

**THE COMMUNICATION AND INFLUENCE OF
CONFIDENCE AND UNCERTAINTY**

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CAROLINE J WESSON BSc

To Mum and Phil.

What men want is not knowledge, but certainty.

Bertrand Russell (1872 – 1970)

A woman's guess is much more accurate than a man's certainty.

Rudyard Kipling (1865 – 1936)

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Abstract

While the social influence of confidence has been shown to be an influential factor in persuasion, previous research, using numerically expressed confidence, has identified a number of factors that mediate its influence (e.g. Paese and Kinnaly, 1993; Price and Stone, 2004; Sniezek and Buckley, 1995; Zarnoth and Sniezek, 1997). However, it is important to take a more ecological approach to this research to look at confidence as it is commonly expressed in our day-to-day lives. Hence, this thesis reports a series of nine inter-linked experiments examining the influence of different levels of *verbal* confidence on choice and interpersonal perceptions. Chapter 2 identifies the levels of confidence associated with some everyday expressions of confidence, expressions that are used as ‘confidence cues’ in subsequent experimental chapters. Chapter 3 examines the influence of confidence cues with different types of task, and Chapter 4 relates these influences to individual differences. Task type is found to have a significant effect on the extent of influence confidence exerts, with Need for Closure further mediating this. Chapter 5 considers our perceptions of speakers who express different levels of confidence. Increasing levels of speaker confidence lead to speakers being perceived more positively in terms of competency, but too much confidence is detrimental in terms of how much a speaker is liked. Chapters 6 and 7 then examine whether these perceptions, and the subsequent use of their information, change when performance feedback is made available. Feedback is shown to have a considerable impact upon these factors, although the influence of confidence does not become redundant. Chapter 8 examines whether our own confidence level affects the extent to which a speaker’s confidence influences us, then Chapter 9 determines if a speaker’s confidence exerts a positive or negative influence, while Chapter 10 investigates how the influence of confidence is influenced by the timing of the advice. Overall, the results indicate that confidence is a potent form of influence, providing evidence that a confidence heuristic is used, whereby a speaker’s confidence is taken as a cue to their accuracy, knowledge, and competency. The extent to which the confidence heuristic is used when making choices strongly depends on one’s own level of confidence, whether this was due to the type of task being tackled, the difficulty of the task, or the timing of the advice, with people relying more on the confidence heuristic as their own confidence decreased. Issues raised by this thesis, and directions for further research are considered in the Discussion.

CONTENTS

Acknowledgements	
Abstract	
Contents	
Table of Contents: Figures	
Table of Contents: Tables	
Table of Contents: Appendices	
Conferences and Publications	

CHAPTER 1 – The Communication and Influence of Confidence

What is confidence?	1
The function of communicating confidence	3
The communication of confidence	5
<i>Numerical and verbal expressions of confidence</i>	6
<i>Confidence-uncertainty continuum</i>	7
<i>Epistemic modality</i>	8
<i>Powerful and powerless speech styles</i>	8
<i>Gender differences</i>	9
<i>Directionality of expressions</i>	10
<i>Variants of uncertainty</i>	11
<i>Non-answers</i>	12
<i>Verbal uncertainty research</i>	12
The influence of confidence in judgement and decision-making	13
<i>Task type</i>	15
<i>Sources of information</i>	16
<i>Group size and consensus</i>	17
<i>Mode of expression</i>	18
<i>Communication channel</i>	19
<i>Levels of confidence</i>	20
<i>Argument quality</i>	23
<i>Accuracy</i>	24
<i>Overconfidence</i>	24
<i>Feedback</i>	26
<i>Individual differences</i>	27
<i>Gender differences in influence</i>	28
Interpersonal perceptions of confidence	29
<i>Trust and expertise</i>	30
<i>Gender differences</i>	31
<i>Too much confidence?</i>	31

Influence of confidence on decision quality	32
The social influence of confidence – theoretical perspectives	33
<i>Influence of confidence within groups</i>	33
<i>Decision-making environment</i>	34
<i>Interpersonal perceptions of confidence</i>	35
<i>Models of persuasion</i>	36
<i>Making Choices</i>	37
<i>Confidence heuristic</i>	38
<i>Contextual framework</i>	41
Rationale	42
Aims of thesis	44

CHAPTER 2 – Pilot Study: Development of Confidence Cues

Introduction	47
Method	49
<i>Participants</i>	49
<i>Materials</i>	49
<i>Procedure</i>	49
Results and Discussion	50

CHAPTER 3 – The Influence of Confidence and Task Type

Abstract	54
Introduction	55
<i>Rationale for Experiment</i>	59
Method	60
<i>Participants</i>	60
<i>Design</i>	60
<i>Materials</i>	61
Intellective task: General Knowledge	61
Judgmental task: Opinions	62
External Judgement task	62
<i>Procedure</i>	63
Results	64
<i>Influence of Confidence Cues on Chosen Answers</i>	64
Intellective task	66
Judgmental task	66
External Judgement task	67
<i>Influence of Confidence Cues on Choice Confidence</i>	68

<i>Influence of Confidence Cues on Perceptions of Speakers</i>	70
Chosen Team-Mate	70
Competency	71
Likeability	71
Speaker Confidence	71
Speaker Gender	72
<i>Summary of Results</i>	72
Discussion	73
<i>Conclusions</i>	77

CHAPTER 4 – Individual Differences in the Influence of Confidence

Abstract	79
Introduction	80
<i>Need for Closure</i>	80
<i>Need for Cognition</i>	81
<i>Rationale for Experiment</i>	83
Method	84
<i>Participants</i>	84
<i>Materials</i>	84
Need for Closure	84
Need for Cognition	84
‘Big-Five’ Personality Factors	84
<i>Design and Procedure</i>	85
Results	86
<i>Covariates</i>	86
<i>Need for Closure</i>	86
Need for Closure and Choice	86
Need for Closure and Confidence in Answers	89
Need for Closure and Perceptions of Speakers	90
Need for Closure – Additional Analysis	91
<i>Need for Cognition</i>	92
Need for Cognition and Choice	92
Need for Cognition and Confidence in Answers	93
Need for Cognition and Perceptions of Speakers	94
<i>Need for Closure and Need for Cognition</i>	94
<i>Gender</i>	94
<i>Summary of Results</i>	95
Discussion	96

<i>Need for Closure</i>	96
<i>Need for Cognition</i>	99
<i>Gender</i>	99
<i>Limitations</i>	99
<i>Conclusions</i>	100

CHAPTER 5 – The Influence of Expressed Confidence on Perceptions of Speakers

Abstract	101
Introduction	102
<i>Speech style and influence/persuasion</i>	102
<i>Speech style and impression formation</i>	103
<i>Speech style and gender</i>	103
<i>Speech style and expressed confidence</i>	105
<i>Rationale for Experiment</i>	105
Method	107
<i>Participants</i>	107
<i>Materials</i>	107
Background	107
Photo line-up	107
Witness testimonies	108
Question sheet	109
<i>Design and Procedure</i>	109
Results	110
<i>Influence of Speaker Confidence on Choice of Answers</i>	110
<i>Influence of Speaker Confidence on Perceptions of Speakers</i>	110
<i>Gender Effects</i>	118
<i>Summary of Results</i>	118
Discussion	119
<i>Conclusions</i>	120

CHAPTER 6 – Perceptions of Confident Speakers and their Judgmental Biases

Abstract	122
Introduction	123
<i>Rationale for Experiment</i>	125
Method	126
<i>Participants</i>	126
<i>Materials</i>	126
<i>Design and Procedure</i>	127

Results	129
<i>Perceptions of Speakers</i>	129
<i>Perceived Accuracy</i>	130
<i>Choice of Team-Mate and Perceptions of Speakers</i>	130
<i>Overconfidence</i>	133
<i>Summary of Results</i>	135
Discussion	136
<i>Limitations</i>	139
<i>Conclusions</i>	139

CHAPTER 7 – Prior Interaction, Feedback and the Influence of Confidence

Abstract	141
Introduction	142
<i>Rationale for Experiment</i>	144
Method	145
<i>Participants</i>	145
<i>Materials</i>	145
<i>Design and Procedure</i>	145
Results	147
<i>Influence of Feedback and Confidence on Choice</i>	147
<i>Influence of Feedback and Confidence on Confidence in Answers</i>	148
<i>Influence of Feedback on Accuracy</i>	149
<i>Influence of Feedback and Confidence on Choice of Team-Mate</i>	149
<i>Choice of Team-Mate and Speaker Agreement</i>	150
<i>Summary of Results</i>	152
Discussion	153
<i>Limitations</i>	155
<i>Conclusions</i>	156

CHAPTER 8 – How does One’s Own Uncertainty affect the Influence of Confidence?

Abstract	157
Introduction	158
<i>Rationale for Experiment</i>	159
Method	161
<i>Participants</i>	161
<i>Materials</i>	161
<i>Design</i>	162
<i>Procedure</i>	162

Results	164
<i>Influence of Confidence on Choice</i>	164
<i>Influence of Confidence on Confidence in Answers</i>	165
Accuracy	167
<i>Influence of Confidence on Choice according to Levels of Overconfidence</i>	167
<i>Influence of Confidence on Choice according to Initial Confidence</i>	168
<i>Changes in Confidence according to Initial Confidence</i>	171
Summary of Results	172
Discussion	173
Limitations	175
Conclusions	175

CHAPTER 9 – The Confidence Heuristic: Positive or Negative Influence of Confidence?

Abstract	177
Introduction	178
<i>Rationale for Experiment</i>	179
Method	180
<i>Participants</i>	180
<i>Materials</i>	180
<i>Design and Procedure</i>	181
Results	183
<i>Confidence Heuristic Use on Choice of Answer</i>	183
Accuracy	184
<i>Confidence in Choice of Answer</i>	184
<i>Ratings of Speakers' Answers</i>	185
<i>Perceptions of Speakers' Overall Accuracy</i>	187
<i>Perceptions of Speakers' Characteristics</i>	188
Summary of Results	192
Discussion	193
Limitations	195
Conclusions	196

CHAPTER 10 - Influence of Confidence in Different Decision-Making Situations

Abstract	198
Introduction	199
<i>Rationale for Experiment</i>	201
Method	203

<i>Participants</i>	203
<i>Task Materials</i>	203
<i>Design and Procedure</i>	204
Results	206
<i>Influence of Speaker Confidence and Decision-Making Condition on Choice</i>	206
<i>Choice according to Speaker Accuracy</i>	208
<i>Accuracy</i>	209
<i>Influence of Speaker Confidence and Condition on Confidence in Choice</i>	210
<i>Influence of Confidence and Condition on Perceptions of Speakers</i>	212
Speaker Accuracy	212
Speaker Confidence, Knowledge, Friendliness, Competence and Trustworthiness	212
Team-Mate	214
<i>Summary of Results</i>	214
Discussion	215
<i>Limitations</i>	218
<i>Conclusions</i>	219

CHAPTER 11 – General Discussion

Discussion of findings	220
<i>Influence of confidence on choice</i>	221
<i>Uncertainty and the influence of confidence</i>	226
<i>Influence of confidence on confidence</i>	228
<i>Interpersonal perceptions of confidence</i>	229
The confidence heuristic	231
Nonverbal communication of confidence	236
Age differences	237
Further research	238
Experimental limitations	239
Applications of research	240
Conclusions	242

REFERENCES	244
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APPENDICES	257
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Table of Contents: Figures

Figure 3.1.	Percentage change in chosen speaker between the control (C) and experimental (E) conditions across intellectual (I), judgmental (J) and external judgment (EJ) task types	66
Figure 3.2.	Percentage change in answer confidence between the control (C) and experimental (E) conditions across task type	69
Figure 4.1.	Percentage change in chosen speaker according to task type, split by Need for Closure	88
Figure 5.1.	Significant interactions relating to perceptions of speakers speaking with different levels of confidence	117
Figure 6.1.	Example slide from PowerPoint presentation.	126
Figure 6.2.	Perceptions of speaker accuracy according to chosen team mate	131
Figure 6.3.	Perceptions of speakers according to chosen team-mate	132
Figure 6.4.	Perceptions of speaker accuracy according to under/overconfidence	134
Figure 7.1.	Mean percentage change in agreement with speakers between feedback conditions	148
Figure 7.2.	Percentage agreement with each speaker according to chosen team-mate	150
Figure 8.1.	Mean percentage change in agreement with speakers	165
Figure 8.2.	Mean percentage change in confidence in answer	166
Figure 8.3.	Change in answers according to initial confidence in answers	171
Figure 9.1.	Example slides from control and experimental conditions	180
Figure 9.2.	Percentage change in choice of speaker's answers between the control (C) and experimental (E) conditions	184
Figure 9.3.	Percentage change in accuracy likelihood ratings of speaker's answers between the control (C) and experimental (E) conditions	186
Figure 9.4.	Significant interactions relating to perceptions of speakers expressing different levels of confidence	191
Figure 10.1.	Example slides from the control and experimental conditions	203
Figure 10.2.	Changes in using different speaker's advice according to condition	208
Figure 10.3.	Change in confidence in answers according to speaker confidence and condition.	211

Table of Contents: Tables

Table 2.1	Mean ratings of expressions, confidence cue level and distribution of cues across experiments	51
Table 2.2	A comparison of mean ratings of confidence cues	53
Table 3.1	Mean percentage of agreement with each speaker across tasks	64
Table 3.2	Mean confidence (%) in answers for agreement with each speaker across tasks	68
Table 3.3	Perceptions of speakers in the presence and absence of confidence cues	71
Table 4.1	Mean percentage of agreement with each speaker across tasks split by high/low Need for Closure	87
Table 4.2	Mean confidence in answers (%) for each task, split by high/low Need for Closure	90
Table 4.3	Mean confidence in answers (%) for each task, split by high/low Need for Cognition	93
Table 5.1	ANOVA Summary Tables	111
Table 5.2	Ratings of speakers in the absence and presence of confidence cues	115
Table 6.1	Perceptions of speakers using different confidence levels	129
Table 7.1	Mean percentage of agreement with each speaker in each Feedback Condition	147
Table 7.2	Mean percentage of confidence in answers for agreement with each speaker in each Feedback Condition	149
Table 8.1	Initial, final and change in choice in the absence and presence of confidence cues	164
Table 8.2	Initial, final and change in mean confidence in answers in the absence and presence of confidence cues	166
Table 8.3	Mean accuracy scores	167
Table 8.4	Initial, final, and changes in agreement with each speaker according to initial confidence	170
Table 8.5	Initial, final, and changes in confidence in answers according to initial confidence	172
Table 9.1	Mean percentage of agreement with each speaker	183
Table 9.2	Mean confidence in answers for agreement with each speaker	185
Table 9.3	Mean ratings of accuracy likelihood for each speaker	185
Table 9.4	Mean estimates of perceived speaker accuracy	188
Table 9.5	Ratings of speakers in the absence and presence of confidence cues	189

Table 10.1	Mean percentage agreement with each speaker	206
Table 10.2	Mean percentage of agreement with each speaker according to speaker accuracy	209
Table 10.3	Mean confidence in chosen answers	210
Table 10.4	Estimates of speaker accuracy	212
Table 10.5	Perceptions of speakers split by levels of speaker confidence	213

Table of Contents: Appendices

APPENDIX A	Chapter 2: Pilot Study Questionnaire
APPENDIX B	Chapter 2: Pilot Study Descriptive Statistics and T-tests
APPENDIX C	Chapter 3: Examples of Task Materials Chapter 3: Example of Debriefing Details
APPENDIX D	Chapter 3: Data
APPENDIX E	Chapter 4: Personality Questionnaires
APPENDIX F	Chapter 4: Data
APPENDIX G	Chapter 5: Examples of Task Materials
APPENDIX H	Chapter 5: Data
APPENDIX I	Examples of Questions used in Chapters 6, 7, 9 and 10 Chapter 5: Overconfidence Questionnaire
APPENDIX J	Chapter 6: Data
APPENDIX K	Chapter 7: Data
APPENDIX L	Chapter 8: Pilot Study Means and Questions used in Main Study
APPENDIX M	Chapter 8: Data
APPENDIX N	Chapter 9: Data
APPENDIX O	Chapter 10: Data

Conferences and publications arising from this thesis

Wesson, C. & Pulford, B. (2006). Verbal expressions of confidence and doubt. *Paper submitted to Behavior Research Methods.*

Wesson, C. & Pulford, B. (2005). Individual differences in the influence of confidence: The effects of Need for Closure and Need for Cognition [Abstract]. *Proceedings of the British Psychological Society, 113(2)*, 163.

Wesson, C. (2004). Factors mediating the influence of another's confidence: The role of task type on choice and confidence in choice. *Paper presented at the PsyPAG Annual Confidence, July 2004.*

Wesson, C. (2004). Factors mediating the use and influence of another's confidence. *Paper presented at Departmental Seminar Series, University of Wolverhampton, May, 2004*

Wesson, C. (2003). The Communication and Influence of Confidence and Uncertainty. *Paper presented at the School of Applied Sciences Research Seminar Series, University of Wolverhampton, June, 2003*

CHAPTER 1

The Communication and Influence of Confidence

What is confidence?

The aim of this thesis is to consider if, and how, we are influenced in the judgements we make, and the decisions we opt in or out of, by the confidence that another person expresses. Confidence can be defined as having a firm trust in one's ability, having a sense of reliance or certainty. When making decisions or expressing our knowledge, opinions or beliefs about something we will have a feeling of confidence that accompanies this. When we are sure that the option we are choosing is the right or best one we can be said to have confidence or certainty in that choice. In this way we take confidence as being a person's belief that a statement represents the best possible response and it describes a person's strength of belief about the accuracy or quality of a prediction, judgment or choice (Peterson and Pitz, 1988; Sniezek, 1992). Confidence is, however, a continuum - one may have complete confidence or certainty in one's position, or there may be an element of doubt in what one believes, i.e. uncertainty or a lack of confidence. Confidence in one's choice is the converse of uncertainty in one's choice and the two terms can be seen as referring to the same construct (Sniezek, 1992). The terms confidence and certainty will be used interchangeably in this thesis, as conversely will a lack of confidence and uncertainty.

How does confidence relate to making judgments and decisions? The level of confidence or uncertainty associated with a judgement determines if and how that judgement will be used – not only by ourselves, but also by others (Sniezek, 1992; Sniezek and Henry, 1989). Hence, confidence can determine what course of action we take. If we have complete confidence in a belief, then common sense dictates that this will strongly influence the choice we will go with (the terms decisions and choices will be used interchangeably in this thesis). For example, if we are confident that it is going to rain then we will choose to take an umbrella when we go shopping, whereas if we are certain it is going to be sunny all day we will not. We will then be confident that the choice was the right one. However, we are not always confident in our decisions. The sky outside may be grey but we still do not know if it is going to rain or not. Should we take the umbrella with us and risk the inconvenience of having to walk round with it unused all day, or should we leave it at home, and risk getting drenched?

As much of the knowledge that we possess is uncertain (Peterson and Pitz, 1988) we often have the need to seek information, advice and opinions from others. Although many judgments are made by individuals they are typically formed in a social context

(Sniezek and Henry, 1989). Ultimately these decisions are down to the individual, but that person has a number of sources of information that they can consult before reaching their decision. In addition to the objective information, such as facts and statistics, an individual is also surrounded by the subjective judgements of others (Sniezek and Henry, 1989). The amount of confidence with which these subjective judgements are expressed can influence our subsequent behaviour, since we use confidence as a way of assessing the quality of a speaker's information. In the case of whether it will rain or not we may seek information from a television weather forecaster. If they say that they are sure it will rain then we are more likely to take the umbrella with us than if they say they're fairly sure it will rain. This example is a fairly light-hearted one, and the consequences of making the wrong decision are no more severe than a minor inconvenience. However, we sometimes have to make important or difficult decisions, in which making the right or wrong choice is more serious. Is the person on trial guilty? Is the evidence of an eyewitness accurate? Which political party do we vote for? Do we opt to give our child the MMR vaccine?

Although we may base our decisions on how confidently someone expresses their information, are we right in doing so? A great deal of research has focused on the relationship between one's confidence level and the accuracy of their information, finding that many people show a tendency for overconfidence: their subjective confidence exceeds the objective accuracy of the outcome (Lichtenstein, Fischhoff, and Phillips, 1982). Not surprisingly decisions based on overconfidence, or even miscommunicated confidence, can have serious consequences. For example, in relation to eyewitness evidence, confidence can be seen as the witness's belief in the accuracy of their memory (Wells and Murray, 1984). The eyewitness's confidence can affect the decisions of the prosecution, in terms of the reliability of the evidence and consequently whether to go to trial or not. Indeed for thirty years, since the *Neil v. Biggers* (1972) case, American courts have used an eyewitness's confidence to determine the accuracy of an eyewitness's identification (Wells, Olson, and Charman, 2002). This view has long been held, for example Deffenbacher (1980) cites Gardner (1933) as saying that a testimony given in an assertive and positive way is treated by the courts as being accurate and truthful. However, Wells and Murray (1984) questioned whether eyewitness confidence should be used in this way. It would appear not, given that a study of the causes of miscarriages of justice in the US revealed that more than three quarters were based upon extremely confident, but mistaken, eyewitnesses (Wells,

Small, Penrod, Malpass, Fulero, and Brimacombe, 1998). As Loftus (1979) warns, high confidence should not be taken as an absolute guarantee of anything.

Given the potential consequences of basing our decisions on the level of confidence someone expresses in their information or advice it is surprising how little research has been carried out in this area. In relation to advice seeking, Yaniv (2004) observes that the act of seeking advice occurs far more often in everyday life than the amount of research dedicated to this area would suggest. More specifically, Zarnoth and Sniezek (1997) note that confidence research has focused on identifying the various determinants of confidence, or what causes us to be confident, whilst ignoring the influence that this confidence has, not just on ourselves but also on others. This latter issue is the focus of this thesis, which aims to answer some questions regarding if, how, and why we are influenced by the confidence expressed by other people in their knowledge, judgements and opinions. To begin with, this review of the literature will consider how we communicate confidence and what the purpose of this communication is. Then the focus will turn to how communicated confidence can influence a listener, before considering why this should be, drawing upon theoretical perspectives identified in the literature. Finally, the aims of the thesis will be laid out in more detail.

The function of communicating confidence

We frequently rely on advice or information passed on by others in a variety of realms, such as relationships, law, finance, health and education (Nelson, Kruglanski, and Jost, 1998). In receiving this advice, and deciding whether or not to take it, we must decide on the extent of the advisors' knowledge. But how do we know what they know? Trying to establish what other people know is a primary basis of interpersonal communication, playing a key role in social influence and decision-making (Nelson et al., 1988).

When we ask for advice, or are given information by a speaker we must determine the quality of that information. Is it reliable, accurate, or justified? We can use our own knowledge to determine how good the information we are receiving is (Fussell and Krauss, 1991; Nickerson, Baddeley, and Freeman, 1987; Nickerson, 1999). But many decisions are made under uncertainty - in fact we are most likely to seek advice when we are uncertain. If we do not know something ourselves, we cannot use our own knowledge as a way of assessing another's knowledge and so we must rely on other cues to help us, such as how confidently a speaker expresses their information.

A primary objective of the expression of confidence is to communicate information to another person, often a decision-maker (Sniezek and Van Swol, 2001). In other words we are communicating what we know about a given subject or issue – our epistemological knowledge. As Fischhoff, Slovic, and Lichtenstein (1977) point out, two aspects of knowledge are what we believe to be true and how confident we are in that belief. When someone is speaking to us, they are not only passing on information, they are also communicating their strength of belief in the validity of that information. We in turn, base our own strength of belief about the validity of the information that we are receiving on the level of confidence that is being expressed.

Grice's (1975) 'logic of conversation' states that speakers should adhere to the maxim of quality, by not saying anything they believe to be false, or for which they lack evidence. In other words, a speaker should say that they're uncertain when they are, as to do otherwise could suggest certainty in one's belief. Such rules of conversation apply most directly to situations in which people are attempting to exchange information or get things done, such as in a decision-making environment. Communicated information is viewed as coming with a guarantee of relevance and on this basis, listeners are entitled to assume that the speaker is trying to be informative, truthful, relevant and clear (Schwartz, 1996). The expectation that a person should follow these rules is seen in many applied settings. For instance, when giving evidence in a court the witness gives an oath that '*...the evidence which I shall give shall be the truth, the whole truth and nothing but the truth.*'

A listener's task is to determine the quality of the information that they are receiving, and a speaker must assess the validity of their own beliefs through a process of metacognition – cognitions about cognitions (Lories, Dardenn, and Yzerbyt, 1998; Nelson et al., 1998). Olson and Astington (1993) distinguish between language *for* thinking, involving numerical systems and the verbalisation of these, and language *about* thinking, language representing and describing the thinking process. The latter encompasses ordinary language, covering terms such as *think*, *know* and *believe*. It is suggested that talking about cognition - using language that represents our mental states - represents metacognitive talk, and may constitute 'sincerity conditions' for speech acts (Astington and Olson, 1990; Kahneman and Tversky, 1982; Olson and Astington, 1993). Indeed, "a common function of mental terms – besides referring to mental states – is to mark the degree of certainty with which a statement is made" (Furrow and Moore, 1990, p. 377).

So far the story is straightforward. We truthfully convey our confidence to indicate the quality of what we are saying. Hence, the level of confidence that we express provides a listener with valid cues to our knowledge level, strength of belief, and the accuracy of our information. However, in reality this is not always the case. Firstly it can be difficult to identify and use valid cues of another person's accuracy, especially when information can be intentionally or unintentionally miscommunicated (Sniezek and Henry, 1989). This miscommunication may occur because the language used is ambiguous or imprecise (Sniezek and Henry, 1989). But we may also miscommunicate our confidence more intentionally, expressing an inappropriate level of confidence for reasons of impression-management (Thomas and McFadyen, 1995). A speaker may want to appear more knowledgeable than they really are, and so overstate their confidence relative to their knowledge level. For example, a candidate at a job interview who wants the interviewers to believe they possess certain skills may confidently say they can do something that they have little experience of doing, in the hope of maximising their chances of landing the job.

Teigen (1990) suggests that there is a 'preciseness paradox'. People are not always truthful or accurate in their responses, but bluffs or guesses may still be confidently voiced despite being typically false. Alternatively, we may want a particular outcome to occur, and so miscommunicate confidence to get our own way. We may also miscommunicate our confidence for less selfish reasons, perhaps simply because we are lacking self-confidence. A lack of self-confidence, or social confidence, may inhibit the behavioural expression of confidence on an issue, even if that issue is important to the individual (Scherer, 1978; Visser, Krosnick, and Simmons, 2003). Given that a great deal of important information can be communicated by expressing our confidence in something, it is important to consider the ways in which we can do this.

The communication of confidence

When communicating what we do or do not know, we may express ourselves using either quantitative or qualitative terms. Quantitative expressions convey confidence in numerical terms, and we may use these to represent our belief that a particular event will occur. For example, when asked what we think the weather will be like the next day we may state, "there's a 50/50 chance it will rain". Alternatively we may attach a confidence rating to an answer, such as saying "I'm 90% sure it will rain". Confidence research traditionally treats confidence in this way, as a subjective probability, using

numerical scales on which to measure confidence. Conversely we may express our confidence in qualitative terms, through a range of familiar expressions relating to expectations, epistemic modalities and subjective probabilities. Not only can confidence be communicated verbally, through the words that we use to express ourselves with, it can also be communicated nonverbally, through body language and paralinguistics. However the focus of this thesis is on the verbal communication of confidence in the written form, as this reflects much of the communications we receive in the modern age, for instance in the form of emails and texts. Hence, a review of literature relating to the nonverbal communication of confidence will not be conducted here, although consideration will be given to the nonverbal communication of confidence in Chapter 11, the General Discussion.

Numerical and verbal expressions of confidence

Confidence may be expressed numerically as a subjective probability – formally, the mapping of a person’s belief onto a real number between 0, indicating an impossible event, to 1, indicating a certain event, although this is more commonly translated into a percentage (e.g. assigning a probability of .5 to an event occurring may also be expressed as a 50% chance of that event happening). “We use the term ‘subjective probability’ to denote any estimate of the probability of an event” (Kahneman and Tversky, 1982, p. 32).

While people appear to have a preference for receiving numerical probabilities, as communicators they often feel more comfortable using verbal phrases (Brun and Teigen, 1988; Clark, 1990; Druzdzel, 1989; Hamm, 1991; Renooij and Witteman, 1999). Verbal expressions of confidence are commonly used to convey chances and beliefs, not only by lay people but also by experts such as doctors, lawyers, and politicians. For example, a doctor may tell a patient, ‘I *think* X is the problem’, and a lawyer may say, ‘I *believe* you have a good case’.

The preference for receiving numerical expressions of confidence may be due to their precision (Budescu and Wallsten, 1985; Olson and Budescu, 1997; Renooij and Witteman, 1999). Numerical expressions convey a definite, quantifiable amount of confidence, allowing us to precisely express how confident or uncertain we feel to others, who in turn understand the level of confidence that we are conveying. Druzdzel (1989) though argues that numerical expressions actually carry a misleading *illusion* of precision suggesting that the probability of an event is measurable, which it frequently

is not. Indeed, Renooij and Witteman (1999) suggest that people prefer to use verbal expressions rather than numerical, except in situations where there is an objectively measurable outcome. The preference for expressing confidence using verbal expressions may be because people do not feel familiar with the concept of probability, or have trouble attaching a numerical value to their beliefs (Renooij and Witteman, 1999). Hence, when people communicate confidence and probabilities, more often than not they choose to do so using words rather than numbers.

Verbal expressions of confidence do have their disadvantages, mainly because they are vague, do not clearly denote a particular amount, and can be extremely imprecise and ambiguous (Snizek and Henry, 1989). However, Renooij and Witteman (1999) argue that numbers may be just as vague as words when expressing uncertainty, and are just as easily influenced by context and personal opinions as verbal expressions are. In fact the preference for verbal or numerical expressions is not universal across people, events or situations, and rather depends, in part, on the degree of vagueness, source of uncertainty and the nature of the communication (Olson and Budescu, 1997). For instance, Budescu, Weinberg, and Wallsten (1988) found that people preferred verbal expressions when dealing with gains, and numerical estimates when dealing with losses.

It would seem then that people view everyday events according to psychological or subjective probabilities rather than mathematical or objective probabilities (Cohen, 1964). The richness and variability of verbal expressions means that they are capable of communicating more information than numerical expressions are, conveying the vagueness and imprecision of much real world information, and making them more suited to how individuals think about uncertainty in everyday life (Druzdzel, 1989; Hamm, 1991; Moxey and Sanford, 1993; Windschitl and Wells, 1996). Natural language is more understandable and easier to digest than its numerical equivalent, and can be used to communicate a range of confidence.

Confidence-uncertainty continuum

We use verbal expressions of subjective probability to indicate our degree of certainty, with terms being placed along a continuum, indicating increasing certainty: *suppose*, *think*, *sure*, *certain*, and *positive* (Berry, 1960; Foley, 1959). Consistent findings for the ordering of these expressions on the continuum have been found in other languages, such as Hebrew (Beyth-Marom, 1982), French (Fabre, 1991) and Dutch (Renooij and Witteman, 1999).

Many other intermediate terms of confidence are used in addition to those mentioned above, along with the addition of many different intensifiers and qualifiers. Qualifiers are words used to strengthen or weaken the belief that is being communicated. Adding the qualifier *probably* to a statement is going to convey to a recipient that the communicator has less strength in their belief than one who adds the qualifier *certainly*. For example, if asked the question, “Which city is the capital of Australia?” the response “I *think* that the answer is *probably* Canberra” conveys less confidence than “I *think* that the answer is *certainly* Sydney”, despite the former response being correct. As with expressions of subjective probability, qualifier terms of certainty are represented by degrees of quantification: possibility-likelihood-certainty (Feezel, 1974). The way in which a speaker expresses their level of confidence conveys what a speaker knows or believes and so can be taken as expressions of epistemic modality.

Epistemic modality

Expressions of epistemic modality relate to the speaker and their state of belief, knowledge, or their degree of certainty, signified by words such as *know* and *think*, along with the degree of likelihood that something is the case, with the use of words such as possible, probable, and certain (Westney, 1986).

In everyday language, belief terms function to regulate the degree of certainty with which a statement is expressed and the strength of epistemic modality may be structured in terms of likelihood, from possible to probable to certain (Moore, Harris, and Patriquin, 1993; Westney, 1986). Strong (certain) values may be represented by terms such as *I know*, *I'm sure*, *It's certain*. Weak (possibility) values are those such as *It's possible*, *perhaps*, *may*, *might*. Intermediate (probable) values may be represented by terms such as *It's probably*, *likely*, *I think*. So for instance, *know* indicates that the speaker is more certain than they are when they say *think*.

Powerful and powerless speech styles

One's degree of confidence or uncertainty may also be communicated via the speech style one opts for. Speech style refers to linguistic features that determine *how* a message is said rather than *what* is said in terms of verbal content. An aspect of speech that can lead to attributions being made about the speaker is how powerful their speech style is, as some words or phrases are associated with powerful persons, whereas others are associated with those who are weak or powerless. O'Barr (1982) defines powerless

speech as being characterised by a higher frequency of hedges, intensifiers, hesitations and gestures, whereas powerful speech should be low these.

What is the result of using 'powerless' speech? On the positive side it shows politeness, but on the negative side it may make the speaker appear uncertain (Bradley, 1981; Myers, 1991). Powerful speakers may be perceived as having more confidence in their position due to the straightforwardness and clarity with which they present their communication, whereas powerless language may indicate a speaker's lack of confidence (Berger and Bradac, 1982; Bradley, 1981; Erickson, Lind, Johnson, and O'Barr, 1978; Leippe, Manion, and Romanczyk, 1992; Parton, Siltanen, Hosman, and Langenderfer, 2002).

Why does powerless speech indicate uncertainty? Aspects of powerless speech, such as tag questions and disclaimers, express uncertainty and marginal commitment to one's remarks, thus indicating a lack of confidence. A tag question can be defined as midway between an outright statement and a yes-no question, in that it is less assertive in the former and more confident in the latter (Lakoff, 1975). The questioning forms of tag questions request the listener's confirmation of the truth of an assertion. So if someone says, "That's the correct answer, isn't it?" they are seeking confirmation, taking a tentative approach and as such they are communicating uncertainty in their statement.

Disclaimers - introductory expressions that may explain or excuse what is to follow - may also communicate uncertainty. Bradley (1981) notes that whilst linguists have identified at least five different kinds of disclaimer, only two project uncertainty: hedging (e.g. *I'm no expert but...*) and cognitive disclaimers (e.g. *I could be mistaken but...*). However, Myers (1991) suggests that hedges may be used to convey politeness rather than uncertainty alone, making it difficult to establish a person's true meaning. For example, hedging a criticism towards a suggestion for reasons of politeness would be difficult to distinguish from expressing uncertainty in that suggestion.

Gender differences

There have been suggestions that the use of a powerless speech style is more characteristic of women's speech than of men's, with differences in speech style resulting from, and reinforcing, sex stereotypes (Bradley, 1981; Lakoff, 1975). Hence, the way men speak maintains images of their being assertive, self-confident and definite whilst women's speech conveys them as non-assertive, vague and lacking in confidence

- attributes traditionally associated with Western cultures stereotyped expectations of feminine behaviour. However, Newcombe and Arnkoff (1979) point out that Lakoff's observations were presented without the support of empirical evidence. Furthermore, times have changed in the last 30 years, and such gender specific stereotypes may no longer be applicable - in the west at least.

There is evidence though to suggest that sex differences in language may be more apparent in mixed-sex rather than same-sex interactions (Carli, 1990; McMillan, Clifton, McGrath, and Gale, 1977). This may be because listeners feel less confident attributing a speaker's speech style to their level of certainty when the speaker is of the opposite sex, presumably because the listener's own speech style cannot be used as a reference point (Erickson et al., 1978). Carli (1990) views differences in language usage in mixed-sex and same-sex interactions as a function of status differences between men and women, with women said to possess lower status in Western society than men do.

Furrow and Moore (1990) point out that the issue is not that women use aspects of powerless speech more than men, but rather that they use them more to express uncertainty. In support of this they cite Holmes' (1986) observation, that women's use of phrases such as "I know" and "I think" functioned more to express confidence and certainty than tentativeness and uncertainty, contrary to Lakoff's (1975) suggestion that women used terms such as "I think" to express uncertainty. However, it has also been argued that the use of tentative, or powerless language is due to status or social power alone, with men and women using powerful speech being viewed more favourably than those using powerless speech (Erickson et al., 1978; Lind and O'Barr, 1979). Powerless communicators may be perceived less favourably not because of their gender, but because of the extra cognitive effort that it takes to understand their more complex manner of communication.

Directionality of expressions

Verbally expressing one's level of confidence does not only convey how confident or uncertain we are in a belief or a given piece of information, it can also indicate the directionality of our uncertainty. It has been argued that numerical expressions of confidence are uni-directional, in that they either affirm or negate a statement, whereas verbal expressions can be bi-directional, with some expressions suggesting a continuum from weak-strong affirmation, whereas others suggest a weak-strong negation (Teigen and Brun, 1995; Teigen and Brun, 1999). Different advice may be given, or different

action taken, depending on directionality of the phrase used, even when both expressions refer to the same objective probability. Phrases may be termed positive when they ask the listener to consider the outcome described, e.g. *likely*, whereas negative phrases suggest negations of the described outcome, e.g. *unlikely*, (Teigen and Brun, 1999).

Similarly, Kahneman and Tversky (1982) suggest that in the everyday usage of language, the notion of probability refers to several distinct states of mind;

A statement of confidence expresses one's uncertainty in a prediction, estimate or inference to which one is already committed. Thus, it is natural to ask, "how confident are you that you are right?" but it is anomalous to ask, "how confident are you that you are wrong?". Confidence is the subjective probability or degree of belief associated with what we 'think' will happen (Kahneman and Tversky, 1982. p.150).

In relation to this, Teigen (1990) found that when people were asked how confident they were about the believability of a statement, people preferred specific (numerical) to more general (verbal) statements. However, when asked which statements they felt most sceptical about, they again chose the specific statements, which aroused their suspicion.

One's choice of expression can indicate not only the direction of one's confidence but also the source of one's uncertainty. This will be discussed in the next section.

Variants of uncertainty

A distinction can be made between uncertainty attributed to the external world, or our state of knowledge in relation to a public body of knowledge, and uncertainty attributed to one's own mind, or one's own ignorance, rather than to external forces (Howell and Burnett, 1978; Kahneman and Tversky, 1982). As such, internal uncertainty refers to events which one can control, and external uncertainty to those that cannot be controlled (Howell and Burnett, 1978).

Kahneman and Tversky (1982) point out that from a Bayesian perspective all probabilities are subjective and personal, whereas natural language differentiates between internal and external uncertainty. They suggest that external and internal uncertainties are often distinguished by the use of a personal pronoun. In this way "*It is uncertain that...*" refers to external, real world, uncertainty, whereas "*I am uncertain*

that...” refers to internal uncertainty, or degree of confidence. Fox and Irwin (1998) distinguish internal and external statements in a slightly different way, proposing that internal phrases convey knowledge of one’s own abilities, e.g. “I am *fairly sure* that...” or “I am *reasonably confident* that...”, whereas external phrases reflect external probabilities, e.g. “I think there is a *good chance* that...” or “I think there is a *high probability* that...”.

Non-answers

A speaker’s non-answers can also convey their level of uncertainty in an answer (Smith and Clark, 1993). Non-answers such as “I can’t remember” and “I don’t know” convey different levels of uncertainty. Saying that you can’t remember suggests that you may know the answer but you just can’t bring it to mind immediately – if faced with options, such as multiple choice questions, it would suggest that you may recognise the answer. Saying “I don’t know” on the other hand indicates less confidence, as it is an outright statement of not having that knowledge. Smith and Clark suggest that the use of non-answers such as “I can’t remember” may be used to save face, as the respondent wants to point out that they do in actual fact know the answer but they can not recall it at present.

Verbal uncertainty research

According to Druzdzel (1989), the main question verbal uncertainty expression researchers have been asking is “do the verbal uncertainty phrases have a reasonably precise, communicable probabilistic meaning”? This has focused on the mapping of quantitative terms to qualitative terms and back again. The literature on this area is fairly extensive and will not be discussed here at length (see Clark, 1990, and Druzdzel, 1989, for reviews of verbal uncertainty expression research). The main findings from these literature reviews are that there is a great deal of between-subject variability in the numerical values assigned to expressions of confidence/subjective probability, but considerably less within-subject variability (Clark, 1990; Druzdzel, 1989). Furthermore, numerical and verbal expressions of confidence/uncertainty are deemed to be interchangeable, with neither being better or worse than the other, and both being sufficient for communicating uncertainties (Clark, 1990; Renooij and Witteman, 1999).

Druzdzel (1989) suggested that an area of research worth pursuing is to combine the findings of verbal uncertainty research with that of human reasoning under uncertainty,

as the latter area often uses numerical probabilities. This can also be applied to judgement and decision-making research. Specifically, whether the biases demonstrated in such experiments also appear if verbal expressions are used, and if so, do the magnitudes of such biases change. As many of the decisions that we make in our daily lives are based on beliefs concerning the likelihood of uncertain events, beliefs that are usually expressed in terms of verbal probabilities, by statements such as, ‘I think that...’, ‘Chances are...’, and ‘It is unlikely that...’ (Tversky and Kahneman, 1982), this is an area worthy of further research. Although we may prefer to receive numerical expressions of confidence, the review of the literature has shown that we tend to express our confidence in more natural language. Given this, it is surprising that much of the research into confidence relies on the numerical expression of confidence in terms of probabilities. The research in this thesis aims to rectify this by using verbal expressions of confidence.

Throughout this thesis the source of communication will be referred to as the speaker and the recipient as the listener, because although information will be conveyed using written statements, most of the conclusions will likely apply more generally to situations in which information can be transmitted through alternative modalities such as speech.

The influence of confidence in judgement and decision-making

The review of the literature so far has shown that there are many different ways in which we can communicate our confidence to others. We have also seen that by communicating our confidence we can indicate our strength of belief in the information that we are imparting to others, whether the level of confidence that we opt to use is appropriate or not. But what is the influence on other people when we express different levels of confidence?

The confidence that a speaker expresses can influence us in a number of ways: it can influence the choices that we make, as well as influencing how we perceive that speaker. However, speech style research has focused on impression formation but not, as Holtgraves and Lasky (1999) observe, on how persuasive the use of powerful and powerless speech is. In the realm of judgment and decision-making on the other hand, confidence can be considered from two perspectives: as an outcome of the decision process and as a factor that influences the decision process (Sniezek and Buckley, 1995; Sniezek and Henry, 1989). Most research has focused on the former, identifying what

makes people confident (e.g. Bradfield, Wells, and Olson, 2002; Gill, Swann, and Silvera, 1998; Heath and Gonzalez, 1995; Kelley and Lindsay, 1993; Koehler, 1991; Wells and Bradfield, 1999). The relationship between a person's confidence and the quality, or accuracy, of their information has been of particular interest, with the prevalent finding being that people are overconfident, which has in turn spawned a body of research interested in finding out what causes people to be overconfident (see Lichtenstein et al., 1982 for an overview). However, what the influence of confidence, whether biased or not, is on other people has been relatively ignored (Budescu et al., 1988; Zarnoth and Sniezek, 1997), although recent research by Wheatcroft, Wagstaff, and Kebbell (2004) have looked at a forensic application. How do we perceive confident speakers, and what influence does a speaker's confidence have on our choices? The lack of research relating to the influence of confidence, specifically in relation to the choices we opt in and out of is surprising as we frequently base decisions, or form opinions, on the advice or information communicated to us by other people.

Communicating how confident we are conveys information to other people, for example how strongly we hold a belief, or our apparent level of knowledge in a given subject area. This not only serves to inform others, but can also be used to persuade others. Indeed, London, Meldman, and Lanckton (1970) suggest that it is the expression of confidence that persuades people during a discussion, stating that, "the single significant behavioral difference between persuaders and persuadees was in the expression of confidence" (p. 82).

Research shows that people who confidently express their views exert more influence on the choice behaviour of others than less confident people do, and a decision-maker is more likely to accept the recommendation of an advisor as that advisor's confidence increases (Gill, Swann, and Silvera, 1998; Sniezek and Van Swol, 2001). This has been found in many different areas, from knowledge-based tasks (Lee, 2005; Paese and Kinnaly, 1993; Sniezek and Buckley, 1995; Sniezek and Van Swol, 2001), and perceptual identification tasks (Pulford and Colman, 2005), to jurors' verdicts and the acceptance of eyewitness testimonies (Leippe, Manion, and Romanczyk, 1992; London et al., 1970; Wells and Murray, 1984). However, not all research has found confidence to be an influential factor (Sniezek, 1989; Sniezek and Henry, 1989; Zalesny, 1990). Why is this? Zarnoth and Sniezek (2002) suggest that rather than this indicating that confidence is a weak or unpredictable aspect of persuasion, it may just be that the social influence of confidence is mediated by other

factors. Some of the factors that could lead to the conflicting research findings are identified below.

Task type

Zarnoth and Sniezek (1997) suggest that the influence confidence has on our decisions may differ according to the type of task undertaken. They provide evidence for this in their review of the literature, finding that confidence predicted influence on recognition tasks (Hinsz, 1990) and maths puzzles (Johnson and Torcivia, 1967), but not on tasks such as marketing forecasts (Sniezek, 1989) and mock jury verdicts (London, 1973). They suggest that confidence predicts influence on tasks that are intellectual but does not, or does but to a lesser extent, on tasks that are judgmental.

Tasks may be placed along a continuum, anchored at either end by intellectual and judgmental tasks (Laughlin and Ellis, 1986). Intellectual tasks are problems or decisions for which there exists a demonstrably correct answer, the accuracy of which can be proven. Judgmental tasks, are evaluative or aesthetic judgements for which there does not exist a demonstrably correct answer, and involve evaluating the problem according to preference. Tasks may lie on a variety of locations along the continuum. Some are highly intellectual (e.g. general knowledge) or highly judgmental (e.g. opinions), whereas others are less so (Zarnoth and Sniezek, 1997). For instance, forecasts are less judgmental than opinions because a correct answer does eventually become available.

To investigate whether the influence of confidence varied on different types of task, Zarnoth and Sniezek (1997) presented participants with multiple-choice questions covering six different task types. Participants chose their answers and provided numerical estimates indicating how confident they were that they had chosen the correct response, first alone then again as a member of a group. Higher confidence led to group members being more influential, regardless of the accuracy of their answers and the type of task they were completing, although confidence exerted greater influence on intellectual than on judgmental tasks. It is suggested that both confidence and accuracy exert an influence, but the influence exerted by accuracy is strongest on intellectual tasks, but the influence that can be attributed to confidence is fairly constant regardless of accuracy or task type. Further research relating to a speaker's accuracy will be discussed later in this chapter.

Although the results from Zarnoth and Sniezek's study indicate that there are differences in the influence of confidence depending on whether a task is intellectual or

judgmental, the full effect of task type may have been obscured as a result of combining the tasks. Recall that 6 tasks were used in this study, each representing a different position on the intellectualive-judgmental task type continuum, which were then combined to produce two task type categories: either intellectualive or judgmental. However, there is still variation within these categories with regards to the influence of confidence. For instance, the intellectualive category consisted of a very intellectualive task at one end, in the guise of difficult maths questions, and a less intellectualive task, leaning towards judgmental, in the form of analogies, at the other end. Differences in the influence of confidence on these two tasks that fall within the same task type category were observed. The most confident group member's response was chosen more frequently on the difficult maths task (dyads: 88% and pentads: 70%) than on the analogies task (dyads: 72% and pentads: 58%). The influence of confidence on the analogies task seems closer to that observed on the opinion-based task (dyads: 67% and pentads: 50%), despite this being classed as the most judgmental task. Therefore to understand more fully the way in which task type may mediate the influence of confidence it may be beneficial to use more discrete categories of task type.

Additionally, Zarnoth and Snizek view judgmental tasks as being the most difficult tasks on account of the demonstrability of a correct answer. However, a decision-maker could take a different view, and may instead see tasks for which they can generate an answer – any answer, regardless of its demonstrability - as being 'easier'. Hence, it may not be the type of task per se that we are tackling that mediates the influence of confidence but how much information the task itself allows us to bring to it.

Sources of information

If a task allows a decision-maker to bring information to it, then that decision-maker can utilise internal information, or their own knowledge concerning the task in hand. Alternatively the decision-maker may have to utilise external information, taking advice from others (Snizek and Buckley, 1995).

Snizek and Buckley propose that *when* we receive another's input is important in determining which source of information we use. If advice from another person comes after we have made an initial decision then we will already have accessed internal information so we can choose to use or ignore the external information subsequently received. Other times we may receive advice before making our initial decision. This gives a decision-maker the opportunity to use information from internal and external

sources, but it also means that they could forgo their own knowledge and just follow the information provided by another. In other situations we may have to make a decision blindly, having only external information to rely upon, for example when we have no knowledge in a particular domain.

Although Sniezek and Buckley found the most confident person exerted the most influence upon the choices people made, this advice was followed to different degrees depending upon when it was received. When an initial decision was made before receiving input, the most confident advisor's recommendation was followed 63.1% of the time, whereas receiving input prior to making any form of decision resulted in the most confident advisor's recommendation being followed on 70.6% of occasions. When the decision-maker had to rely solely on the input of another they followed the most confident advisor's recommendation 90.2% of the time.

Sniezek and Buckley's methodology allows for some consideration to be given to the extent to which an individual relies upon their own knowledge, compared to knowledge offered by another person. However, it still does not address the issue of how easily an individual can bring an answer to mind, and whether this ease of generating an answer mediates the influence of confidence. Instead the study suggests that a speaker's confidence can curtail a listener's information processing, in terms of generating alternative answers once this external information has been received. It would be worthwhile therefore to take into account task difficulty, as opposed to just task type, and what sources of information are called upon as a function of this.

In addition to the sources of information one uses, the number of external information sources available may also be a factor in the influence of confidence. Of relevance here is the number of people within a decision-making group.

Group size and consensus

The number of people in a group can dampen the influence of the most confident group member. Zarnoth and Sniezek (1997) compared groups with two and five members, finding that the most confident group member's response was chosen more frequently within the smaller group (72% vs. 57%).

However, the most confident group member may only exert the most influence when all of the group are in disagreement. When group members agree on an answer confidence plays a subservient role, with a speaker's confidence being a less powerful persuader than advisor consensus (Sniezek and Buckley, 1995). Here it does not even

matter how confident the group members are, as the number of people being in agreement with one another has the strongest influence. Indeed, the tendency to go along with the consensus opinion was so prevalent that it occurred even when the confidence expressed in that opinion was so low it indicated that the answers were mere guesses. Problems relating to group decision-making are highlighted later on in this chapter, under the sections on the influence of confidence within groups, and decision-making environment.

A number of factors directly relating to the communication of confidence can affect the influence of confidence. Literature relating to the mode of expression, communication channel, and levels of confidence will now be reviewed.

Mode of expression

How a speaker chooses to express their confidence, and not just the level of confidence they express, can affect the influence that they have over the decisions of other people (Fox and Irwin, 1998).

The review of the literature relating to the communication of confidence indicated that people prefer to receive confidence in a numerical form because of the apparent preciseness of these expressions compared to their verbal equivalents, which can be more ambiguous. On this basis it might be expected that peoples' choice behaviour would be different depending on which form of expressed certainty they are basing a decision on. This has not been found to be the case. Renooij and Witteman (1999) found that the same decisions were made, with the same level of confidence, regardless of whether the information was communicated with verbally or numerically expressed confidence attached, with similar results being found by Budescu et al. (1988).

Lee (2005) did however find some gender differences in the influence of verbally and numerically expressed confidence. Men were influenced (to change their answers) more than women when a partner's answers had numerically expressed confidence attached, whereas women were influenced more than men by verbally expressed confidence. However, this was only found when the participant and partner were of differing sexes. When receiving information from a same sex partner no differences were found in participants' sensitivity to numerical expressions of confidence. Gender differences in the influence of confidence will be returned to later in this chapter.

The amount of research that uses verbal expressions of confidence in relation to their influence is limited. The tendency is to use numerically expressed confidence (e.g.

Paese and Kinnaly, 1993; Price and Stone, 2004; Zarnoth and Sniezek, 1997, but see London, McSeveney, and Tropper, 1971; Pulford, 2002; Pulford and Colman, 2005). Although this is advantageous in that it is easily controllable, and can be clearly communicated, it does not represent day-to-day communication of confidence and uncertainty, where confidence is rarely expressed numerically.

Whether we express our confidence using internal or external expressions may also exert differing influence on a decision-maker. Fox and Irwin (1998) cite a study by Fox and Malle (1997) that found people were more willing to bet on events whose outcomes were expressed using internal expressions of confidence than when equivalent external terms were used. This may be because events over which people perceive themselves as exerting some control tend to be judged as more certain than the evidence warrants, and convey more responsibility than external statements do (Fox and Malle, 1997; Howell and Burnett, 1978). When a listener attributes outcomes to factors internal to the speaker, such as effort or ability, the listener may overvalue their certainty, leading to a confidence bias.

However, Feezel (1974) found that statements expressed using the external mode were accepted more than equivalent statements expressed in the internal mode, suggesting that expressions in the external mode, which are preceded by terms such as *It is*, may “imitate a general consensus making the assertion more certain, probable or possible” (p. 353).

The conflicting findings relating to the influence of external and internal expressions could be due to differences in how these concepts are defined. Whereas Feezel follows Kahneman and Tversky’s (1982) definition of external and internal uncertainty, whereby they are distinguished by the use of a personal pronoun (i.e. *It is* vs. *I am*), Fox and Malle define internal expressions as conveying knowledge of one’s own abilities and external expressions as reflecting external probabilities (i.e. *fairly sure* vs. *good chance*).

Communication channel

Chaiken and Eagly (1976) compared the persuasive impact of different communication modalities, finding that message difficulty mediated persuasion but speaker’s confidence did not. However, confidence was manipulated, by an actor, in just the audio and video modes and not in the written format meaning that a full comparison across modalities was not conducted. Sparks, Areni, and Cox (1998) found that the

influence of speech style on persuasion was dependent on communication modality. Speech style did not influence persuasion in the written format, but in the audio mode it had a significant effect on listener's attitudes towards a recommendation, and approached significance in the video modality. However, the influence of speech style on perceptions of the speaker was found to be largely independent of modality.

Sparks et al. (1998) suggest that when a listener has to evaluate a speaker's recommendation, rather than the speaker themselves, they may rely on different cues, the influence of which may depend on the modality of communication. They advise that the communication modality used in research should depend on the dependent variables of interest. When the dependent variables are source-related perceptions, the written modality will adequately convey features of speech style. However, when the focus is on attitudes toward the speaker's recommendation, the written mode may not effectively communicate speech style's persuasive qualities.

The experiments reported in this thesis use communication in the written format, focusing on the language of confidence. Other channels of communication bring with them a wealth of other cues, and while these are interesting, and certainly worthy of further research (and will be considered in the discussion), they are beyond the scope of this thesis. Further consideration will now be given to literature relating to the language of confidence.

Levels of confidence

The literature review so far has focused on factors that may mediate the influence of confidence in relation to the observation that some researchers have found the most confident speaker to be the most influential, whereas others have found no relationship between confidence and influence. A further possibility to consider is that we may be influenced by a speaker's confidence, but not necessarily the most confident speaker.

Many experiments have looked at the influence of a confident speaker relative to that of an uncertain speaker. For instance, speech style research compares the influence of powerful speech, which indicates confidence, to that of powerless speech, which indicates uncertainty. Invariably this shows powerful speech to have the greatest (positive) influence (Erickson et al., 1978; Holtgraves and Lasky, 1999). Similarly, Carli (1989; 1990; 1995) pits confident speech against tentative speech, again reaching the same conclusion.

However, as we have already seen, we can use expressions to cover a wide range of confidence, indicating many different positions along the confidence-uncertainty continuum, and hence the influence of confidence is not as black and white as some research would suggest. Research into the influence of confidence should not just cover the two extremes, be it powerful and powerless speech, confidence versus doubt/uncertainty, or high and low confidence.

What is the influence of confidence when a broader range is used? Some research, using interacting groups or dyads covers a naturalistic range of confidence examining the influence of confidence in situ so to speak. Again, this tends to find that the most confident speaker has the greatest influence over the rest of the group or the partner with whom they are interacting (e.g. Sniezek and Van Swol, 2001; Zarnoth and Sniezek, 1997). However, the problem here is that we do not know what level(s) of confidence we are comparing the most confident speaker's influence to – is the partner/group totally uncertain, or fairly confident, or even very confident, but just not the most confident? Also there is a reliance on numerical expressions of confidence. As was pointed out previously these can be easily interpreted, and hence we have a preference for receiving them, but this is often not the way in which we choose to communicate. Verbal expressions are far more ambiguous and open to interpretation. What then is the influence of verbal expressions of confidence?

Presenting participants with high, medium, or low confidence arguments, London, McSeveney, and Tropper (1971) found that people were most persuaded by the medium confidence argument. Furthermore, as a speaker's confidence increased, so to did the listener's feelings of antagonism towards that speaker. This suggests that confidence is positively related to persuasion up to an optimum point, after which confidence has a detrimental effect, leading to a reduction in persuasion and an increase in negative feelings and antagonism on the part of the listener toward the speaker (London et al., 1971; Maslow, Yoselson, and London, 1971). In other words there is a curvilinear relationship between expressed confidence and persuasion, and so once an individual is persuaded, to continue to try to persuade, with increasing confidence, only has negative effects (London et al., 1971).

In London et al.'s study, only female participants were used. It may be that men and women respond differently to a speaker's confidence. This is what Pulford (2002) found. Here a similar effect to London et al.'s was found for females in that they were influenced by a medium confidence speaker the most. Men, on the other hand, were not

persuaded to change their answers by a speaker, regardless of that speaker's level of confidence.

Initially these results seem at odds with the other literature reviewed in this chapter, with the finding that the medium confidence speaker, and not the high confidence speaker, exerts the most influence. However a number of methodological issues may contribute to these findings.

Firstly, the number of items over which the influence of confidence was measured may be a contributing factor to these results. Pulford (2002) measured the influence of confidence over nine definition-type questions, whereas London et al. (1971) used a single jury-method based task. It may be that a strong influence of (high) confidence manifests over a longer period, perhaps as the individual develops a strategy to aid their decision-making. The brevity of these tasks may not have given individuals sufficient opportunity to do so, whereas experiments using the numerical expression of confidence, that tend to use more task items, do so. The influence of confidence as numerical confidence has been measured over 24-items (Zarnoth and Snizek, 1997), 60-items (Paese and Kinnaly, 1993), and 70-items (Snizek and Buckley, 1995), studies that have all shown the most confident speaker to exert the most influence. Future studies could consider the influence of confidence over time.

London et al. (1971) and Pulford (2002) also use verbal expressions of confidence, as opposed to the numerical expression of confidence. This may indicate that the influence of verbal confidence is different to the influence of numerical confidence. However, in face-to-face interactions, where speakers used verbal expressions of confidence, Pulford and Colman (2005) found that the most confident speaker was the most influential. Hence, further research relating to the influence of verbal expressions of confidence is needed to clarify the nature of its influence.

There are also differences between the two studies in terms of how the influence of confidence was measured. In London et al.'s study persuasion was determined by considering changes in the intensity of a participant's position. Here they were asked, before and after viewing a persuasive message, to indicate how confident they were that the defendant should, and should not be held liable, on a 0-100% scale. As London et al. report, participants in the medium confidence condition actually became *less* confident in their initial position, whereas those in the high and low conditions became *more* confident. In Pulford's study however, changes in choice of answer, as reported above, as well as changes in confidence in answer, were considered. In the case of the latter,

men, although not changing their answers after viewing a speaker's confidence, did become more confident in their answers when the speaker expressed high confidence, whereas women became more confident in their answers when a speaker expressed any level of confidence (high, medium or low).

A further consideration is that the influence of different levels of confidence may be associated with the appropriateness of a given level of confidence. Research findings relating to the match between confidence and argument quality and accuracy, including aspects of overconfidence literature, will now be reviewed.

Argument quality

It should not automatically be assumed that for maximum persuasiveness one should adopt a highly confident manner of speech (Zarnoth and Sniezek, 2002). As has already been seen, the influence of confidence is not consistent. After finding that a highly confident speaker was more influential than a low confidence speaker when presenting a strong argument, but the low confidence speaker was more influential when the argument was of poorer quality, Zarnoth and Sniezek suggested that the effect of a speaker's confidence on persuasion is moderated by argument quality. In other words, to be effective expressed confidence needed to match argument quality.

Zarnoth and Sniezek related their findings to those of London et al. (1971) with the suggestion that the mismatch between argument quality and expressed confidence in the argument may have led to the speaker being perceived as overconfident, and therefore unlikeable in some way, which results in a detrimental effect on influence. So, expressing too much confidence can actually make you less persuasive than someone expressing less confidence in their position.

In a related study Hosman, Huebner, and Siltanen (2002) considered the effects of argument quality and power of speech style on persuasion. Contrary to Zarnoth and Sniezek's results it was found that whilst argument quality affected persuasion, with strong arguments being more persuasive than weak arguments, speech style had no direct effect on persuasion. However, as with Zarnoth and Sniezek's results and those of London et al. (1971), the speech used did influence a listener's attitude towards the speaker, which in turn could affect the listener's attitude towards the topic. How a speaker's expressed confidence affects interpersonal perceptions will be discussed later.

However, argument quality does not always dampen the influence of confidence. In relation to eyewitness testimonies, confident witnesses have been found to influence

jurors' decisions even when the evidence does not support their claims (Lindsay, Wells, and Rumpel, 1981; Whitley and Greenberg, 1986).

Accuracy

Similar to the notion of argument quality is a speaker's accuracy. An accurate answer can be seen as strong evidence, and hence expressing high confidence in that answer would be justified, whereas an inaccurate answer would not justify high confidence. The question can be asked, are we more influenced by a speaker's confidence or accuracy?

Zarnoth and Sniezek (1997) found that greater confidence made speakers more influential regardless of their accuracy. In dyads the most confident speaker's answers were chosen on 89% of occasions when they were correct and 62% of occasions when they were incorrect. In pentads the correct, and most confident responses were chosen 85% of the time, with the incorrect, but most confident answers being chosen 40% of the time. So even though these speakers were giving wrong answers they could still convince other people to choose their incorrect answer. Zarnoth and Sniezek conclude that a speaker's confidence has a significant impact upon the influence that they exert over others beyond the influence that can be attributed to the speaker's accuracy alone.

However, whilst individuals within a group have been found to be able to identify the most accurate member of a group under conditions of uncertainty (Henry, 1993), this is not always the case, and the accuracy of another person's information is not always directly observable (Paese and Kinnaly, 1993). As Sniezek and Van Swol (2001) point out, most real-life tasks do not have a demonstrably correct answer that can be proven at the time of interaction, if at all. A speaker's accuracy is only useful as a way of determining the quality of a speaker's information if we can prove that accuracy. If we do not know an answer ourselves then we must rely on other ways of assessing accuracy. The confidence that a speaker expresses is frequently used to make inferences about that speaker's accuracy. With this in mind, it is also important to take into account the issue of over- and underconfident speakers.

Overconfidence

For a speaker's confidence to be useful to a decision-maker, it is important that their confidence is appropriate. Given that confidence can be viewed as the subjective probability that one's own judgement is correct (Paese and Kinnaly, 1993), confidence and accuracy are inextricably linked, and we expect subjective probabilities to predict

the truth as often as they promise (Fox and Irwin, 1998). In other words we expect people to be well calibrated. To be well calibrated one's confidence should be equal to, or at least close to the external reality of an outcome, be it an event occurring or an answer being correct. Thus, confidence should equal accuracy.

Although we often take the subjective experience of confidence as evidence of objective fact, in reality this is not always the case. Zarnoth and Sniezek (1997) found the most confident individual to exert the most influence even when they were inaccurate. Indeed, confidence does not always correspond with accuracy, and much of the input that we give and receive is prone to overconfidence. This may be an intentional or unintentional bias, with people miscommunicating their confidence for reasons such as impression management, motivational factors or individual differences (Thomas and McFadyen, 1995).

Whilst there has been a lot of research from the perspective of the overconfident individual, very little of this research has looked at the influence of this overconfidence from a listener's viewpoint (Price and Stone, 2004). Sniezek and Buckley (1995) say that if confidence is an effective means of influence, people communicating high confidence may get their own way more often than those who are underconfident or even well-calibrated. Paese and Kinnaly (1993) consider how biased confidence in judgement can affect the accuracy, and confidence, of those receiving such input. As people are generally unaware of their own overconfidence, would they expect it in others? Participants answered a set of questions, selecting their answer from the two alternatives. They then answered the same set of questions again, this time accompanied by a speaker's input, which was either overconfident, underconfident, or well-calibrated. When a speaker's accuracy was high, well-calibrated input improved participants' accuracy more than underconfident input did. Underconfidence also resulted in fewer changes towards that speaker's answers than being confident and well-calibrated did. When the speaker's accuracy was low, well-calibrated input improved participants' accuracy more than overconfident input did. Paese and Kinnaly say that this latter result is puzzling, as lower confidence resulted in better accuracy than high confidence did. However, when considered in relation to Zarnoth and Sniezek's (2002) results it would make sense - people are sensitive to the match between argument quality, or in this case accuracy, and confidence.

Paese and Kinnaly suggest that overconfident input may be representative of everyday experience, although as they themselves point out, the experiment does not

reflect everyday life as face-to-face communication is not used, and people rarely express their confidence numerically as it was here. However, the question still remains as to whether someone who is overconfident can detect such bias in other people.

Detecting a speaker's judgmental biases may become easier if feedback is provided about the quality of their previous judgements and decisions.

Feedback

Although we cannot always prove the accuracy of someone's information at the time of interaction, over time or following repeated interaction we may begin to pick up on the quality of someone's judgments, and whether or not they are prone to judgmental biases such as overconfidence. For example, in real life situations we may have information about a person's past performance. We may stop using a financial advisor after receiving inaccurate advice in the past, or we may lose faith in our GP after a series of misdiagnoses. But do people actually use this information when it is available to them? Using a methodology where feedback is provided is advantageous as it demonstrates the extent to which listeners may rely on a speaker's confidence in a situation where their accuracy is directly observable, thus countering the arguments highlighted earlier relating to the relative influence of confidence versus accuracy (e.g. Paese and Kinnaly, 1993; Snizek and Van Swol, 2001).

Price and Stone (2004) suggest that people are more sensitive to confidence alone than the match between confidence and accuracy. Providing participants with feedback relating to an advisor's judgments they found that a majority of participants (74%) preferred an advisor who expressed extreme confidence, but was overconfident, to a more moderate, but well-calibrated advisor. They suggest that this preference for high, but misplaced, confidence may be due to participants taking confidence as representative of competence, knowledge and accuracy.

Not everyone though showed this preference – there was still a fairly high minority of participants (26%) who preferred the moderately confident advisor. Although Price and Stone suggest that it may be because extreme confidence may be seen as overcompensating for a lack of knowledge, or alternatively moderate confidence may be taken as indicative of greater honesty, no evidence to support this suggestion was found.

It may be that there are individual differences mediating the influence of confidence, in terms of personality factors and gender differences. Literature relating to these issues will now be discussed.

Individual differences

In addition to situational factors, a number of individual differences may affect the ways in which we process confidently communicated information, and the subsequent influence this has. Our tendency to be high or low in Need for Cognition (NFC) or Need for Closure (NFClo), whether we are certainty or uncertainty-orientated, and whether our cognitive style is closed-minded or dogmatic can determine whether we pay more attention to the content of what is being said to us, or to how confidently that information is expressed.

The Need for Cognition refers to an individual's "tendency to engage in and enjoy thinking" (Cacioppo and Petty, 1982, p. 116). Individuals high in NFC attend more to the central task at hand, such as the informational content of a message, rather than responding to peripheral cues that are associated with the task, such as the confidence with which that information is communicated, as people low in NFC tend to do (Cacioppo and Petty, 1982; Cacioppo, Petty, and Morris, 1983).

Sorrentino, Bobocel, Gitta, Olson, and Hewitt (1988) argue that the level of personal relevance of a task is also important in determining which information we attend to. They suggest that people have different approaches to uncertainty, termed uncertainty orientation. Uncertainty-orientated individuals are motivated by situations that allow for the resolution of uncertainty, engaging in central processing in situations of high personal relevance, and peripheral processing otherwise, whereas certainty-orientated individuals, who are motivated by situations that do not involve uncertainty, show the opposite pattern. Sorrentino et al. (1988) suggest that the key difference between need for cognition and uncertainty orientation may be that, whereas need for cognition provides a measure of motivation to think, uncertainty orientation is a measure of when to think.

How confident a person is in the information they are receiving may also depend on what sort of person they are. For example, Heslin, Rotton, and Blake (1977) found that people who are closed-minded attend more to the surface quality of a message, such as the confidence with which it is expressed, whereas those who are more open-minded penetrate below this surface to pay attention to other factors, such as the motivation of the source. Closed-mindedness forms a subscale of the Need for Closure - the general tendency to prefer certain knowledge to uncertain knowledge (Webster and Kruglanski, 1994). Whilst a relatively stable dimension of individual differences, NFClo may be

situationally induced, and furthermore may be culture dependent, resulting from sources such as cultural norms which place a premium on confidence (Kruglanski and Webster, 2000; Vermeir, Van Kenhove, Vlerick, and Hendrickx, 2002; Webster and Kruglanski, 1994). NFClo may affect how an individual thinks, feels, acts towards and speaks about other people (Kruglanski and Webster, 2000). People who are high in NFClo are motivated to produce quick and confident judgments (Maysel and Kruglanski, 1987), and so may rely on peripheral cues to achieve this. For instance, people high in NFClo may rely more on a speaker's expressed confidence than people who are low in NFClo. This possibility is explored in Chapter 4, where the influence of confidence in relation to Need for Cognition and Need for Closure will be covered in more detail.

Gender differences in influence

One factor that may lead to differences in the influence of confidence is the gender of participants used in the experiments. For instance, many studies have found the most confident speaker to be most influential (e.g. Sniezek and Van Swol, 2001; Zarnoth and Sniezek, 1997), yet London et al. (1971) found a speaker expressing a medium level of confidence to be more influential than one expressing high or low confidence. Why was this? It is feasible that this result was due to the use of female participants only. Perhaps if they had used male participants too the results would have been different.

Evidence does suggest that there may be differences in people's use of a speaker's confidence. Pulford (2002) found that while women's choices were influenced by a speaker's level of confidence, men's were not. Although men did not change their choices, they did raise the level of confidence they had in their choices after receiving high confidence input, whereas women's confidence in their choices was raised after receiving input at any level of confidence. It has been suggested that women are more easily influenced than men (Carli, 1989; Eagly and Carli, 1981), although Burgoon and Klingle (1998) argue that rather than it being that women are more susceptible to influence, it is possible that men are more resistant to persuasion. However, Lee (2005) found that both men and women were influenced by a speaker's confidence.

Carli (2001) points out that most research on gender differences in social influence focuses on the extent to which men and women are influenced by others, rather than the effect of a person's gender on their ability to influence others. Carli (1990) found that women using tentative, uncertain speech increased their ability to influence men but

decreased their ability to influence women. For men using equivalent language, there were no differences in the extent of influence they had over men or women.

Carli (1990) suggests that the use of uncertain or tentative speech may be functional for women. When a woman wants to influence a man they may adopt the subtle approach of using tentative language, whereas when they are communicating with another woman, using tentative language may be less influential than using a more assertive, confident style. Carli (1990) suggests that women may use tentative speech when interacting with men because they expect men to be overconfident in their speech. Women therefore become more conscious of their speech in front of men as they are making a concerted effort not to behave in the same overconfident manner.

Women may be sensitive to overconfidence. Pulford (2002) found that women preferred advice spoken with medium confidence, and were averse to answers given with high confidence, irrespective of speaker gender. However, women showed a dislike of answers expressed with low confidence by men, but not when given by another woman. Price and Stone (2004) considered whether men and women differed in the preferences for an overconfident and a more moderately confident (male) speaker. Although a higher proportion of men than women preferred the overconfident speaker this difference was not significant.

Clearly then, mixed results relating to the presence of gender differences in the influence of confidence have been found. This may be due to the way in which confidence is expressed within these experiments, with some using numerical expressions of confidence (Price and Stone, 2004), some using verbal expressions of confidence and uncertainty (Carli, 1990; Pulford, 2002), and other using both (Lee, 2005). Gender differences in the influence of confidence will be considered further in Chapter 5.

Interpersonal perceptions of confidence

The confidence that a speaker expresses can affect not only how influential they are in what they are saying but also how they are perceived (Erickson et al., 1978; Sparks et al., 1998). These perceptions may in turn affect the influence of a speaker's confidence. Two major personality dimensions have been identified in relation to speech – one encompassing competence and the other relating to likeability (Apple, Streeter, and Krauss, 1979; Erickson et al., 1978; Lind and O'Barr, 1979; Scherer, 1979). A speaker's level of confidence can affect how they are perceived on these two dimensions.

Confident speakers are generally viewed more favourably than less certain speakers are (Holtgraves and Lasky, 1999; Hosman et al., 2002). Specifically, a highly confident speaker is viewed as being more accurate, competent, credible, intelligent, knowledgeable, likeable, and believable than a less confident or uncertain speaker (Carli, 1990; Carli, LaFleur, and Loeber, 1995; Erickson et al., 1978; Gibbons, Busch, and Bradac, 1991; Haleta, 1996; Leippe et al., 1992; Parton, Siltanen, Hosman, and Langenderfer, 2002; Price and Stone, 2004). How trust and expertise affects interpersonal perceptions of confidence has been considered in direct relation to the influence of confidence.

Trust and expertise

Sniezek and Van Swol (2001) suggest that higher confidence should exert more of an influence than lower levels of confidence because it is taken as indicative of expertise and trustworthiness. They found high confidence to be positively related to a judge's trust of the speaker, and suggest that once trust is developed a listener is more likely to follow the trusted speaker and in turn place more confidence in decisions based on their advice.

But whether or not we are influenced by a speaker's perceived expertise may depend upon a decision maker's assessment of their own capability of making good judgements (Harvey and Fischer, 1997). Someone who sees themselves as capable of making good judgements, rightly or wrongly, should be less influenced by another person's expertise when a decision is important because they are willing to engage in the extra cognitive effort it takes to reach the decision themselves. On the other hand, if someone does not believe themselves capable of making good judgements, then they are more likely to be influenced by an advisors level of expertise.

Furthermore, our own expertise, relative to an advisor's, can be taken into account – we tend to take advice from people we consider to have more expertise than ourselves. Non-experts are influenced by information they think is diagnostic of an advisors expertise, such as their confidence. The more expertise we attribute to an advisor, the more likely we are to take their advice. Low self-confidence, and hence perceived low levels of our own expertise makes us more likely to put our trust in information from a source other than ourselves (Lee and Moray, 1994; Sniezek and Van Swol, 2001).

Important in how people perceive a speaker's confidence is who the speaker is. The discussion above focussed on speaker expertise. The gender of the speaker, and the impact this has upon interpersonal perceptions of confidence will now be considered.

Gender differences

Men and women who express the same level of confidence as each other may not necessarily be perceived in the same way. Women using assertive, confident language have been found to be viewed as more confident and knowledgeable than those using tentative, uncertain speech, by men and women alike (Bradley, 1981; Carli, 1990; Hawkes, Edelman, and Dodd, 1996). Confidence in language did not seem to effect how men are perceived, with men being judged as more knowledgeable than women speakers, based on their gender alone, rather than any other factor (Bradley, 1981; Carli, 1990). On the other dimension of speech cue, likeability, a tentatively speaking woman is viewed as being more friendly by men than one speaking assertively (Carli, 1989; Carli, 1990; Carli et al., 1995). However, contrary to the expectations of Carli et al. (1995), women who spoke confidently were not viewed as less likeable, or more threatening, than men who spoke confidently. Rather, Carli et al. (1995) found that people using confident language were disliked more than those using tentative language, regardless of the gender of the speaker. Other studies have found no gender differences (Holtgraves and Lasky, 1999; Lind and O'Barr, 1979; Newcombe and Arnkoff, 1979; Parton et al., 2002). Reasons for these inconclusive results will be discussed in more detail in Chapter 5.

Too much confidence?

Although the research reviewed so far relating to listeners' perceptions of confident speakers has found confident speakers to be viewed more favourably than less confident or uncertain speakers, this is not always the case. As previously mentioned, too much confidence can be ineffective, and a speaker may correctly be perceived as being overconfident, which in turn may lead to them being disliked (Zarnoth and Sniezek, 2002). Research findings support this notion. London et al. (1971) found that increasing levels of speaker confidence led to increasing feelings of antagonism towards that speaker on the part of the listener. It was not just the most confident speaker that had this effect either - medium and high confidence speakers markedly elicited more antagonism than low confidence speakers did. Whether or not this effect was due to

perceived overconfidence is unclear as the nature of the task used, a jury method, did not allow accuracy to be taken into account. Nevertheless, others have suggested that overt indications of confidence are sometimes distrusted (Erickson et al., 1978; Kimble and Seidel, 1991).

Influence of confidence on decision quality

We have seen some of the factors that can determine whether or not we take someone's advice or not, but what affect does taking someone's advice have on the subsequent decisions that we make, particularly when those decisions are based on their level of confidence? Are we right in using such a strategy? And what are we trying to achieve when we seek advice?

People typically seek advice or opinions from other people when they are faced with a difficult or important task. We seek advice because we want to improve the accuracy of our judgments and believe that receiving advice will help (Yaniv, 2004). But does it, especially when our assessment of that advice is based on the confidence with which it is expressed? Not necessarily.

First of all, being able to observe how confident someone is may be a good thing. Bloomfield, Libby, and Nelson (1996) found that decreasing the ability to do so decreased group accuracy. Hence, they suggest that the performance of interacting groups partly depends upon their ability to observe the communication of confidence between group members. However, in Bloomfield et al.'s study, confidence was conceptualised as individuals' willingness to trade shares, rather than directly communicating confidence, be it verbally or numerically. Nevertheless, basing our decisions on a speaker's confidence can be a good strategy. For example, Sniezek and Van Swol (2001) believe that participants in their experiment were wise to follow the advice of the most confident speaker, as this advice was valid.

This strategy doesn't always work effectively, and following a confident speaker's advice can harm the quality of subsequent decisions. The general finding is that confidence in decisions increases more than the accuracy of those decisions does, if at all (Heath and Gonzalez, 1995; Paese and Kinnaly, 1993; Ronis and Yates, 1987; Sniezek, Paese, and Switzer, 1990). Such increases in confidence following interaction have been found to occur regardless of whether initial choices were the same or different from the advisors (Paese and Kinnaly, 1993), and regardless of the speaker's level of confidence (Paese and Kinnaly, 1993; Pulford, 2002).

As we have seen, people are often overconfident in their beliefs. What effect does this have on the quality of our decisions? The general expectation is that interaction with others will reduce overconfidence, although this has not been found to be the case (Heath and Gonzalez, 1995; Paese and Kinnaly, 1993). Paese and Kinnaly (1993) found that not only did overconfident input considerably increase participants' own overconfidence, but underconfident input did not eliminate overconfidence, and was not more effective at reducing biases than appropriately confident advice was. However, Paese and Kinnaly (1993) still maintain that basing decisions on a speaker's confidence in their input is not a bad strategy, arguing that it is actually quite valid, given that people who are extremely confident do actually end up being more accurate than those who are less confident.

The social influence of confidence – theoretical perspectives

Influence of confidence within groups

In a group decision-making environment a consensus must be reached most of the time. Freely interacting groups will choose the position of their best member on which to base the group decision (Einhorn, Hogarth, and Klempner, 1977). The best member is often identified on the basis of the level of confidence that they communicate. The information they offer or position they hold may not necessarily be the one that all group members hold or agree with. Group decision-making has many issues surrounding it that may hide or obscure an individual's true preference, with group members being susceptible to group pressures and norms. Such issues led to Zarnoth and Sniezek (1997) identifying a confident speaker's behavioural style or resistance to group norms as potential reasons for their greater persuasiveness.

The behavioural style of a group, rather than their expression of confidence, may make individual members more, or less, persuasive (Moscovici, 1976). Someone who is a confident person may also be more talkative or argumentative, making the influence of confidence difficult to determine. For example, extroverts have been found to speak louder than introverts, indicating a more forceful use of the voice in social interactions, which in turn may lead to such a person exerting a greater influence within a group setting (Scherer, 1978). Conversely, within a group the norm to be pleasant and non-confrontational is probably at least as strong as the motive to be as accurate as possible (Henry, 1995), which may lead to some people suppressing their views choosing instead to go along with the group consensus. A confident individual may also be more resistant

to the social influence of others, vehemently sticking to their views to the extent that others are forced to give in and agree (Stasser and Davis, 1981; Visser et al., 2003). Group decision-making involves trade-offs and negotiation in order to reach a consensus (Heath and Gonzalez, 1995). However, decisions are not always made within groups, as shall be discussed in the next section.

Decision-making environment

Much of the research relating to determinants of confidence focuses on decisions made by the individual, whereas group decision-making is the focus of much research relating to the influence of confidence. However, many important decisions are made in systems that cannot be clearly dichotomised as either an individual or group environment (Sniezek and Buckley, 1995). Decision-making can also be social in nature, an element not represented in individual decision-making, and there is not necessarily always the need to reach a consensus, as is commonly found in group decision-making.

An alternative approach is that of interactive decision-making, where we gather information from others but make the final decision alone, giving us the option to use or ignore other people's advice (Heath and Gonzalez, 1995; Sniezek and Buckley, 1995). Interactive decision-making is termed a Judge-Advisor System (JAS) by Sniezek and colleagues (e.g. Sniezek and Buckley, 1995; Sniezek and Van Swol, 2001), whereby one or more advisors communicate their information and recommendations to a judge, who has the sole responsibility for the final decision.

Interactive and group decision-making are treated interchangeably in the literature, with emphasis on the group process, even though both methods may lead to different outcomes (Heath and Gonzalez, 1995). The study of interactive decision-making has many advantages. Firstly many of our decisions are made in such a way - we infrequently have to reach a consensual decision, and we often ask others for advice on our individual decisions. The interactive environment is also more ecologically valid than group decision-making as it allows for the influence of others to be investigated upon the individual, while avoiding the complications that accompany group decision-making (Heath and Gonzalez, 1995; Sniezek and Buckley, 1995). The influence of confidence may be different in an interactive environment than in a group environment for reasons that will be discussed later in this chapter. Judgement and decision-making within this thesis is examined from an interactive decision-making perspective.

Interpersonal perceptions of confidence

It does seem that the information that one conveys is not the only factor in the influence of confidence. How we perceive a speaker, resulting from their level of expressed confidence is also important in determining the influence of confidence. As previously mentioned, there are two major dimensions of speech cues – competence and likeability, covering factors such as a speaker's perceived trustworthiness. Lind and O'Barr (1979) suggest that the acceptance of a communication is often influenced by judgements concerning the communicator's competence - their ability to make valid statements - and by judgements concerning the communicator's trustworthiness - their intention to convey only statements that they consider to be truthful. However, Burgoon, Birk, and Pfau (1990) point out that although it is assumed that credibility leads to persuasion rather than vice-versa, it is just as plausible that that being persuaded by a speaker leads one to view that speaker as credible.

While Western society generally expects a competent communicator to speak fluently and confidently, deviating from these expectations may reduce a communicator's effectiveness (Krauss and Chiu, 1998). Furthermore, simply appearing competent may not be enough. Aspects of competency may also work against persuasiveness by decreasing liking for a person (Heslin and Patterson, 1982). Scherer (1979) suggests that to be truly persuasive a communicator needs to be seen as both competent *and* trustworthy. Of course, it may be that some people value competency more than likeability or vice-versa and so may not be influenced by the same level of confidence in the same way.

For instance, the extent to which a female speaker can influence a man may depend on how friendly that speaker is perceived as being, with a tentatively speaking woman being viewed as more friendly by men than an confidently speaking woman (Carli, 1989; Carli, 1990; Carli et al., 1995). However, Carli et al. (1995) found that people using confident language were disliked, regardless of the gender of the speaker, and this dislike was greater for confident speakers than it was for tentative speakers. Even so, Carli et al. suggest that with a male audience, perceptions of likeability are more important determinants of influence for female speakers than for male speakers. Additionally, a man is more likely to be influenced by a woman when she is perceived as competent and likeable, rather than just competent.

In contrast to Carli's (1990) finding that the role of speech style on persuasion is determined by speaker-listener gender combinations, Holtgraves and Lasky (1999)

found that powerful speech was perceived more positively, and powerless speech more negatively, regardless of either speaker or listener gender. These results are consistent with those found by others (e.g. Erickson et al., 1978; Lind and O'Barr, 1979; Newcombe and Arnkoff, 1979).

Differences in the results may be due to how perceptions of the speakers are conceptualised. For instance, while Carli et al. (1995) considers perceptions of speaker competency and likeability, Holtgraves and Lasky (1999) combine ratings of likeability and competency, amongst others, to give an overall impression of the speaker.

It is important to take into account how speakers are perceived in relation to the influence of confidence, as a listener may use this to help validate a speaker's information. This suggestion has direct relevance to the models of persuasion discussed in the next section.

Models of persuasion

There are two dominant theories of persuasive communication within which confidence can be considered: the Heuristic-Systematic Model (e.g. Chaiken, 1980; Chaiken, Liberman, and Eagly, 1989) and the Elaboration Likelihood Model (Petty and Cacioppo, 1986). Both of these models rely on essentially the same principles. When a listener is involved, motivated or has the capacity to do so, they will engage in thoughtful processes. Systematic, or central, processing of the message occurs, and a message's arguments are evaluated. However, processing at this level is not always possible, for example when a person is not sufficiently motivated to think about a message, or when cognitive capacity is reduced. This is when heuristic, or peripheral, processing may be used. Cognitive heuristics provide 'rules of thumb' or shortcuts to making decisions (Tversky and Kahneman, 1974). Chaiken (1980) suggests that we learn certain persuasion heuristics that provide shortcuts around the more effortful processing of the actual information contained within a message. If engaging in heuristic or peripheral processing, other factors become important in persuasion. For example, the context the message is delivered in, or the style of speech used, will be more persuasive than the message content itself.

Where does confidence fit in within these models? The role of confidence here is not straightforward. Does it facilitate systematic or heuristic processing? Research relating the influence of confidence to theories of persuasion has been mainly done so from a speech style perspective. To recap, speech style is related to the expression of

confidence in that the use of a powerless language style, with its hesitations and hedges, suggests that a speaker is uncertain about the position or beliefs that they are advocating, whereas a powerful style may indicate suggests that the recipient believes their statements to be correct. When a strong argument is expressed in an uncertain way this discrepancy may cause the listener to process the message differently to how they would if the strong argument was accompanied by a more confident speech style. For example, in the case of the former, speech style would facilitate systematic/central processing in persuasion, as the important variable is the message. In the case of the latter, Berger and Bradac (1982) suggest that a powerless speech style could be attributed to speaker uncertainty, acting as a peripheral cue to persuasion, facilitating heuristic processing as argument relevant thinking is not carried out.

Information conveyed in a powerful speech style is given more weight than that conveyed in a powerless style (Erickson et al., 1978; Holtgraves and Lasky, 1999). Holtgraves and Lasky (1999) suggest that this is a result of how a listener perceives the speaker and the message argument. They found that when the message was delivered in a powerless style both speaker and message were viewed more negatively than when a powerful style was used, which in turn reduced the likelihood of any attitude change occurring. However, the listeners' ability to process a message has no effect on persuasion, leading to the suggestion that speech style may affect via both peripheral/heuristic processing (when distracted) and central/systematic processing (when not distracted).

Hosman, Huebner, and Siltanen (2002) investigated whether powerful speech has a central, peripheral, or biasing role. If it has a central role, then powerful speech may inform listeners about the merits of the given argument. If it acts as a peripheral cue, then it will provide information about the speaker. If speech style has a biasing role, then it will strengthen only strong arguments. It was found that whilst argument quality affected persuasion, with strong arguments being more persuasive than weak arguments, speech style had no direct effect on persuasion. They suggest that speech style acts as a peripheral cue, influencing cognitive responses about a speaker's personal attributes, which in turn affects attitudes toward a topic.

Making choices

Evidence for the role of confidence as a peripheral or heuristic cue comes from overconfidence research. Theories of overconfidence identify the cognitive processes

people engage in when making choices, with overconfidence being attributed to biases in information processing. Koriat, Lichtenstein, and Fischhoff (1980) suggest that overconfidence occurs because people generate evidence to support an answer, and this biases the subsequent search for additional information in the direction of that initial answer. The confidence with which information is expressed may be taken as such supporting evidence.

Griffin and Tversky (1992) further this notion by suggesting that overconfidence results from attending too much to the strength of available information and not enough to the weight of that information. This can be directly related to the influence of confidence, whereby previous research (e.g. Zarnoth and Sniezek, 1997) has found that the confidence, or strength, with which information is expressed can exert a greater influence than the accuracy, or weight, of that information.

Sniezek, Paese, and Switzer (1990) found that overconfidence increases when people are presented with cued choices. Pre-selection of an answer leads to people favouring that answer in their subsequent choices, as opposed to when they have a free-choice between a set of answers, as such cueing reduces the need, or want, to search for evidence favouring alternatives. One way in which an answer may be cued is to attach a confidence rating to an answer. Sniezek and Buckley (1995) found that when such cues are available choices are made on the basis of these confidence cues, with the highest confidence exerting the most influence. Hence, it would seem that confidence is used as a way of simplifying decision-making, in that confidence is taken as evidence to favour or support an answer.

Confidence heuristic

As we have seen, the task of assessing the knowledge that another person has may be simplified by relying on the use of cognitive heuristics (Fussell and Krauss, 1991; Tversky and Kahneman, 1982). The level of confidence that is expressed may be one such heuristic. People use confidence as a heuristic “according to which they use a [speaker’s] confidence as a cue to his or her knowledge, competence or correctness” (Price and Stone, 2004. p.40). Price and Stone (2004) suggest that people rely on a confidence heuristic when making decisions or judgements because they are more sensitive to overall confidence than the match between confidence and accuracy – they assume that the most confident individual is the one most likely to be correct.

Thomas and McFadyen (1995) propose a game-theoretical model of decision-making, in which it is assumed that in social interactions people are strategic in making decisions, and optimum interaction may be based on the mutual use of a confidence heuristic. Confidence being used heuristically has been suggested by others (e.g. Chaiken et al., 1989; Erickson et al., 1978; Lieppe et al., 1992; Sniezek and Buckley, 1995; Zarnoth and Sniezek, 1997), yet no thorough investigation of this has been conducted, although recent research is addressing this (e.g. Price and Stone, 2004; Pulford and Colman, 2005).

Thomas and McFadyen note that social psychologists focus on two forms of social influence in group behaviour: informational and normative (Deutsch and Gerard, 1955). The former sees an individual as being influenced by the informational content of an argument whereas the latter is based upon social relations and relates to conforming to the positive expectations of others. Burnstein and Sentis (1981) suggest that normative processes describe the real or imagined impact of rewards and punishments, e.g. to fit in, to be liked and so on. Informational influence is influence based on the belief that the information one is receiving is representative of objective reality (Turner, 1991).

Each type of influence is likely to be dominant in different situations determined by factors such as the type of task being undertaken. For instance, it was noted earlier that tasks can be intellectual or judgmental (Laughlin and Ellis, 1986). Informational influence has been found to exert a greater influence on intellectual issues whereas normative influence exerts a greater influence on judgmental issues, for mock juries at least (Kaplan and Miller, 1987). However, Thomas and McFadyen draw on evidence suggesting that in situations where informational influences are expected to be dominant, a lot of weight is placed upon the confidence with which arguments are presented, as opposed to the content of those arguments (London et al., 1970). While expressed confidence is not informational influence it is still not necessarily normative either. It may be though a *means* by which informational influence is transmitted (Thomas and McFadyen, 1995). In other words, informational influence may be mediated via the expression of confidence.

Hence, it is suggested that there is a confidence heuristic that people use to try and assess the reliability of the information that they are receiving. In this way, someone is judged as being likely to hold more reliable information if they express that information confidently rather than tentatively. Additionally, Thomas and McFadyen argue that there may be a social norm whereby in social interactions people should argue with a

level of confidence that is in proportion to their information. This norm forms the basis of the confidence heuristic, and when it is followed, the confidence heuristic will work. In a similar vein, Zarnoth and Sniezek (1997) suggest that confidence may be used as a default option, either because people believe confidence to be a valid indicator of accuracy or because they believe that such behaviour is dictated by social norms of fairness and courtesy.

Thomas and McFadyen point out that there are some social contexts in which the model is most likely to work, namely those where both individuals have common interests and want to exchange information efficiently. In such cases following the norm allows an efficient information exchange, as it pays to be persuaded by some with more reliable information. However, there are also situations where the model will not work as well, and as with other heuristics, the confidence heuristic is prone to error (see Tversky and Kahnemen, 1974). Such errors may occur, for instance, when an individual argues confidently despite having unreliable information. Such a person may be aware of the social norm and purposefully exploit it so as to appear more knowledgeable than they actually are, simply by arguing confidently. This may achieve its goal in the short term but can be detrimental in the long run, possibly leading to a loss of reputation once others realise that a speaker frequently overstates their confidence. On the other hand, the norm may also be exploited by not expressing enough confidence relative to one's information, for reasons such as a lack of self-confidence. As Paese and Kinnaly (1993) note, if we do infer accuracy on the basis of a speaker's confidence then it is important that the level of expressed confidence is appropriate.

Thomas and McFadyen stress that when modelling the confidence heuristic they are not thinking of situations in which the information that each person possess relating to the best choice can be directly communicated, rather the information must be 'signalled' through the style of argumentation. Hence, it is assumed that because it is not possible to directly verify another's arguments, expressed confidence is a major signal for decision-making. As such the confidence heuristic allows for decision-making based on a simple comparison of the confidence in arguments.

However, Thomas and McFadyen (1995) did not conduct an empirical study of their model of the confidence heuristic. How would it stand up in different situations and with different types of people? For example, Thomas and McFadyen's conceptualisation of the confidence heuristic is in terms of collective decision-making, where there are common interests to reach the most beneficial decision, and therefore

provides no reason to deviate from the norm. But how does it apply to interactive decision-making? How is the confidence heuristic used when taking advice from another (so there are not necessarily common interests)? Furthermore Thomas and McFadyen question whether it can be assumed that the confidence heuristic is a general cognitive heuristic since there may be gender, or other information-irrelevant, differences in the way we perceive speakers with confident speech styles. Price and Stone (2004) go on to suggest that it may be that only *some* people use a confidence heuristic. They argue that the important issue when researching the confidence heuristic is the extent to which confidence is relied upon to evaluate a speaker in the presence - and absence - of other relevant information. “It is becoming increasingly clear that a complete understanding of confidence judgements must include this social dimension” (Price and Stone, 2004, p. 54). Fox and Irwin (1998) provide a contextual framework that provides a basis of factors that could be considered in relation to this social dimension. Their contextual framework is outlined below.

Contextual framework

Fox and Irwin (1998) argue that while people do make judgements via heuristics, the communication and influence of confidence is actually much broader than this, and the social context also needs to be considered, specifically judgements made on the interpretation of a speaker’s statement. Indeed, communicating one’s confidence to others is essentially a social process, making it subject to many sources of social influence. Furthermore, decisions are often social in nature, in that decision makers use information provided to them by others. Hilton (1995) argues that in ignoring the social context, assumptions made about a speaker within this context are also ignored – such assumptions may determine which information we attend to and how we use this. Hence, it is important to take into account the social context in which the confidence is used.

Fox and Irwin suggest that a listener, after receiving the communication, must decide on what to do with it. Rather than viewing the listener’s task as one of mapping natural language into numbers to determine just how confident the speaker is that a particular outcome will occur, Fox and Irwin argue that it is more productive to view the listener’s task as one of constructing a representation of the speaker’s state of mind. Hence, when trying to interpret what a speaker is saying a listener must ask themselves three questions: what does a speaker mean by their statement? What do they truly believe?

And what is the true propensity of an outcome? The answers to these three questions may not necessarily coincide. For instance, a speaker's beliefs may not necessarily match the propensity of the event. Furthermore speakers do not always intend to express what they truly believe.

Fox and Irwin (1998) provide a framework of contextual factors that may influence the process of how a listener interprets a speaker's verbal expressions of confidence. Firstly there are social informational factors. For instance, the listener may be influenced by their prior beliefs about the likelihood of an event occurring, drawing upon base rate information. The listener may also have certain assumptions about the world, including their ideas of what is just and fair. There are also social motivational factors to consider. For instance, is the speaker susceptible to judgmental biases, such as overconfidence? Does the listener perceive the speaker to be credible or sincere in what they are saying? Does the speaker have any motivation to misrepresent the likelihood of a particular event occurring? Finally there are social discourse factors to take into account. This includes information that is directly, and indeed indirectly, conveyed by the verbal expressions the speaker chooses to use or the way in which they opt to communicate. For instance, what channel of communication was used – were there nonverbal cues in addition to verbal cues to aid the listener in their interpretation of the speaker's statement? What linguistic mode of expression did the speaker use – was confidence expressed using internal (e.g. *I'm certain*) or external (e.g. *It's certain*) language? In terms of ongoing discourse, it can also be asked whether the speaker and listener share common ground, or what their relationship is. Throughout the review of the literature some of these factors have been discussed, and so do not need to be expanded upon again.

Rationale

The review of the literature has shown that for the social influence of confidence is an influential factor in persuasion. With a few exceptions, the literature reviewed indicates that the higher a speaker's confidence is, the more influence is exerted by that speaker. Although it has been noted that a speaker's influence increases as their confidence does, the extent to which a highly confident speaker can influence another person's judgements and decisions depends upon a number of inter-linked factors identified within the literature. These may be situational factors, individual factors, or communicative factors.

Situational factors that have been identified as important in mediating the influence of confidence include the type of task being tackled (Zarnoth and Sniezek, 1997), the sources of information available to the decision-maker (Sniezek and Buckley, 1995), and the decision-making environment one is in (Heath and Gonzalez, 1995). Individual factors are also important. For instance, the gender of both the speaker and listener may have an effect on how a speaker is perceived and their subsequent influence (e.g. Carli, 1990; Pulford, 2002), as can perceptions of a speaker's judgmental biases (Price and Stone, 2004). Personality factors, such as the Need for Cognition (Cacioppo and Petty, 1982) and the Need for Closure (Webster and Kruglanski, 1994), which place high emphasis on the role of heuristics and confidence in the way we process information, also seem to be highly relevant to the influence of confidence. Factors relating to how confidence is communicated can also affect its influence. Some of these are beyond the scope of the present research, such as the communication modality used (Sparks et al., 1998), whereas others, namely the mode of communication, provide the basis for the research presented in this thesis. The rationale for the current research will now be outlined.

Previously the communication and influence of confidence has been viewed mainly from a cognitive perspective. However a number of contextual factors may mediate the influence of confidence. It is important to take a more ecological approach to this research than has been previously used, primarily looking at confidence as it is commonly expressed in our day-to-day lives. Previous research has tended to use subjective probabilities or confidence ratings to see how this influences other people's judgements and decisions (e.g. Paese and Kinnaly, 1993; Price and Stone, 2004; Sniezek and Buckley, 1995; Zarnoth and Sniezek, 1997). While the findings from these studies provide a useful basis for theoretical perspectives of the influence of confidence, and indeed for further research, they largely ignore the importance of the how confidence is communicated. The experiments reported in this thesis aim to rectify this. It is important to take the communication of confidence into consideration, and not just the influence of confidence, as this would allow the findings from this research to be applied more directly to the communication and influence of confidence in real-life situations. As many judgmental errors may occur due to miscommunicated or misinterpreted confidence this issue is of utmost importance.

Secondly, a more ecological approach is taken by looking at the influence of confidence in an interactive rather than group environment. Decisions in the real world

are often made interactively – we gather information from those around us but ultimately the final decision is up to the individual – rather than individually or within groups, as has been the main focus of previous research (e.g. Henry, 1995; Zarnoth and Sniezek, 1997).

Aims of thesis

This thesis aims to find out if verbal expressions of confidence serve as an effective form of influence, in terms of choice, confidence in choice, and interpersonal perceptions of speakers. In conducting this research, an empirical investigation of the confidence heuristic will be undertaken, identifying some factors that may determine if it is used, who by, when and why. Therefore this research looks at the confidence heuristic and argues that the use of this is mediated by contextual factors. Having identified in the literature review a number of factors that may mediate the influence of numerical expressions of confidence, in terms of subjective probabilities and confidence ratings, the current research draws upon these findings to investigate whether the influence of verbal expressions of confidence is also mediated by these factors. Hence, the focus is on the extent to which people will rely on confidence cues to evaluate communicators in the presence, and absence, of other relevant information. Following Sniezek and Buckley (1995), effectiveness of confidence as influence refers to the ability to get participants to choose a (confident) speaker's answers, regardless of their accuracy.

As the experiments within this thesis use verbal expressions of confidence, as opposed to numerical expressions, it is first necessary to identify and develop a pool of confidence cues for use in the experiments. Chapter 2 reports the pilot study in which this is done. Chapter 3 examines how we are influenced by different levels of confidence expressed by a speaker in their recommendations/answers. This chapter considers the influence of confidence upon choice behaviour and how confident people are in those subsequent choices. In particular, attention is given to how different types of task, lying at various positions along the intellectual-judgmental task type continuum, mediate this influence. Chapter 4 goes on to consider if there are individual differences in the extent to which we are influenced by another person's expression of confidence in their answers, focussing on two personality measures of direct relevance to this research – the Need for Cognition and the Need for Closure. Chapter 5 changes the

focus from choice behaviour to the perceptions of the speakers who express different levels of confidence.

The first part of this thesis therefore examines how we are influenced by another person's expression of confidence, in terms of the dependent variables of choice, confidence in choice, and interpersonal perceptions when we have little other differentiating information available to us. Chapters 6 and 7 consider how making feedback available, regarding the accuracy/performance of speakers, affects the influence that expressed confidence has on these variables. Does confidence have the same influence when feedback is made available compared to when it is not? Do we pick up on a speaker's judgmental biases, learning that their level of expressed confidence does not necessarily, or always, match their level of accuracy? Do we place more weight on how confidently someone expresses an answer than to the actual quality of the information they are conveying? Chapter 6 considers these questions in relation to interpersonal perceptions of confidence, taking into account the participants' own judgmental biases as well – do people who are themselves overconfident pick up on this in others more than people who are underconfident or more well-calibrated? Chapter 7 examines how having prior opportunity to observe the way in which people answer questions, and hence having the opportunity to observe their judgmental biases, affects our subsequent use of their advice.

Chapters 8, 9, and 10 revisit some of the issues raised in earlier chapters to create a more comprehensive picture of how and why we are influenced by other people's expressions of confidence. Chapter 8 asks whether our own level of confidence in an answer affects how we are influenced by another person's level of confidence in their answers. This experiment uses a within-subjects design, as opposed to the between-subjects design used in previous chapters, to examine how we are influenced in our choices and the confidence we hold in those choices when we have made an initial choice. Are we influenced by another person's expressed confidence in an answer even though we have already made a choice? Do we become more or less confident when asked to revise our answers? Does this depend upon another person's expression of confidence? Are we more susceptible to being influenced by another person's confidence the more uncertain we are ourselves in the first place? Chapter 9 asks whether the influence of another person's confidence is due to a positive or a negative influence – do we choose highly confident answers because they offer the most

attractive alternative or is it because uncertain answers offer the least attractive alternative?

Chapter 10 brings the experimental chapters full circle, tying together the findings from previous chapters. In this chapter, consideration is given to how the influence of confidence may alter according to the timing of when advice is given. Are we swayed in our answers by a highly confident person more so when we have made an independent choice before receiving another person's recommendation or when we receive their recommendation before we have had chance to make an independent choice? Finally, issues raised by the research in this thesis, applications of the findings, and ideas for further research will be examined in Chapter 11, the discussion chapter.

CHAPTER 2

Pilot study: Development of Confidence Cues

Previous research into the influence of confidence tends to use numerically expressed subjective probability estimates to represent confidence (e.g. Paese and Kinnaly, 1993; Sniezek and Van Swol, 2001; Zarnoth and Sniezek, 1997). These provide a straightforward, seemingly easily interpretable indication of another's confidence. For instance, we know that being 100 percent confident means we are certain, and we know that being 80 percent certain indicates more confidence than being only 60 percent sure. But, while people appear to have a preference for receiving numerical probabilities, as communicators they often feel more comfortable using verbal phrases (Brun and Teigen, 1988; Hamm, 1991). Verbal expressions may facilitate thinking about uncertainty, as they are better at expressing the vagueness and ambiguity of judgements than numerical expressions are (Hamm, 1991). Windschitl and Wells (1996) argue that it is the lack of formal constraints characteristic of verbal probabilities that makes them better suited to represent how we think about uncertainty in everyday life.

A lot of research has focused on the mapping of quantitative terms to qualitative terms and vice-versa, attempting to identify the numerical values we place on different expressions (see Clark, 1990, and Druzdzel, 1989, for reviews), yet very little research has looked at how verbal expressions of confidence influence us. If people communicate using verbal rather than numerical expressions of confidence in everyday life then this has implications for the ecological validity of previous research (c.f. Price and Stone, 2004) into the influence of confidence that has relied solely on numerical subjective probability confidence estimates.

In order to consider the influence of verbal expressions of confidence it is first necessary to compile a list of words and phrases that convey different levels of confidence. Although it can be argued that for reasons of validity one should use actual samples of speech, this itself has implications. Specifically, the study and use of verbal expressions of confidence/uncertainty is problematic, mainly because there are a huge number of words and expressions that can be used to express one's state of uncertainty, and people do use many different ones in everyday conversation (Astington and Olson, 1990; Hamm, 1991; Teigen and Brun, 1995). Renooij and Witteman (1999) demonstrated this when they attempted to draw up a list of commonly used probability expressions. Although 144 different expressions were generated by 53 participants, 77% of the expressions generated were done so by just three participants. Similar results

were found by Budescu, Weinberg, and Wallsten (1988). Therefore, it is advantageous to use a predefined list of verbal expressions of confidence to ensure that consistent levels of confidence are being communicated.

With this in mind a list of confidence cues (interchangeable statements that are used preceding/in conjunction with responses) was constructed using expressions identified in previous research as indicating varying levels of confidence, such as *I know* and *I think* (Berry, 1960; Fabre, 1991; Feezel, 1974; Foley, 1959; Furrow and Moore, 1990; Moore, Harris, and Patriquin, 1993; Pulford, 2002; Westney, 1986). Although Druzdel (1989) and Clark's (1990) reviews of the verbal uncertainty expression literature point out that there is a great deal of between-subject variability in the numerical values assigned to expressions, the general ordering of these expressions in relation to one another is consistent. People may assign different numerical values to expressions such as *I know* and *I think*, but they always tend to place *I know* as indicating more confidence than *I think*. Feezel (1974) suggests that terms of confidence/certainty lie along a continuum, ranging from certainty and descending through likelihood to possibility. Consistent results have been found for the positioning of words along this continuum, with terms such as *suppose*, *think*, *sure*, *certain*, and *positive* indicating increasing certainty (Berry, 1960; Beyth-Marom, 1982; Fabre, 1991; Foley, 1959; Moore et al., 1993; Renooij and Witteman, 1999; Westney, 1986).

Uncertainty, on the other hand, is said to be characterised by the more frequent use of tag questions and disclaimers (Bradley, 1981; Erickson et al., 1978). However, Bradley points out that whilst there are many kinds of disclaimer, only two are associated with uncertainty – hedges and cognitive disclaimers. So, uncertainty may be expressed with the use of tag questions (*It's..., isn't it?*), hedges (*I'm no expert but...*) and cognitive disclaimers (*I could be mistaken but...*);

Hedging indicates the tentative nature of a statement, communicating some measure of uncertainty about the likely response to it [whereas] cognitive disclaimers are used when a person believes that his opinion may be questioned and/or that some doubt exists concerning his capacity to deal adequately with the facts (Bradley, 1981, p. 77-78).

Thus, the aim of this pilot study is to create a list of expressions covering the confidence-uncertainty continuum that may then be used as confidence cues in the subsequent experimental chapters.

Method

Participants

26 participants (9 males and 17 females) ranging in age from 19 – 49 years ($M = 26.69$, $S.D. = 9.25$) completed the pilot study. None of these participants took part in the main studies reported in experimental chapters of this thesis.

Materials

A list of 62 confidence cues was constructed. In addition to the expressions noted in the introduction to this chapter, further expressions that are commonly used in natural language to express confidence and uncertainty (e.g. *I'm not sure but it could be...*) were added to the list of confidence cues. These were taken from various sources including conversations, television quiz shows and court transcripts. However as Hamm (1991) points out, there are a large number of different expressions people can, and do, use to indicate their level of confidence, thus making it extremely difficult to comprehensively cover all of these. As such the list of confidence cues uses those expressions identified in previous research, and some of the more naturalistic expressions of everyday life. It is hoped that a broad range of ways of expressing confidence and uncertainty are thus covered.

Procedure

Participants were asked to rate the 62 confidence cues for how confident they would be that their answer was correct if they answered a question using such expressions. Participants indicated their confidence in each answer on a seven-point scale, where 1 = “Not at all confident”, 4 = “Moderately Confident” and 7 = “Highly confident”. To allow for greater freedom of use of the confidence cues in the subsequent experiments, half of the participants rated cues that were presented in present tense (e.g. *I'm confident that it is...*) with the other half rating cues that were presented in past tense (e.g. *I'm confident that it was...*). Questionnaires and instructions issued to participants in the pilot study can be found in Appendix A.

Results and Discussion

The mean rating of each confidence cue was calculated. Between-subjects t-tests on the ratings given by participants viewing the confidence cues presented in past and present tense revealed no significant differences in any of the ratings (all $p > .05$, see Appendix B). Therefore the ratings given in past/present tense were pooled, and the cues rank ordered based on the overall means, which ranged from 2.15 to 6.38 (Table 2.1).

The expressions were then divided into high, medium and low confidence cues based on their mean ratings (Table 2.1). Expressions with means falling between 2.73 and 3.54 were classed as low confidence cues ($n = 18$). Means between 3.88 and 4.77 were assigned as medium confidence cues ($n = 17$). Finally, means falling between 5.58 and 6.38 were classed as high confidence cues ($n = 13$). Each category of confidence cues covered a similar range of means (.81, .89 and .80 respectively). Although there were uneven numbers of cues assigned to each confidence level, an equal number of cues from each level were used in a majority of the experiments in this thesis.

However, not all the expressions rated in the pilot study were selected as experimental confidence cues, as in retrospect some of the expressions were not deemed to be suitable for use in the subsequent experiments. For example, *I'm not sure it's kind of...* was removed from the list of confidence cues, as it was not suitable for appending to a majority of short answers. Furthermore, cues preceded by utterances such as *Yes*, *Err* and *Erm* were also excluded. Eight confidence cues in total were removed on this basis.

Druzdzel's (1989) review of the verbal uncertainty expression literature points out that there is often a great deal of overlap between terms. For this reason words should be selected that are rated sufficiently apart from each other to eliminate this overlap, and hence ambiguity of terms. Hence, a continuous range was not used, so as to create a distinction between levels of confidence cues, avoiding ambiguity between the levels. Expressions with mean ratings higher than 3.54 but lower than 3.88 were not used, to create distinct categories of low and medium confidence cues. Similarly, expressions with mean ratings higher than 4.77 but lower than 5.58 were omitted to distinguish between medium and high confidence cues. This resulted in a further six cues being excluded. All excluded cues are shown in Table 2.1.

Table 2.1

Mean ratings of expressions, confidence cue level and distribution of cues across experiments

Q. No.	Expression	M	S.D.	Confidence Level	Chapter							
					3/4	5	6	7	8	9	10	
5	Err, I think it's...	2.15	0.97	Low								
17	I'm not sure, it's kind of...	2.54	1.14	Low								
15	I suppose it could be...	2.73	0.96	Low	✓	✓	✓	✓	✓	✓	✓	✓
31	I think it's.... isn't it?	2.73	1.34	Low	✓	✓	✓	✓	✓	✓	✓	
28	I'm guessing, but I would say it's...	2.81	0.90	Low	✓	✓	✓	✓	✓	✓	✓	✓
16	Well, it's.... I guess.	2.81	1.10	Low	✓	✓	✓	✓	✓	✓	✓	
50	Oh, I don't know, I suppose it's...	2.81	1.10	Low	✓	✓					✓	
29	Erm, I think it's...	2.85	1.35	Low								
2	Is it...?	2.96	1.40	Low			✓	✓	✓	✓	✓	
53	It could be.... but I don't know.	3.00	1.10	Low	✓	✓	✓	✓	✓	✓	✓	✓
6	Perhaps it's...	3.04	0.77	Low		✓	✓	✓	✓	✓	✓	✓
54	Isn't it...?	3.04	1.28	Low			✓	✓	✓	✓	✓	
9	I'm not sure, but it may be...	3.11	1.14	Low			✓	✓	✓	✓	✓	✓
32	It's.... I think.	3.11	1.34	Low				✓	✓			✓
3	I could be wrong, but I think it's...	3.15	1.32	Low		✓		✓	✓			✓
38	I guess it's...	3.15	1.08	Low		✓		✓	✓			✓
44	I think, I think it's....	3.15	1.08	Low								
7	It could be...	3.27	0.87	Low		✓	✓	✓	✓	✓	✓	✓
35	I'm not sure but, it could be...	3.31	1.01	Low		✓			✓			✓
26	It might be...	3.54	1.10	Low				✓	✓			
57	Could it be...?	3.54	0.76	Low				✓	✓			
34	It's possibly...	3.54	0.99	Low								
21	It may be...	3.58	0.99	N/a								
12	I think it's.... but I can't be sure.	3.58	0.99	N/a								
25	I'm not certain, but it could be...	3.58	1.24	N/a								
46	Chances are it's...	3.73	.96	N/a								
14	I'm not completely confident, but I think it's...	3.77	.76	N/a								
33	I could be mistaken but I'm sure it's...	3.88	1.07	Medium		✓		✓				

4	I should say it's...	3.88	1.07	Medium				✓	✓		
36	As far as I can recall, it's...	3.88	0.95	Medium				✓	✓		
30	I would say it's...	3.88	0.95	Medium	✓	✓		✓	✓		
56	Oh, I think it's...	3.92	1.29	Medium	✓	✓					
43	It's around about...	3.92	1.02	Medium							
49	I think it's...	3.92	0.98	Medium	✓	✓		✓	✓		✓
60	I can't say for sure, but I think it's...	3.92	0.98	Medium	✓			✓	✓	✓	✓
23	I suspect it's...	4.00	1.06	Medium	✓	✓	✓	✓	✓	✓	✓
47	It is probably...	4.08	1.09	Medium		✓	✓	✓	✓	✓	✓
51	I believe it's...	4.15	1.08	Medium	✓	✓	✓	✓	✓	✓	✓
10	There's a good chance it's...	4.35	0.98	Medium			✓	✓	✓	✓	✓
18	If I remember correctly, it's...	4.35	0.98	Medium		✓	✓	✓	✓	✓	✓
42	I seem to recall it's...	4.54	0.99	Medium		✓	✓	✓	✓	✓	✓
27	There are, I believe...	4.58	1.06	Medium							
37	I have no doubt, I mean I'm sure it's...	4.69	1.64	Medium			✓	✓		✓	
52	I remember it's...	4.69	0.97	Medium		✓	✓	✓	✓	✓	
62	Surely it's...	4.69	1.19	Medium		✓	✓	✓	✓	✓	✓
1	It must be...	4.77	1.42	Medium			✓			✓	✓
19	I'm fairly confident it's...	5.11	1.14	N/a							
45	Oh yes, it's...	5.38	1.27	N/a							
13	I'm sure it's...	5.58	1.10	High		✓		✓	✓		
24	It's...	5.58	1.55	High		✓		✓	✓		
58	It is...without a doubt.	5.85	1.41	High			✓	✓	✓	✓	
55	I have no doubt it's...	5.85	1.26	High				✓	✓	✓	✓
8	I'm certain it's...	5.96	1.37	High	✓	✓	✓	✓	✓	✓	✓
22	It's obviously...	6.04	1.00	High		✓	✓	✓	✓	✓	✓
61	It's certainly...	6.08	1.06	High		✓	✓	✓	✓	✓	✓
20	I know it's...	6.11	1.40	High	✓	✓	✓	✓	✓	✓	✓
40	Yes, it's...	6.19	.94	High							
11	I'm positive it's...	6.27	1.25	High	✓	✓	✓	✓	✓	✓	✓
48	I know for a fact that it's...	6.27	1.08	High	✓	✓	✓	✓	✓	✓	✓
41	I'm confident that it's...	6.35	0.85	High	✓	✓	✓	✓	✓	✓	✓
39	It's definitely...	6.38	0.90	High		✓	✓	✓	✓	✓	✓
59	I'm absolutely certain it's...	6.38	1.10	High	✓	✓	✓	✓	✓	✓	✓

The three levels of confidence cue developed in this pilot study concur with previous research that has found expressions of confidence/certainty to fall along the certainty-probability-possibility continuum (Berry, 1960; Fabre, 1991; Feezel, 1974; Foley, 1959). The high confidence cues convey the certainty of the statement – what one knows to be true. E.g. *It's definitely* and *I'm confident it's*. The medium confidence cues convey what one thinks is probably true. E.g. *It's probably* and *I think it's*. The low confidence cues convey what one thinks is possibly true. E.g. *It's possibly* and *I guess it's*. Additionally the ordering of the words positive, certain, sure, think and suppose, in terms of the confidence that was associated with them, was consistent with other studies (Berry, 1960; Fabre, 1991; Foley, 1959).

To further consider the reliability of the confidence levels of the confidence cues used in this study comparisons were made where possible with similar expressions used by Pulford (2002). Table 2.2 indicates that the ratings given for the cues in the present pilot study are largely in agreement with those found by Pulford.

Table 2.2
A comparison of mean ratings of confidence cues

Confidence Cue	Pulford (2002)		Wesson	
	<i>M</i>	<i>S.D.</i>	<i>M</i>	<i>S.D.</i>
I'm absolutely positive/I'm positive...	6.34	1.10	6.27	1.25
Certainly, this is a/It's certainly...	5.91	1.00	6.08	1.05
I'm certain...	5.76	1.16	5.96	1.37
I'm fairly confident...	5.06	1.29	5.11	1.42
It's probably...	4.00	1.05	4.08	1.09
It may be...	3.73	1.06	3.69	1.16
Perhaps this could be/Perhaps it's...	3.31	1.23	3.04	0.77

Note. *N* = 20 for Pulford (2002) and *N* = 26 for Wesson

Overall, the confidence cues developed in this pilot study have been found to cover a range of expressions of confidence and uncertainty, and the ratings given in the present pilot study are in concordance with previous findings. The three distinct levels of confidence cues (high, medium and low) that have been developed in this pilot study are used in the subsequent experiments reported in this thesis, and reference will be made back to this pilot study in the following chapters. The use of these cues across each of the eight experimental chapters is also illustrated in Table 2.1

CHAPTER 3

The Influence of Confidence and Task Type

This experiment investigates the role of task type upon the influence of confidence. In a mixed factorial design 116 participants completed three different tasks, each consisting of 12 questions with three alternative responses from which participants selected their answer. Each response was given by a different 'speaker'. In the experimental condition speaker's answers were preceded by confidence cues; one speaker answered each question with high confidence, one with medium confidence and one with low confidence. In the control condition speaker's answers were given in the absence of confidence cues. A significant interaction between speaker confidence and condition showed that the addition of high confidence cues had the most positive influence upon choice, and low confidence cues had the most negative influence, on all three tasks. A significant speaker confidence, condition and task type interaction indicated that the extent of this influence depended upon task type. Speaker confidence of any level also served to increase participant's confidence in their answers with the extent of this influence again depending on task type. Furthermore, different levels of speaker confidence led to differences in how the speakers were perceived. The results indicate that when we are uncertain we use another person's confidence level as a way of distinguishing between information we are receiving, taking high confidence as indicative of the 'best' answer.

The Influence of Confidence and Task Type

Decision-making is often social in nature - we turn to others for their opinions or advice when we are uncertain. How we evaluate and interpret this information can determine whether or not we use it in making our final decision. A potential method of evaluating the quality of another person's information is by attending to the level of confidence with which they express themselves, where confidence is defined as the strength of a person's belief that a specific statement represents their best or most accurate response (Peterson and Pitz, 1988).

Previous research has found information expressed confidently to be used more than that which is expressed tentatively or with some element of doubt in many situations, including eyewitness testimony (Leippe, Manion, and Romanczyk, 1992), knowledge based tasks (Sniezek and Van Swol, 2001), and group-decision making (Zarnoth and Sniezek, 1997). But the extent of this influence is not constant, with high confidence exerting more influence in some of these situations than in others. Additionally, as outlined in Chapter 0, expressing too much confidence has been found at times to have a detrimental effect, leading to a reduction in that speaker's influence (London, McSeveney, and Tropper, 1971; Pulford, 2002). So what determines how much influence a particular level of a speaker's expressed confidence has?

Zarnoth and Sniezek (1997) studied the social influence of confidence in group-decision making. After participants had individually answered a series of multiple-choice questions, and indicated their confidence in each of their given answers, they generated a group response for the same questions. Group size was found to affect the influence of confidence, with two-member groups choosing the answer given by the most confident member 72% of the time, and five-member groups choosing the most confident members answers on 57% of occasions. The extent to which participants agreed with the most confident group member also varied according to task type. Based on Laughlin and Ellis' (1986) terminology, Zarnoth and Sniezek divided the questions into a series of intellectual and judgmental tasks. Intellectual tasks are those for which there exists a demonstrably correct answer, such as general knowledge questions, whereas judgmental tasks are those for which there is not a demonstrably correct answer, instead being based on aesthetic judgements or preferences, such as opinion-based questions.

Zarnoth and Sniezek (1997) found that the most confident group members answers were chosen more frequently on tasks that were intellectual than on those that were judgmental. Whilst this could partly be attributable to the accuracy of the most confident faction on the intellectual task, the most confident group member still exerted the most influence over the final decision on both task types, regardless of whether they were correct or incorrect.

Zarnoth and Sniezek conclude that the relationship between confidence and influence is not constant. Although the social influence of confidence *is* constant, in that the most confident individual was found to exert the most influence on both task types, it *is not* constant in the extent of this influence, with confidence being a greater predictor of influence on intellectual rather than judgmental tasks.

Why does the most confident group member exert the most influence? As Zarnoth and Sniezek (1997) suggest it may be due to behavioural styles, in that confident group members may be more talkative or confrontational. In turn confident group members may also be more resistant to persuasion from others, a suggestion supported by Visser, Krosnick, and Simmons (2003) who found that people who hold their attitudes with certainty are less susceptible to social influence. These suggestions are unique to group decision-making situations, or at least to situations where a consensus must be reached. However, decisions in the real world are often made interactively, rather than having to reach a group consensus, in that we consult with others but ultimately make the final decision alone, deciding whether or not to use the information that we have collected (Heath and Gonzalez, 1995). When we have the final say on a decision and do not have to bow to group pressures, do we still rely on other peoples' high confidence when selecting which information we use and which we ignore?

Sniezek and Van Swol (2001) looked at the influence of confidence within an interactive decision-making environment, using the Judge-Advisor System (JAS). On a knowledge-based task there was a significant positive relationship between an advisor's confidence, how much the judge trusted that advisor, and how accurate that advisor was. The advisor's confidence was also found to influence the judges' final decisions, with the advice being taken from individuals who expressed higher confidence.

In an interactive decision making environment, not having to reach a consensual decision means that the influence of confidence should not be due to group decision procedures, such as conceding to a confident individual because they are more confrontational. Why then does the most confident individual's answers still exert the

most influence? It has been suggested that the most confident individual's answers may be selected as a default option, using confidence as a heuristic by which to simplify the decision-making process (Leippe et al., 1992; Thomas and McFadyen, 1995; Zarnoth and Sniezek, 1997). In utilising the confidence heuristic more weight is placed on a person's expressed confidence than on the actual content of what they are conveying. Expressed confidence is taken as a cue to accuracy, knowledge and competency, and the expectation is that someone is more likely to possess reliable information if it is expressed confidently rather than tentatively. When all else is equal we may reach a decision based on a comparison of other people's expressed level of confidence (Thomas and McFadyen, 1995). We should not have to pay close attention to what someone says, just how they say it in terms of the confidence that they express, as this should give us enough information on which to base our decision. In other words, the higher the confidence the greater the influence that should be exerted.

If confidence does indicate accuracy reliably then using the confidence heuristic is an effective strategy as in, for example, Sniezek and Van Swol's (2001) experiment, where high confidence was a valid indicator of an advisor's accuracy. However this is not always the case. People may use the confidence heuristic to their advantage, arguing confidently so as to appear more knowledgeable than they really are. As such, receiving input from others may enhance our confidence more than it enhances the accuracy of the decisions we make (Heath and Gonzalez, 1995; Paese and Kinnaly, 1993).

Does this mean that we abandon our own knowledge when faced with confident knowledge from another, regardless of the quality of that information? Paese and Kinnaly (1993) say no, pointing out that in their experiment participants' accuracy should have increased if this was the case, as the information they were receiving was either 60% or 90% accurate. However, given that accuracy actually fell to around 40%, this would indicate that participants did not abandon their own perceived knowledge for that of another's confident knowledge. But Sniezek and Buckley (1995) disagree, stating that 'confidence is power' as the very act of communicating one's confidence to another serves to influence that person's final decision. The influence of confidence as they see it is a two way process - confidence enhances the influence one has upon others yet uncertainty makes one more susceptible to social influence.

The extent to which another's confidence influences us may depend upon our source of information (Sniezek and Buckley, 1995). A decision-maker can utilise internal information, their own knowledge concerning the task in hand, or they can utilise

external information, taking advice from others. As the amount of information one can bring to a task decreases, the power of another person to influence and manipulate our choices via their confidence level increases (Snizek and Buckley, 1995).

The above studies rely on numerically expressed confidence, such as “I’m 80% sure”, to convey the confidence of another person. However in real-life situations, as discussed in Chapter 1, uncertainty is rarely expressed numerically. People more usually express their level of confidence or uncertainty using verbal expressions, through expressions such as “I’m certain” or “I’m not sure”.

In Snizek and Van Swol’s (2001) experiment, advisors had the opportunity to add written comments in support of their answers in addition to the numerical estimates of confidence they had provided. The extent to which judges trusted these advisors was positively correlated to the frequency of additional confidence comments, such as “I’m definite about this”, that were given by the advisor.

High confidence can however have a negative influence. Pulford (2002) found that a highly confident speaker was the least trusted and least liked when compared to speakers expressing their answers with medium or low confidence. High and low confidence actually led to reductions in agreement with those speakers whereas medium confidence increased agreement. The speaker who expressed medium confidence not only exerted the most influence over the choices made by individuals but they were also trusted and liked the most. This concurs with London, McSeveney, and Tropper’s (1971) suggestion that there is a curvilinear relationship between confidence and influence. They also found that too much confidence led to increased feelings of antagonism towards a speaker – the higher the confidence the more negatively the speaker was perceived.

It would appear then that the level of confidence with which a person expresses himself or herself can affect how that speaker is perceived, as well as the influence that their expressed confidence exerts. Previous research has identified two major dimensions of speech cue attributions – those relating to speaker competency and those relating to speaker likeability (e.g. Chaiken and Eagly, 1976; Erickson, Lind, Johnson, and O’Barr, 1978; Scherer, 1979). Some researchers have also suggested that speech styles serve as a cue to the gender of the speaker (Bradley, 1981; Lakoff, 1975; but see Erickson et al., 1978; Newcombe and Arnkoff, 1979). How speakers using different levels of expressed confidence are perceived in relation to these dimensions may in turn mediate their influence.

Rationale for Experiment

The research reviewed here has shown that people assess the quality of another's knowledge by attending to their expressed level of confidence. This would suggest that people use confidence as a heuristic to simplify the decision making process. While confidence as a heuristic has been suggested previously (e.g. Leippe et al., 1992; Thomas and McFadyen, 1995; Zarnoth and Snizek, 1997), empirical research has not focused on this. Do people use confidence as a heuristic on which to base their judgements and decisions? Do they use it all of the time or only in some situations?

This experiment considers the influence of verbal expressions of confidence on different types of task, replicating Pulford's (2002) methodology. Verbal expressions are used as they are more representative of how we communicate uncertainty in everyday life than numerical expressions are, although research has tended to focus on the latter. Additionally, three levels of confidence are used – high, medium and low – to represent a broader range of confidence than the traditional high/low, confident/tentative dichotomy. It is also important to consider the influence of confidence across a range of task types as some tasks allow the decision-maker to bring more information to the task than others. For this reason three different tasks are used. The first, a general knowledge task, represents an intellectual task and allows the individual to bring their *own knowledge* to hand, or use the information provided by another. The second task, an opinion-based task, represents a judgmental task, and allows the individual to use their *own opinions*, or the opinions provided by another. In some situations we may have to make a decision blindly, having only external information to rely upon. The third task was used to represent this as it allows the individual to bring *no prior knowledge or opinions* to the task, and is therefore classed as an external judgement task.

Drawing upon the research findings discussed, the hypothesis of this experiment is that higher levels of speaker confidence will exert a greater influence upon participants' choices than low confidence, but the extent of this influence may be dependent upon the task being completed. Additionally, in relation to previous research (Heath and Gonzalez, 1995; Paese and Kinnaly, 1993), it is hypothesised that being able to view another person's confidence will lead to increases in confidence. How speakers using different levels of confidence are perceived, and the relation of this to the influence of confidence upon choice, is also considered to investigate the underlying reasons for any changes in choice that occur.

Method

Participants

116 participants (86 women and 30 men), both members of the public and undergraduate students from the University of Wolverhampton's participant pool, took part in the study. The participant pool is a reciprocal scheme, consisting of first and second year undergraduate psychology students who gain access to the participant pool for their own final year research upon completion of a set number of participant hours for which they have volunteered. Participants ranged in age from 18 to 57 years ($M = 21.69$, $S.D. = 5.95$). Participants were randomly assigned to either the experimental ($n = 59$) or control condition ($n = 57$).

Design

The study was a 2 (Condition: Experimental with confidence cues; Control with no confidence cues) \times 3 (Task Type: Intellective; Judgmental; External judgement) \times 3 (Speaker Confidence: High/Speaker A; Medium/Speaker B; Low/Speaker C) mixed design, with repeated measures on the last two variables. The dependent variables were the percentage of time each speaker's answers were chosen on each of the three tasks, the participant's mean confidence in their answer, the mean accuracy of their answer (only on the intellective/general knowledge task), and their perceptions of each speaker.

The correct answer to each question was placed in a counterbalanced design, so that each correct answer appeared equally often in answer position 1, 2 and 3. In a similar way the order of presentation of each speaker was counterbalanced to reduce any response biases. Finally the presentation of task type was counterbalanced so that, within each condition, a third of the participants received the intellective task first, a third the judgmental task first and a third the external judgmental task first.

The control condition allowed for the number of participants who chose each multiple-choice answer in the absence of the independent variable of confidence cues to be determined. The answers each of the three speakers gave in the control condition were exactly the same as those in the experimental condition apart from the omission of confidence cues. In doing so, the answers that participants opted for in the control group were not due to the confidence in each speaker's answer but due to their own knowledge.

Materials

All participants responded to 12 questions on three different types of task. Across the tasks, questions were presented in the same format, in that each question was followed by three alternative responses from which participants had to select their answer. In the experimental condition the responses had confidence cues attached, with each speaker expressing a different level of confidence in their answer - either high, medium or low. Six cues from each confidence level were selected, with 18 confidence cues being used in total (see Table 2.1, Chapter 2). A relatively small number of cues were used to maintain consistency across the experimental tasks. The chosen cues were then randomly assigned to the answers given in the experimental condition, where each question was followed by three answers, one preceded by a high confidence cue, one by a medium confidence cue and one by a low confidence cue. Each confidence cue was used six times, each time in a different combination, so that no two cues were used together more than once.

Each task was designed to represent elements of popular game shows, with the intellectual task mirroring the style and format of the popular TV show “Who Wants to be a Millionaire?”, the judgemental task representing questions that would be used on “Family Fortunes” and the external judgment task being based on a section of “The Generation Game”. Instructions issued to participants and the task materials used can be seen in Appendix C.

Intellectual task: General Knowledge. 12 general knowledge questions were selected from Nelson and Narens’ (1980) database of general-information questions for which they had developed norms. As the experiment required difficult questions to be used, in order to increase participant uncertainty so that they would utilise the ‘advice’ of the speakers, only those with a low probability of recall were selected ($M = 0.07$, $S.D. = 0.06$). Questions were also chosen with a low Feeling-of-Knowing score (see Hart, 1965) ($Mdn = 3.5$, based on a 1-9 range), as the experiment utilised a multiple-choice format. Therefore using such questions meant that people were more likely to use the ‘advice’ given to them, rather than to answer questions due to a Feeling-of-Knowing.

In addition to the correct answer, two alternative incorrect responses were given to each question. These consisted of either related answers, (e.g. “What is the longest river in Asia”? Indus; Yenisei; *Yangtze*), or similar answers (e.g. “What is the name of Alexander Graham Bell’s assistant?” *Watson*; Walker; Warner).

For example, in the experimental condition,

“What is the longest river in Asia”?

Friend C said, I think the Indus is the longest river, isn't it?

Friend B said, I suspect the longest river is the Yenisei

Friend A said, I know the longest river is the Yangtze

In the control condition,

Friend C said, the Indus is the longest river

Friend B said, the longest river is the Yenisei

Friend A said, the longest river is the Yangtze

Judgmental task: Opinions. 30 participants who did not take part in the main study participated in a pilot study conducted to generate responses to 30 opinion-based questions. The frequency of each response was logged, and then 12 questions were selected from the original 30 that had clear “top” answers, i.e. those that had the highest response frequency. Two alternative responses were selected from the second and third most frequent responses for each of the chosen questions.

For example in the experimental condition,

“Name a famous Saint”

Friend A said, I know the top answer is Saint Patrick?

Friend B said, I believe the top answer is Saint Paul

Friend C said, I'm guessing but I would say that the top answer is Saint Christopher

External Judgement task. To give a greater range of task types an external judgement task was also used, where a decision was required on the basis of externally provided information only. This took the form of a ‘memory’ game. Participants were told that their ‘friends’ had been shown pictures of twelve different objects, which they had to name in the correct order of appearance. From the three responses given, participants had to select which answer they thought was correct.

For example in the experimental condition,

“What was the fourth object you were shown?”

Friend B said, I would say the fourth object was the book

Friend A said, I have no doubt that the fourth object was the wine bottle

Friend C said, I suppose the fourth object could have been the clock

As the aim of the study was to consider the influence of different levels of speakers' confidence on different task types in the absence of other differentiating information about the speaker such as age or gender, the speakers were identified only as 'Friend A', 'Friend B' and 'Friend C'. In the experimental condition 'Friend A' was the high confidence speaker, 'Friend B' medium confidence and 'Friend C' low confidence. In the control condition, no confidence cues were attached to any of the friends' answers. Whilst the use of these labels may be argued to possess less validity than using peoples names, Allwood (1994) points out that by simply "presenting subjects with a situation where another person had actually selected the answers in the belief that they were correct [as opposed to simply using MCQs], realistic possibilities [are] created that subjects would pay attention to content of a social nature" (p. 200).

Procedure

All the experiments reported in this thesis required participants to sign informed consent forms before taking part. Each participant was then given written instructions and a booklet containing task materials. For each task the participants were asked to circle the 'name' of the speaker who had given the correct answer (*A*, *B* or *C*) and also to indicate how confident they were in this answer on a scale of 0 to 100, where 0 = not at all confident and 100 = completely confident. The questionnaire was administered in a group but completed individually and without interaction.

After all three tasks had been completed the participants were presented with another questionnaire which asked a series of questions regarding their impressions of the speakers on the basis of how they had responded on the three tasks. Firstly they were asked to indicate who they would choose as a team-mate to take through to the 'next round', based on their overall performance. This was to see if participants overall preference for a particular speaker was the same as the speaker whose answers they had selected the most. It may be that whilst on each individual question the participants attend to each answer, overall one particular level of confidence may be more salient. Participants were also asked to indicate which speaker they thought was the most competent and the least competent, which they liked the most and the least, and which sex they thought each speaker was. As a manipulation check participants were also asked to indicate which speaker they thought was the most confident and which they thought was the least confident. After the questionnaires had been completed participants were debriefed and thanked. (See Appendix C for debriefing details).

Results

The percentage of times each participant chose the answers given by each of the three speakers was calculated for each task, along with participants mean confidence in their answers when choosing the answers of each speaker. Throughout this thesis results relating to the speakers and their level of confidence will be referred to as the high, medium or low confidence speaker (as opposed to Speaker A, B or C in this experiment, for example) in both the experimental and control conditions. In the case of the latter, although no confidence cues are actually used, these labels refer to the answers given by the equivalent speaker in the absence of confidence cues. The influence of a speaker's answers in the presence and absence of confidence cues was investigated through the use of a mixed design Analysis of Variance (ANOVA) with planned comparisons between conditions made using t-tests. The use of other tests is specified when necessary. An alpha level of .05 was used for all statistical tests within this thesis, unless stated otherwise.

Influence of Confidence Cues on Chosen Answers

Table 3.1

Mean percentage of agreement with each speaker across tasks

Task Type	Speaker Confidence					
	High		Medium		Low	
Intellective						
Control	33.19	(14.81)	37.13	(18.44)	29.68	(13.91)
Experimental	66.81	(30.30)	21.61	(22.80)	11.58	(14.10)
Judgmental						
Control	32.89	(12.44)	27.48	(13.08)	39.62	(13.84)
Experimental	47.74	(28.48)	29.80	(19.46)	22.46	(19.03)
External Judgement						
Control	32.16	(22.02)	31.58	(21.63)	36.11	(25.02)
Experimental	76.84	(30.72)	17.23	(25.18)	5.93	(16.08)
Total						
Control	32.73	(11.87)	32.07	(11.59)	35.08	(12.73)
Experimental	63.76	(25.15)	22.88	(17.69)	13.32	(12.37)

Note. Standard deviations are in parentheses.

The influence of speaker confidence on participants' choice of answers was analysed using a Condition \times Task Type \times Speaker Confidence mixed ANOVA, with repeated measures on the last two variables. The mean percentage of agreement with each of the three speakers' answers, in the absence and presence of confidence cues, is shown in Table 3.1. There were no main effects of the between-subjects factor of Condition, $F(1, 114) = 1.05$, $p = .31$, or the within-subjects factor of Task Type, $F(2, 228) = 1.05$, $p = .35$, although a significant main effect of Speaker Confidence was observed, $F(2, 228) = 51.02$, $p < .001$; the 'high' confidence speaker's answers were chosen more frequently when combining the results from the control and experimental conditions ($M = 48.27$) than the medium and low confidence speakers' answers were ($M = 27.47$ and $M = 24.23$).

There was no Task Type \times Condition interaction, $F(2, 228) = 1.03$, $p = .36$, but a significant Speaker Confidence \times Condition interaction was found, $F(2, 228) = 57.11$, $p < .001$. As Table 3.1 indicates, in the absence of confidence cues (Control) there is no difference in the amount of times each speakers' answers were chosen, whereas there was when confidence cues were added (Experimental). Here participants chose the answers given by the high confidence speaker ($M = 63.76$) more than those given by the medium ($M = 22.88$), and in turn low confidence speakers ($M = 13.32$). A significant Speaker Confidence \times Task Type interaction was also found, $F(4, 456) = 13.41$, $p < .001$. This can be explained in relation to the significant three-way Speaker Confidence \times Task Type \times Condition interaction, $F(4, 456) = 13.46$, $p < .001$. This three-way interaction is illustrated in Figure 3.1, which shows the mean difference in the amount of times each speaker's answers are chosen between the control and experimental group for all three tasks.

On all three tasks there was a shift towards answers expressed with high confidence and away from those expressed with low confidence, although the extent of these changes do depend upon task type. The influence of a speaker using medium confidence cues also depends on task type with there being either no change or a decrease in the amount of times that speaker's answers are chosen. Table 3.1 shows that on all tasks high confidence answers were chosen more frequently than either medium or low confidence answers and in turn answers expressed with medium confidence were chosen more frequently than those expressed with low confidence. The results for each task type shall be reported separately below in more detail.

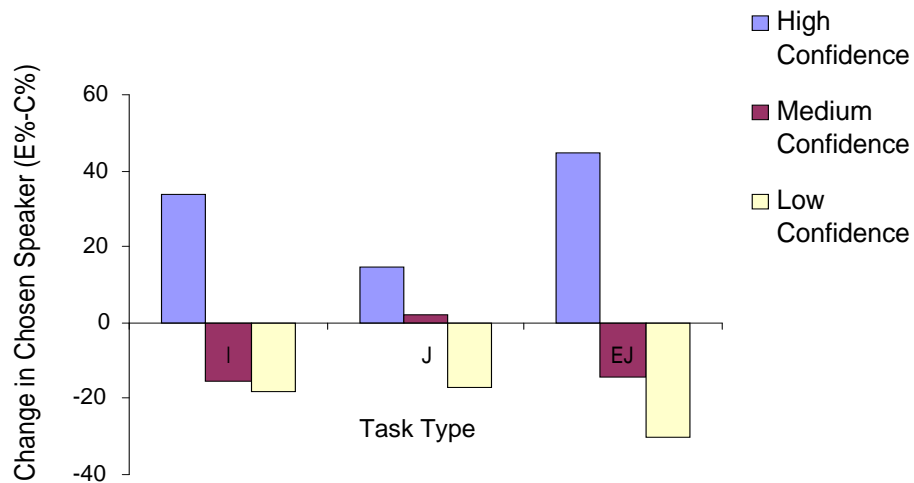


Figure 3.1. Percentage change in chosen speaker between the Control (C) and Experimental (E) conditions across Intellectualive (I), Judgmental (J) and External Judgement (EJ) task types.

Intellective Task

On the intellective task, compared to when no confidence cues were used, a speaker's answers were chosen 33.62% more often when expressed with high confidence, $t(114) = 7.55, p < .001$. Speakers expressing their answers with medium or low confidence saw comparable decreases in the amount of times their answers were chosen (-15.52% and -18.10%), $t(114) = 4.02, p < .001$, and $t(114) = 6.96, p < .001$.

As this was an intellective task a correct answer existed for each question. However it was not the intention of this experiment to provide any cues to the accuracy of the answers, with each speaker being correct an equal amount of times. The addition of confidence cues made no difference to the participants' accuracy on this task, with mean accuracy for the control and experimental groups being no better than would be expected by chance alone ($M = 34.06\%$ vs. $M = 37.85\%$), $t(114) = 1.28, p = .20$. Therefore the differences between chosen speakers, on the intellective task at least, is due to their expressed confidence and not the accuracy of their answers.

Judgmental Task

On the judgmental task the addition of confidence cues led to a much less pronounced change in the choice of speaker whose answers were selected. There is again a shift towards a speaker's answers when expressed with high confidence, $t(114) = 3.62, p < .001$, albeit to a lesser extent than on the intellective task (14.85% vs.

33.62%), with the high confidence speakers answers being chosen less often on this task than on the intellectual task ($M = 47.74\%$ vs. $M = 66.81\%$), $t(58) = 4.94, p < .001$. The shift towards high confidence is to the detriment of the speaker answering with low confidence, whose answers were chosen 17.16% less often when they used confidence cues than when they did not, $t(114) = 5.54, p < .001$. However, the low confidence speaker's answers were still chosen more frequently on this task than on the intellectual task ($M = 22.46\%$ vs. $M = 11.58\%$), $t(58) = 4.23, p < .001$. Whilst the addition of medium confidence cues made no difference to the amount of times that speaker's answers were selected on this task, $t(114) = .75, p = .46$, the answers given by this speaker were chosen more often here than on the intellectual task ($M = 29.80\%$ vs. $M = 21.61\%$), $t(58) = 2.33, p = .02$.

External Judgement Task

The most substantial choice shifts from the absence to the presence of confidence cues were seen on the external judgement task. Here a speaker's answers were chosen 44.68% more often when expressed with high confidence, $t(114) = 8.97, p < .001$, and 30.18% less often when expressed with low confidence, $t(114) = 7.76, p < .001$, compared to when no confidence cues were used. Medium confidence cues also decreased selection of that speaker's answers by -14.35%, $t(114) = 3.29, p = .001$. The answers expressed with high confidence were chosen more often on this task than on either the intellectual ($M = 76.84\%$ vs. $M = 66.81\%$, $t(58) = -3.34, p = .001$) or the judgmental task ($M = 76.84\%$ vs. $M = 47.74\%$, $t(58) = 7.34, p < .001$). As can be seen in Table 3.1, out of the three tasks the answers expressed with a medium or low level of confidence were chosen least often on this task. The medium confidence speaker's answers were chosen less often here than on either the intellectual, $t(58) = 2.16, p = .04$, or the judgmental task, $t(58) = 3.40, p = .001$, as were the low confidence speaker's answers, $t(58) = 3.09, p = .03$ and $t(58) = 5.71, p < .001$.

The three-way interaction therefore appears to arise from the judgmental task being very different to the intellectual or external judgement task in how strongly it evokes the use of the confidence heuristic. The addition of confidence cues does seem to serve as a means of distinguishing between different sources of information one is receiving. But although the experimental group shows a preference towards answers expressed with high confidence the extent to which a speaker expressing their answers with high confidence influences people's choices depends upon the type of task being undertaken.

Influence of Confidence on Choice Confidence

Due to the strong positive effect that high confidence had upon choice in the experimental condition, and conversely the strong negative effect of low confidence, the results relating to participant confidence were analysed separately for each speaker's confidence level using ANOVA, with comparisons being made across conditions and task type. The analysis of these data was conducted in this way because the small number of participants who chose the answers given by the low confidence speaker made analysis for all three speakers together problematic. The low numbers of participants choosing the answers given by the low confidence speaker, in the experimental group meant there were a lot of missing data for confidence in these cells.

Table 3.2

Mean confidence (%) in answers for agreement with each speaker across tasks

Task Type	Speaker Confidence					
	High		Medium		Low	
Intellective						
Control	32.52	(17.41)	35.24	(17.47)	35.55	(19.67)
Experimental	58.89	(24.93)	52.51	(26.73)	53.09	(28.73)
Judgmental						
Control	62.64	(16.01)	64.16	(16.44)	61.15	(13.89)
Experimental	72.30	(16.37)	70.94	(14.66)	67.77	(14.91)
External Judgement						
Control	29.29	(20.04)	26.73	(19.33)	30.71	(23.11)
Experimental	65.33	(25.96)	56.39	(24.56)	48.21	(20.30)

Note. Standard deviations are in parentheses.

There was a main effect of Condition, whether participants were agreeing with the high confidence speaker, $F(1, 101) = 61.40, p < .001$, the medium confidence speaker, $F(1, 72) = 24.91, p < .001$, or the low confidence speaker, $F(1, 61) = 5.47, p = .02$. From Table 3.2, which shows the mean confidence participants had in their answers when agreeing with each of the three speakers, it can be seen that participants' confidence in their answers was higher in the experimental condition than the control condition. There was also a main effect of Task Type for agreement with the high, $F(2, 202) = 64.94, p < .001$, medium, $F(2, 202) = 65.26, p < .001$, and low confidence

speaker, $F(2, 202) = 20.79, p < .001$. As Table 3.2 indicates, this can be attributed to higher levels of participant confidence on the judgmental task.

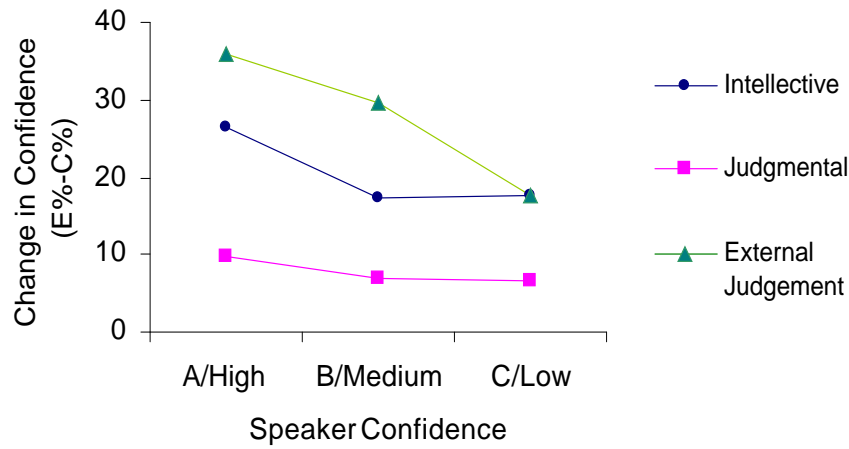


Figure 3.2. Percentage change in answer confidence between the control (C) and experimental (E) conditions across task type.

The extent of these increases did appear to depend upon the speaker's confidence level and the task. There were significant Task Type \times Condition interactions for the high and medium confidence speakers, $F(2, 202) = 22.09, p < .001, F(2, 144) = 10.46, p < .001$, respectively, with this result nearing significance for the low confidence speaker, $F(2, 122) = 3.06, p = .051$. As a rule, participants' confidence increased the most on the external judgement task, where high confidence cues raised participants' confidence by 36.03%, $t(104) = 7.93, p < .001$, medium confidence by 29.66%, $t(75) = 5.83, p < .001$, and low confidence by 17.50%, $t(64) = 2.42, p = .02$. Similar increases were also seen on the intellectual task, albeit to a lesser extent. On this task high confidence increased participants' confidence in those answers by 26.37%, $t(112) = 6.53, p < .001$, medium confidence by 17.27%, $t(91) = 3.77, p < .001$, and low confidence by 17.54%, $t(87) = 3.41, p = .001$. Figure 3.2 shows the increases in participants' confidence when confidence cues are added to the speakers' answers.

The Task Type \times Condition interactions again appear to arise from the nature of the task. Much smaller increases in confidence were seen with the addition of confidence cues on the judgmental task. For the high confidence speaker the listeners' confidence in their choices increased by only 9.65% compared to when no confidence cues were used, $t(111) = 3.27, p = .001$, with the increases being just 6.78% for the medium

confidence speaker and 6.62% for the low confidence speaker, $t(104) = 2.23, p = .03$ and $t(97) = 2.27, p = .03$, respectively.

The cause of this Task Type \times Condition interaction can be explained with reference to the level of confidence given in the absence of confidence cues (control group). From Table 3.2 it can be seen that, in the absence of confidence cues accompanying the speakers answers, participants' confidence in the answers they chose was similar across all three speakers on the intellectual and external judgement tasks (ranging from 26.73% - 35.55%). However on the judgmental task participants were much more confident in the answers they gave (61.15% - 64.16%). This further reinforces the suggestion that this task is different in nature to the other two tasks leading to differences in participants' choice behaviour and the confidence they have in those choices.

Influence of Confidence on Perceptions of Speakers

After completing all the tasks participants were asked a series of questions relating to their perceptions of the three speakers. Table 3.3 summarises the results, as percentage of participants, in the presence and absence of confidence cues, for chosen team-mate, competency and likeability.

Chosen Team-mate

The control and experimental groups differed in their choice of team-mate, $\chi^2 = 27.13, df = 2, p < .001$. In the absence of confidence cues there is no clear preference for any speaker as participants' choice of team-mate. When confidence cues are added a majority of participants selected the high confidence speaker as their team-mate (70%), although a sizeable minority opted for the medium confidence speaker as a team-mate (29%). Virtually no one selected the low confidence speaker to join their team.

Competency

The control and experimental groups differed in terms of the speaker they perceived as being the most competent, $\chi^2 = 27.03, df = 2, p < .001$, and the least competent, $\chi^2 = 50.87, df = 2, p < .001$. As with choice of team-mate, there was little difference between speakers in the absence of confidence cues. However, the addition of confidence cues resulted in the high confidence speaker being seen by 71% of the participants as the most competent of the three speakers, with the low confidence speaker being seen as the least competent by 88% of the participants.

Likeability

Differences were also seen between conditions in terms of who they liked the most, $F(2, 17) = 17.18, df = 2, p < .001$, and the least, $F(2, 17) = 8.66, df = 2, p < .001$. Again little difference between speakers was seen in the control group (Table 3.3). When confidence cues were added the medium confidence speaker was most liked by 53% of participants, followed by the high confidence speaker (39%). The high and low confidence speakers were each liked the least by 45.8% of the participants, with only 8.5% of participants liking the medium confidence speaker the least.

Table 3.3

Perceptions of speakers in the presence and absence of confidence cues

	Speaker Confidence		
	High	Medium	Low
Team-mate			
Control	36.8	22.5	40.4
Experimental	69.5	28.8	1.7
Most Competent			
Control	29.8	28.1	42.1
Experimental	71.2	23.7	5.1
Least Competent			
Control	36.8	40.4	22.8
Experimental	8.5	3.4	88.1
Most Liked			
Control	40.4	22.8	36.8
Experimental	39.0	52.5	8.5
Least Liked			
Control	36.8	29.8	33.3
Experimental	45.8	8.5	45.8

Speaker Confidence

As a manipulation check participants were asked to indicate which speaker they thought was the most, and the least, confident. The addition of confidence cues led to significant differences between conditions. In the absence of confidence cues all three speakers were seen as more or less equal in terms of being the most/least confident.

When high confidence cues were added 98.3% of participants correctly identified the high confidence speaker as the most confident, $\chi^2 = 59.63, df = 2, p < .001$. When low confidence cues were used the low confidence speaker was correctly identified as the least confident speaker by 94.9%, $\chi^2 = 55.84, df = 2, p < .001$.

Speaker Gender

In the absence of confidence cues participants did not identify any of the speakers as being predominantly male or female, $\chi^2 = .02, df = 1, p = .45$, $\chi^2 = .86, df = 1, p = .18$, and $\chi^2 = .44, df = 1, p = .26$, (one-tailed). As expected, the use of confidence cues did serve as gender markers. More participants identified a speaker using high confidence cues as being male than female (68% vs. 32%), with 68% of participants seeing the medium confidence speaker as female, both $\chi^2 = 7.48, df = 1, p = .003$, (one-tailed). The low confidence speaker was also seen by more participants as female than male (61.0% vs. 39.0%), $\chi^2 = 2.86, df = 1, p = .05$, (one-tailed).

Summary of Results

In relation to the influence of confidence cues on chosen answers, a significant main effect for Speaker Confidence was found, but not for Task Type or Condition, nor was there a Task Type \times Condition interaction. Significant two-way interactions between Speaker Confidence and both Condition and Task Type, and a significant three-way Speaker Confidence \times Task Type \times Condition interaction indicates that the addition of confidence cues has a strong influence upon chosen answers, an effect that is mediated by the different tasks.

Similarly, in relation to the influence of confidence on confidence in answer, significant main effects of Task Type and Condition were observed for all three speakers (high, medium and low confidence). Task Type \times Condition interactions found for the high and medium confidence speakers, with this nearing significance for the low confidence speaker, indicating that the addition of confidence cues has a strong influence upon confidence in answers, an effect again mediated by the different tasks.

The addition of confidence cues also had significant effects on participants' perceptions of the speakers, in terms of their choice of team-mate, and who they viewed as being most/least competent and likeable.

Discussion

In the present study it was found that the confidence expressed by a speaker in their answers influences the extent to which a listener chooses those answers, with increasing levels of confidence exerting the greatest influence upon choice. The results therefore indicate that confidence is used as a means of differentiating between different sources of information, and the greater our uncertainty is the more we rely on the level of confidence with which information is expressed by others to help us reach a decision.

The answers given by the highly confident speaker were chosen most frequently overall, but the extent to which their answers were chosen did depend on the task. Zarnoth and Sniezek (1997) found that high confidence exerted more influence on intellectual tasks than judgmental tasks. This was supported in the present study, with answers expressed with high confidence being chosen more often on the intellectual, knowledge-based task than on the judgmental, opinion-based task. The extent to which participant's chose the high confidence speaker's answers on these two tasks paralleled those seen in Zarnoth and Sniezek's experiment. On the external judgement task, that is not knowledge or opinion-based, and of which there is no comparable task in Zarnoth and Sniezek's experiment, reliance on the high confidence speaker's answers was the highest out of all three tasks.

Why is another's confidence more influential on some tasks than on others? One's own level of uncertainty does appear to be important. Taking confidence in answers in the control group as a baseline, confidence was lowest on the external judgement task, closely followed by the intellectual task, and was highest on the judgmental task. In the experimental group the answers given by the highly confident speaker were chosen most frequently on the external judgement task, followed by the intellectual task, and were chosen least often on the judgmental task. So the lower the participants' confidence in their answers, the more frequently the high confidence speaker's answers were chosen. This suggests that when we are uncertain we are more susceptible to social influence and when we are certain we are less influenced. This concurs with findings by Sniezek and Buckley (1995) and Vissers et al. (2003).

But why are we more uncertain on some tasks than on others? The amount of information that one can bring to the task appears to be the important factor here. On the external judgement task participants could not bring any prior knowledge or opinions to the task and although theoretically they could do on the intellectual task this was not the

case because hard questions were selected, and participants' accuracy was no better than would be expected by chance in either condition. With control group confidence for these two tasks being low it would seem that participants' choices of answers were no more than guesses. This would indicate that participants approached these two tasks in similar ways. Zarnoth and Snizek (1997) point out that although a task may be classed as intellectual, if it is outside one's own knowledge domain it may involve a judgement. This clearly seemed to be the case here. The judgmental task though provided participants with the opportunity to use their own opinions, meaning that the answers given were more than just guesses, indicated by the much higher level of confidence in answers in the control group.

Snizek and Buckley (1995) suggested the influence of confidence depends on whether we use internal or external information to reach a decision, determined by when we receive input from other sources. They found that the influence of high confidence was lowest when one's own knowledge could be utilised and greatest when this opportunity was removed. This can also be applied to task type, as on some tasks we can bring internal information and on others we can not. In relation to the present results, on the judgmental task, where participants used their own opinions, the influence of high confidence was lowest, whereas on the other two tasks where participants could not or did not bring much or any of their own knowledge the influence of the high confidence speaker was greatest. This may explain why Zarnoth and Snizek (1997) found high confidence exerted more influence on some tasks than on others – people may feel that they can bring more information to a judgmental task than to an intellectual task, at least when that task is not in their domain.

Not being able to bring any internal information to a task means that one must search for another basis on which to make a decision. This leaves us relying heavily on external information. When we receive information from a number of external sources we need a way of distinguishing between these. We could attend to the accuracy of the information to do this, but accuracy is of no use if one has no way of knowing which answer is correct and which is not, and some tasks do not have a correct answer at all. This leaves us relying on communicative cues to help us, comparing the confidence with which different sources of information are expressed (Leippe et al., 1992; Thomas and McFadyen, 1995). The greater our own uncertainty, the more we will use and rely upon the confidence that another person expresses as a way of making a decision.

What is our basis for comparing different levels of confidence even when we can not confirm the quality of that information? Previous research has shown that confidence is taken as a cue to a speaker's accuracy, competency and credibility (Erickson et al., 1978; Leippe et al., 1992; Thomas and McFadyen, 1995). In the present experiment high confidence was seen as indicative of high competence and low confidence as indicative of low competence. However many participants in the present study liked the high confidence speaker the least even if they thought this speaker was the most competent, whereas using a more moderate, medium, level of confidence increased liking for that speaker. Previous research has also shown that too much confidence to have a detrimental effect on how much a speaker is liked (London et al., 1971; Pulford, 2002).

Although the discussion so far has focused on the influence of high confidence cues, the effects of the other confidence cues should also be considered. The results appear to indicate that the higher a speaker's confidence the greater their influence upon the choices made by a listener. Speaking with high confidence leads to a shift towards one's answers while speaking with low confidence results in a shift away from one's answers. It may be that only the high confidence cues had any real influence – the decrease for low confidence may simply be because this is where the high confidence speaker's gain came from. High confidence cues make an answer more appealing but choosing to take this answer means that the medium or low confidence speakers must lose out. But it is also conceivable that these shifts in choice are not due to the positive influence of high confidence, but rather the negative influence of low confidence. It may in fact be the case that the high confidence speaker does not offer the most appealing answers, but that the low confidence speaker offers the least appealing answers.

While the choice shifts seem to be due to either the high or low level of confidence the influence of the medium confidence speaker should not be overlooked. Although there was a reduction in agreement with the medium confidence speaker as a whole, this speaker was still agreed with on almost one quarter of occasions overall. One might expect that if it were the low confidence speaker that exerted the strongest (negative) influence, then people would choose the answers given by the high and medium confidence speaker equally often. But this was not the case. Yes, the medium confidence speaker had their answers chosen more often than those given by the low confidence speaker, but this was far less frequently than those given by the high confidence speaker.

Why would this be? It may be that medium confidence is not seen as being more or less appealing than high or low confidence but that the other two afford more salience. Indeed, the medium confidence speaker was the most liked, and least disliked, speaker. But high confidence suggests a definite, certain answer, providing (seemingly) strong evidence for that answer, whereas low confidence offers an indefinite, uncertain answer, providing reason to doubt an answer. In a way low confidence cues can be seen as being more definite than medium confidence cues because they more clearly indicate doubt in an answer, whereas medium confidence is ambiguous.

If the influence of confidence is due to the clarity of the high or low confidence, with medium confidence being too ambiguous then this would suggest that people do use confidence as a heuristic, be that a positive or negative use of the confidence heuristic. Heuristics provide cognitive shortcuts, enabling a decision-maker to engage in less cognitive effort. Attending to either the high or low confidence speakers allows a fairly simple comparison of answers – is the answer certain or uncertain – and on this basis a quick answer can be reached without having to process too much informational content of the answer. But to attend to the medium confidence speaker's answer means that the decision-maker has to decipher that speaker's confidence level – just how uncertain are they? Are they fairly confident or fairly uncertain? High and low confidence statements can be seen as more distinguishable one way or the other than medium confidence – high confidence is certain, low confidence is uncertain but medium confidence could be interpreted either way. This may take too much effort for someone who wants to reach a quick decision. Although participants in this experiment did not have a time limit imposed upon them to complete the tasks, being in an experimental situation may have imposed pressure on some participants to complete the task quickly. Additionally, some people may be more compelled to make quick decisions for reasons such as individual differences. This will be considered in Chapter 4.

The problem with relying on confidence as a heuristic is its effect on decisions when that confidence is miscommunicated. Previous research has shown that interaction increases decision confidence but not decision quality, or accuracy, resulting in overconfident decisions (Heath and Gonzalez, 1995; Paese and Kinnaly, 1993). This appears to be the case here also, on the intellectual task as least, where participants' confidence in their answers increased after viewing a speaker's confidence but their accuracy did not increase significantly. But why does participants' confidence increase? Being able to view another's confidence in addition to their answer provides the

decision-maker with additional information. After selecting our answer we may interpret the confidence with which it is expressed as supporting that decision, with another person's confidence acting as confirmatory evidence for our initial choices (see Nickerson, 1998 for review of the confirmation bias). Alternatively social interaction may force people to better organise and elaborate on their choices, leading to increased confidence in those choices (Heath and Gonzalez, 1995).

There were a number of limitations to the present study. As has been mentioned previously, the strength of the manipulation, resulting in large choice shifts from the answers given by the low confidence speaker to the high confidence speaker, made analysis of some of the data problematic. These large choice shifts also raise the question of whether they are due to a positive or negative use of the confidence heuristic, which the methodology used here does not fully answer. It would be worthwhile developing a methodology whereby peoples' use of the confidence heuristic in their choice behaviour can be investigated without the issue of one speaker's gain being another's loss. Chapter 9 will take this issue into account.

The present experiment also provided no clues to the speakers' identity. For the purposes of this experiment it was necessary to label the speakers simply as Friend A and so on, to allow perceptions of speaker gender to be considered and to provide no differentiating personal information about the speakers. However the participants may have seen this as fairly abstract. Giving the speakers' names may create a more realistic situation, helping participants to engage in the social nature of the interaction. Further research should give consideration to who the speaker is. For instance, the results from the present experiment indicated that people made stereotypical judgements of a speaker's gender on the basis of their confidence. A confident speaker was believed to be male, whereas those expressing some element of doubt were believed to be female. This too has implications for the influence of confidence, as a communicator who deviates from our expectations may be reducing their effectiveness (Krauss and Chiu, 1998). By taking into consideration both speaker and listener gender Chapter 5 addresses these issues.

Conclusions

Communicating one's confidence can influence the choices made by others, the confidence that they have in those choices, and the way in which one is perceived. But which level of confidence should one use? If one is communicating confidence then the

appropriate level of confidence could depend on what the aim of the communication is – is it more important to appear competent and get people to agree with you or to get people to like you? The situations in which these factors are important are worth further investigation. The finding that task type mediates the influence of confidence indicates that it also depends on what your audience already knows – if they already have an opinion or the appropriate knowledge then they are less likely to change their decisions for you, no matter how confident you are.

As indicated in the literature review, apart from situational factors there may be individual factors that mediate the influence of confidence. Particularly relevant to this line of research are the personality variables of Need for Cognition (Cacioppo and Petty, 1982) and the Need for Closure (Webster and Kruglanski, 1994). Given that these place high emphasis on the role of heuristics and confidence in the way we process information, consideration should be given to how these affect the influence of confidence. Chapter 4 takes this into account.

CHAPTER 4

Individual Differences in the Influence of Confidence

The aim of this study was to determine whether the confidence heuristic is a general cognitive heuristic or is mediated by individual differences. 110 participants completed the same tasks as used in Chapter 3, as well as completing two personality questionnaires measuring Need for Closure and Need for Cognition. The general results replicated those from Chapter 3, with the extent of shifts in answer and increases in confidence being dependent on task type. In relation to the personality measures used, Need for Closure had an effect on participants' choice of answer whereas Need for Cognition affected participants confidence in their chosen answers. High (vs. low) Need for Closure participants showed a greater shift towards answers expressed with high confidence and away from those expressed with medium confidence. High (vs. low) Need for Cognition participants were more confident in their chosen answers. Hence, people do appear to use a heuristic that uses the confidence of a person as an indicator of the validity of their information. People use the heuristic when they are uncertain as a means of making choices and having confidence in those choices. However, the extent to which the confidence heuristic is used, and the way in which it is used, is influenced by individual differences.

Individual Differences in the Influence of Confidence

We infer certain traits about speakers on the basis of how they express themselves, and this can give us sufficient information on which to base our decision. For instance we may apply the rule that “a speaker’s confidence indicates accuracy”. Attending to a speaker’s confidence level may therefore be used as a heuristic, enabling quick decisions to be made. However the confidence heuristic may not be a general cognitive heuristic, in that it may not be used by everyone, or at least not by everyone all of the time, or even in the same way (Thomas and McFadyen, 1995). In Chapter 3 it was suggested that individual differences might influence who relies on the level of confidence with which information is expressed as a basis for making a decision. This possibility is explored in this chapter.

Two measures of individual differences are of direct relevance to the present research. The first, Need for Closure, refers to the general tendency to prefer certain to uncertain knowledge, the desire for a firm answers and an aversion to ambiguity (Kruglanski, Webster, and Klem, 1993; Webster and Kruglanski, 1994). People who are high in Need for Closure are motivated to produce quick and confident judgements (Mayseless and Kruglanski, 1987). The second, Need for Cognition, is the tendency for an individual to engage in and enjoy thinking, an individual’s need to organise, abstract and evaluate information (Cacioppo and Petty, 1982). It has been suggested that low Need for Cognition individuals rely more on the use of heuristic cues when evaluating information than those who are high in Need for Cognition, who actively think about the content of the information (Cacioppo, Petty, and Morris, 1983; Chaiken, Liberman, and Eagly, 1989; Petty and Cacioppo, 1986). Both Need for Closure and Need for Cognition may affect how people use the confidence heuristic.

Need for Closure

The Need for Closure may be situationally induced, such as when an individual finds a task difficult or dull, but it also represents a dimension of stable individual differences (Webster and Kruglanski, 1994). Individuals high in Need for Closure are said to ‘seize’ upon an initial judgement, in that they make it quickly, and then ‘freeze’ upon it, in that they fix on this choice, (Kruglanski and Webster, 2000). High Need for Closure individuals take less information into account, make quicker decisions, and are more confident in those decisions than low Need for Closure individuals (Mayseless and Kruglanski, 1987). As such, high Need for Closure leads to less information processing

being engaged in before committing to a judgement, but higher confidence in those judgements because fewer alternatives are considered than individuals under low Need for Closure, who may savour uncertainty. Hence, people who are high in NFClo will rely on the use of heuristics in their choice behaviour more than those low in NFClo (Vermeir, Van Kenhove, Vlerick, and Hendrickx, 1999). As high Need for Closure individuals have a desire for confident knowledge and are motivated to produce quick and confident decisions, it is hypothesised that they will rely more upon the confidence heuristic as a basis for making a choice than individuals who are lower in Need for Closure. Higher Need for Closure participants are also expected to be more confident in their answers than those who are lower in Need for Closure.

The tendency to seize upon an initial judgement and then to freeze upon this choice means that when high Need for Closure individuals are in possession of prior information they are more resistant to persuasion, but less resistant to persuasion when they are lacking such information (Kruglanski et al., 1993). Having prior information allows the individual to seize and freeze on this, and to ignore subsequent information. Not having prior information means that the high Need for Closure individual is more open to persuasion because they want to reach a quick and confident decision on the basis of subsequent information that is supplied.

In addition to the motivational aspect of knowledge construction, i.e. Need for Closure, there is also the social character – other people may provide the information that we construct our knowledge from (Kruglanski and Webster, 2000). Need for Closure may “significantly affect the way a person thinks about, feels about, acts towards, and even talks about significant others” (p. 357). High Need for Closure individuals tend to rely more on stereotypes and pay less attention to individuating information, as stereotypes represent pre-existing knowledge structures that can be instantaneously utilised, whereas attending to differentiating information requires more extensive cognitive effort (Dijksterhuis, Van Knippenberg, Kruglanski, and Schaper 1996). Compared to individuals low in Need for Closure, high Need for Closure individuals tend to perceive groups in more stereotypical terms, and recall less stereotype-inconsistent behaviours (Dijksterhuis et al., 1996).

Need for Cognition

High Need for Cognition individuals have been found to pick out and think about the arguments in a message more than low Need for Cognition individuals (Cacioppo and

Petty, 1982; Cacioppo et al., 1983). If people who are low in Need for Cognition look for short cuts to avoid cognitive effort, then they may pay more attention to how information is expressed rather than the actual content of the information that is being expressed. Hosman, Huebner, and Siltanen (2002) investigated this possibility in relation to powerful and powerless speech styles (see Erickson, Lind, Johnson, and O'Barr, 1978). Based on the assumption that the more certain and direct language used in a powerful style may provide low NFC individuals with sufficient information on which to base their attitudes, choices or opinions, it was expected that individuals low in NFC would engage in less argument processing when the argument is communicated in a powerful speech style compared to when it is communicated in powerless speech style. No significant effects were found for Need for Cognition. However, as Cacioppo et al. (1983) point out, Need for Cognition may be a contributory factor rather than a necessary cause of persuasion. As with Need for Closure, situational factors should also be considered, as low involvement can reduce both high and low Need for Cognition individuals to simpler, less cognitively demanding methods of evaluation (Cacioppo et al., 1983; Hosman et al., 2002). In other words, if the motivation is not there, a quick way of processing the information one is receiving may be undertaken, regardless of whether we *usually* like to take more time and care. Hosman et al., agree, suggesting that the ambiguous personal relevance of the persuasive argument used in their study may have caused participants to process the message in similar ways, regardless of their Need for Cognition. However, Sorrentino, Bobocel, Gitta, Olson, and Hewitt (1988) suggest that whilst individuals who are high in NFC engage in more central processing than those who are low in NFC, as personal relevance increases, central processing should also increase for both high and low NFC individuals.

If people do use confidence as a heuristic, is this because it is a general cognitive heuristic, perhaps being situationally induced, or is it used more by some people than others due to reasons such as individual differences? It is hypothesised that while answers expressed with high confidence will be used more than those expressed with some level of uncertainty, participants who are higher in Need for Cognition will use answers expressed with high confidence more frequently than participants who are lower in Need for Cognition. In other words, high Need for Cognition participants will utilise the confidence heuristic more frequently.

While Need for Closure and Need for Cognition both have a motivational basis, these two scales have been found to have a low, negative correlation, indicating that

they are unlikely to represent the same underlying construct (Webster and Kruglanski, 1994). Webster and Kruglanski (1994) argued that Need for Cognition seems to exert a quantitative influence on cognitive activity, affecting the extent to which one thinks about an issue. Need for Closure on the other hand, refers to the desired cognitive end state that may be obtained, the desire for confident knowledge, regardless of the amount of information processing engaged in.

Rationale for Experiment

Need for Closure and Need for Cognition both indicate a tendency for some people to engage in as little extensive cognitive effort as possible, in order to make quick but confident decisions. One way in which this could be achieved is by paying more attention to non-content cues than to the actual information that is being conveyed. One's level of expressed confidence may provide such a cue. Chapter 3 showed that participants relied more heavily on confidently expressed answers than on those expressing some level of uncertainty, indicating that the confidence heuristic was used as a decision-making strategy. But did everyone behave in this way and to the same extent? Are some people more predisposed to relying on heuristics? The aim of this chapter is to see if the confidence heuristic is a general cognitive heuristic or whether there are individual differences operating.

Method

Participants

Out of the participants who took part in the experiment reported in Chapter 3, 110 (86 women and 24 men) volunteered to complete a series of further questionnaires. This group of participants ranged in age from 18 – 46 years, with a mean age of 21.20 years ($S.D. = 4.81$).

Materials

The materials used to measure confidence heuristic use were described in Chapter 3. Following completion of the tasks described in Chapter 3, participants were presented with the following personality questionnaires which can be seen in full in Appendix E.

Need for Closure. The Need for Closure (NFClo) scale (Kruglanski et al., 1993) consists of 42-items, measured on a six-point scale, ranging from 1 ‘strongly agree’ to 6 ‘strongly disagree’. The items on this scale are designed to tap into an individual’s general tendency to prefer certain to uncertain knowledge (Kruglanski, 1989). Individuals with higher scores on this scale display a need for closure, whereas those with lower scores on this scale show a need to avoid closure. Kruglanski (1989) views these two needs as functionally opposite, conceptualised as ends of a continuum. Webster and Kruglanski (1994) found the overall scale to have high reliability ($\alpha = .84$).

As an individual differences dimension, Webster and Kruglanski (1994) reason that Need for Closure may manifest itself in a number of ways. The Need for Closure scale therefore consists of five major subscales: Preference for Order, Preference for Predictability, Decisiveness, Discomfort with Ambiguity, and Closed-Mindedness. Cronbach’s alpha for these subscales ranges from .62 to .82 (Webster and Kruglanski, 1994).

Need for Cognition. The short-form Need for Cognition (NFC) scale (Cacioppo, Petty, and Kao, 1984) consists of 18 items relating to one’s enjoyment of engaging in the thinking process, and rated on a five-point scale from 1 ‘extremely characteristic’ to 5 ‘extremely uncharacteristic’. Individuals with high scores on this scale have a high Need for Cognition, whereas low scores represent a low Need for Cognition. Cacioppo et al. (1984) found this scale to have high reliability ($\alpha = .88$).

‘Big-Five’ Personality Factors. The 50-item IPIP scale (Goldberg, 1999) measuring the ‘big-five’ personality factors again on a five-point scale was also used to control for

any covariates. This has items relating to extraversion, agreeableness, conscientiousness, emotional stability and intellect. Alpha values for these scales range from .79 to .87, with the overall reliability being .84 (Goldberg, 1999).

Design and Procedure

The design and procedure were largely identical to those described in Chapter 3, apart from the addition of the personality questionnaires. These were administered, after completion of the three tasks described in Chapter 3, to the participants who had agreed to take part in the further study. Need for Closure and Need for Cognition were treated as independent variables according to high/low scores on these. For each measure, individuals with scores in the upper 40% of the distribution were labelled as the 'high' group, and those in the lower 40% of the distribution were labelled as the 'low' group. Participants with scores in the middle tripartite were excluded from analyses, following Cacioppo, Petty, and Morris' (1983) advice that doing this, as opposed to a true median split, minimises errors in classification that could result when there are clusters of scores falling around the median.

To see if individuals who were high/low on these measures differed in the extent to which they chose each speakers' answers and their confidence in answers, two analysis of variance were carried, one for Need for Closure and one for Need for Cognition. Differences in how the speakers were perceived by the high/low Need for Closure/Need for Cognition individuals were also considered. All other personality measures used were inspected to see if they correlated with the dependent variable and treated as covariates where appropriate.

Results

Covariates

Correlational analyses indicated that Conscientiousness (IPIP Factor 3) had a positive relationship with the percentage of times the high confidence speaker's answers were chosen on the intellective task, $r(52) = .30, p = .03$, and a negative relationship with the percentage of times the low confidence speaker's answers were chosen on the intellective and external judgement tasks, $r(52) = -.42, p = .002$ and $r(52) = -.28, p = .04$. No other significant correlations were observed. Hence, Conscientiousness was taken into consideration as a covariate in the choice analyses.

The lack of any robust correlations between the personality measures used and participants' confidence in their chosen answers meant that no covariates were used in the confidence in answers analyses.

Need for Closure

The Need for Closure scores ranged from 78 – 206, with a median score of 150. Allocating participants to Need for Closure groups using the method described above resulted in 48 participants in the low Need for Closure group (*Group Mdn* = 134) and 44 participants in the high Need for Closure group (*Group Mdn* = 166). 18 participants with mid-range scores (147 - 154) were excluded from the analysis.

Need for Closure and Choice. Table 4.1 shows the percentage of agreement with each of the three speakers for the two Need for Closure groups. To test whether Need for Closure affected participants choice of answer, when the answers were expressed with different levels of confidence, a Speaker Confidence \times Condition \times Need for Closure ANCOVA was conducted, with repeated measures on the first variable. Each of the three task types was investigated separately.

After adjusting for Conscientiousness, there were no main effects of Speaker Confidence, Condition or Need for Closure for either the intellective, $F(2, 162) = .47, p = .40, F(1, 81) = .37, p = .55$ and $F(1, 81) = 2.78, p = .10$, judgmental, $F(2, 162) = .93, p = .63, F(1, 81) = .04, p = .84$ and $F(1, 81) = 1.39, p = .24$, or external judgement tasks, $F(2, 162) = 1.04, p = .36, F(1, 81) = .81, p = .37$ and $F(1, 81) = .77, p = .38$. Reflecting the findings from the previous chapter, that the addition of confidence cues affects choice, significant Speaker Confidence \times Condition interactions were found for the

intellective, $F(2, 162) = 36.74, p < .001$, judgmental, $F(2, 162) = 11.99, p < .001$, and external judgement tasks, $F(2, 162) = 48.44, p < .001$.

There were no Condition \times Need for Closure or Speaker Confidence \times Need for Closure interactions for the intellective, $F(1, 81) = 1.51, p = .22$ and $F(2, 162) = 2.88, p = .06$, judgmental, $F(1, 81) = 1.27, p = .26$ and $F(2, 162) = 1.47, p = .23$, or external judgement tasks, $F(1, 81) = .69, p = .41$ and $F(2, 162) = 2.11, p = .13$. However, there were significant Speaker Confidence \times Condition \times Need for Closure interactions on the intellective and external judgement tasks, $F(2, 162) = 3.29, p = .04$, and $F(2, 162) = 3.63, p = .03$, but not on the judgmental task, $F(2, 162) = .22, p = .80$.

Table 4.1

Mean percentage of speaker agreement across tasks split by high/low Need for Closure

	Need for Closure					
	High			Low		
	Speaker Confidence			Speaker Confidence		
	High	Medium	Low	High	Medium	Low
Intellective						
Control	32.99	39.58	27.43	32.08	37.92	30.00
Experimental	81.25	11.46	7.29	59.30	25.64	15.06
Judgmental						
Control	35.76	26.04	38.19	31.24	26.67	42.08
Experimental	53.12	28.12	18.75	43.91	32.37	23.72
External Judgement						
Control	29.86	31.25	38.54	32.08	30.00	37.92
Experimental	94.27	3.12	2.60	69.23	20.83	9.93

To investigate where the differences lay in the significant interactions, Need for Closure \times Condition between-subjects ANCOVAs were conducted, separately for agreement with each speaker on the intellective and external judgement tasks. It was expected that differences between Need for Closure (NFClo) groups would arise from the answers expressed with high confidence being chosen more frequently in the high NFClo group, whereas answers not expressed with high confidence would be chosen more frequently in the low NFClo group. All following analyses in this section are one-tailed to reflect the directional hypothesis.

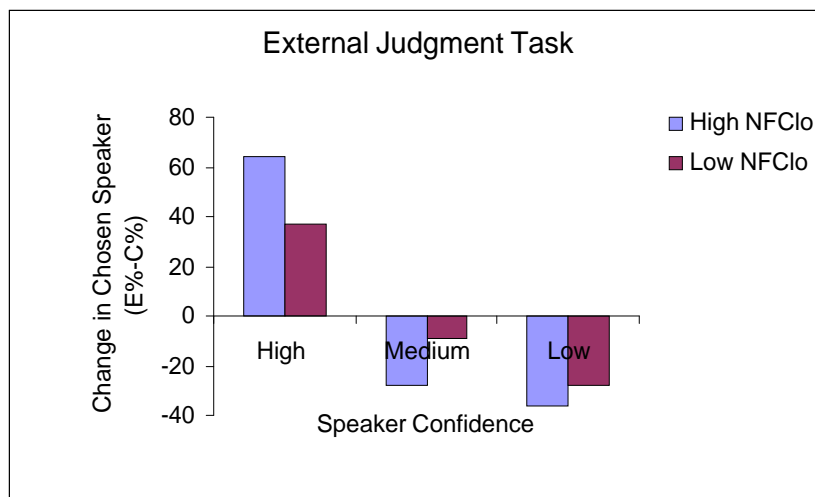
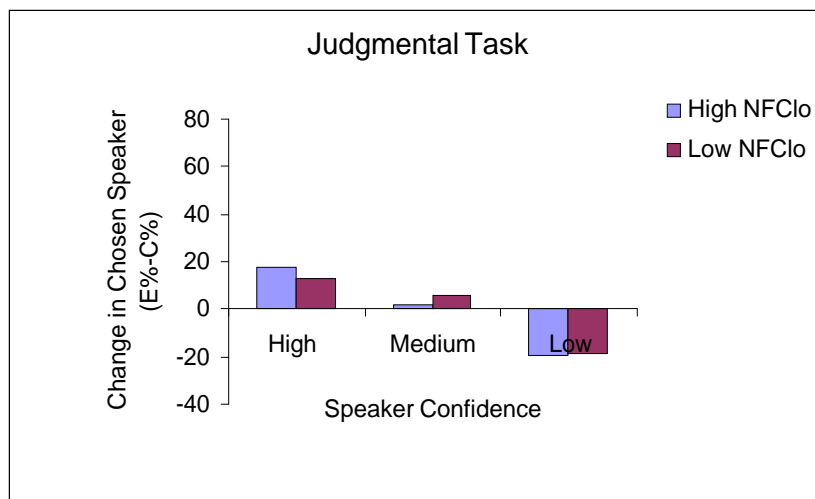
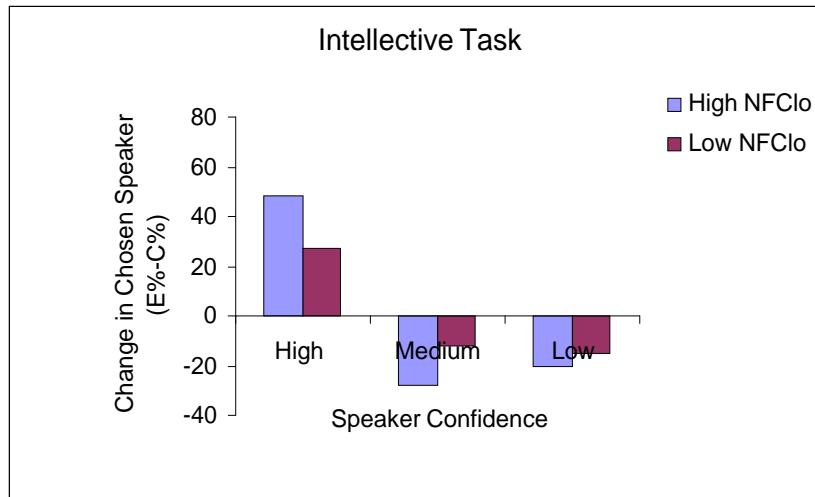


Figure 4.1. Percentage change in chosen speaker according to task type, split by Need for Closure.

Figure 4.1 illustrates the pattern of results for each task, showing the change in chosen speaker with the addition of confidence cues for both Need for Closure groups. The addition of confidence cues to answers given on the intellectual task led to a greater shift towards the high confidence speaker's answers, $F(1, 81) = 4.11, p = .03$, and away from the medium confidence speaker's answers, $F(1, 81) = 3.61, p = .03$, for the high (vs. low) NFClo group. Both NFClo groups showed comparable shifts away from the low confidence speaker's answers when confidence cues were added, $F(1, 81) = .44, p = .25$. Hence, when speakers accompanied their answers with confidence cues on the intellectual task, the high confidence speaker's answers were chosen 21.95% more frequently, and the medium confidence speaker's answers were chosen 14.18% less frequently, by the high (vs. low) NFClo group.

Figure 4.1 also shows that the addition of confidence cues to a speaker's answer on the external judgement task results in more robust choice shifts than on the intellectual task. Again there is a greater shift towards the high confidence speaker's answers, and away from the medium confidence speaker's answers for the high (vs. low) NFClo group, $F(1, 81) = 5.84, p = .01$, and $F(1, 81) = 4.36, p = .02$. The high NFClo group chose the high confidence speaker's answers 25.04% more frequently than the low NFClo group, but the medium confidence speaker's answers 17.71% less frequently. The high and low NFClo groups both show similar size shifts away from the low confidence speaker's answers when confidence cues were used, $F(1, 81) = .42, p = .26$.

Need for Closure and Confidence in Answers. In Chapter 3 the effect of task type appeared to be due to the confidence participants had in their answers. To investigate whether differences in confidence also contributed to the present results, participants' overall confidence on each task was calculated and a Task \times Condition \times Need for Closure mixed ANOVA was performed. Overall confidence in answers on each task is shown in Table 4.2. There were significant main effects of Task, $F(2, 174) = 54.31, p < .001$, and Condition, $F(1, 87) = 36.36, p < .001$ but not of Need for Closure, $F(1, 87) = .01, p = .91$. As in Chapter 3, on all three tasks participants' confidence in their answers increased when confidence cues were added, as indicated by a significant Task \times Condition interaction, $F(2, 174) = 16.45, p < .001$. There were no significant Condition \times Need for Closure, $F(1, 87) = .11, p = .74$, Task \times Need for Closure, $F(2, 174) = .49, p = .62$, or Task \times Condition \times Need for Closure interactions, $F(2, 174) = .60, p = .55$,

indicating that Need for Closure made no difference to participants' confidence in answers overall, or on the different tasks.

Table 4.2

Mean confidence in answers (%) for each task, split by high/low Need for Closure

Task	Need for Closure		Overall
	High	Low	
Intellective			
Control	34.78 (15.57)	31.08 (19.81)	32.73 (17.95)
Experimental	56.03 (28.86)	56.68 (21.72)	56.43 (24.40)
Judgmental			
Control	63.71 (17.52)	60.26 (11.02)	62.17 (14.92)
Experimental	69.55 (10.25)	69.46 (15.24)	69.49 (13.40)
External Judgement			
Control	32.09 (23.85)	27.13 (19.88)	29.87 (22.08)
Experimental	61.91 (27.44)	63.64 (26.89)	62.97 (26.80)

Note. Standard deviations are in parentheses.

Need for Closure and Perceptions of Speakers. Did Need for Closure make a difference to how participants viewed the speakers who used different levels of confidence? Chi-square analysis comparing participants' perceptions of the high, medium and low confidence speakers according to the Need for Closure groups revealed expected counts of less than 5 on more than one occasion. For this reason, responses to chosen teammate, most/least competent and most/least liked speaker were recoded, producing two new categories for analysis: 'high confidence speaker', which was the same category as used in Chapter 3, and 'lower confidence speakers', which resulted from amalgamating the medium and low confidence speakers. As the hypothesis regarding the participants' perceptions of the speakers was that the high Need for Closure group would view the high confidence speaker more positively than speakers expressing some element of doubt in their answer, this re-categorisation was felt to adequately reflect the variables being investigated.

88.9% of the high NFClo group chose the high confidence speaker as their teammate, compared to 55.6% of the low NFClo group, $\chi^2 = 5.60$, $df = 1$, $p = .02$. Thus, only

11.1% of the high NFClo group chose the lower confidence speakers as their team-mate compared to 44.4% of the low NFClo group.

Both Need for Closure groups thought the high confidence speaker was the most competent, but this occurred to a far greater extent in the high than the low NFClo group (88.9% vs. 59.3%), $\chi^2 = 4.62$, $df = 1$, $p = .03$. Chi-square was not calculated for least competent speaker, as two cells had expected counts less than 5. However, 100% of the high NFClo group and 85.2% of the low NFClo group thought the lower confidence speakers were least competent.

For the speaker chosen as the most liked by participants, the high NFClo group showed no strong preference for either the high or lower confidence speakers (55.6% vs. 44.4%), whereas 70.4% of the low NFClo group liked the lower confidence speakers the most, although this difference between the groups did not quite reach significance, $\chi^2 = 3.02$, $df = 1$, $p = .08$. The high NFClo group least liked the lower confidence speakers (77.8%), whereas the low NFClo group least liked the high confidence speaker (63.0%), $\chi^2 = 7.20$, $df = 1$, $p = .007$. In the control group there were no differences between higher and lower Need for Closure participants on any of the attributions, all $p > .05$.

Need for Closure – Additional Analyses. Webster and Kruglanski (1994) reason that as an individual differences dimension Need for Closure may manifest itself in a number of ways. They identify five major aspects assumed to represent this: Preference for Order, Preference for Predictability, Decisiveness, Discomfort with Ambiguity, and Closed-Mindedness. It was decided to investigate further the relationship between Need for Closure and people's use of different levels of confidence as a basis for making a decision by correlating each of the five Need for Closure factors with the percentage of times each speakers answers were chosen, according to task type.

The Need for Closure factor of Decisiveness represents the urgency with which someone high in Need for Closure feels a judgement or decision should be made, i.e. the decisiveness of their choices. This is represented in the Need for Closure scale with items such as, "I usually make important decisions quickly and confidently". Decisiveness was positively correlated with choosing the high confidence speaker's answers on the intellectual task, and negatively correlated with the medium confidence speakers answers on this task, $r(55) = .30$, $p = .03$ and $r(55) = -.34$, $p = .01$. A similar pattern was seen on the external judgement task, but this did not reach significance for

the high confidence speaker's answers, $r(55) = .21, p = .12$ and $r(55) = -.27, p = .05$. This factor represents the urgency with which someone high in Need for Closure feels a judgement or decision should be made, i.e. the decisiveness of their choices. This is represented in the Need for Closure scale with items such as, "I usually make important decisions quickly and confidently".

Another aspect that showed noteworthy correlations was that of Closed-Mindedness. This factor represents an unwillingness to have one's knowledge confronted by alternative opinions, (e.g. "I do not usually consult many different opinions before forming my own view"). On the intellectual and external judgement task, the percentage of times the medium confidence speakers answers were chosen was negatively correlated with this factor, $r(55) = -.30, p = .03$ and $r(55) = -.31, p = .02$. For the high confidence speaker these correlations did not reach significance on either of these two tasks, $r(55) = .25, p = .07$ and $r(55) = -.20, p = .15$.

On both the intellectual and the external judgement task, the Need for Closure factor Preference for Order was negatively correlated with the amount of times the low confidence speakers answers were chosen, $r(55) = -.37, p = .005$ and $r(55) = -.30, p = .03$. This factor represents a preference for structure and order in one's environment.

Need for Cognition

The Need for Cognition scores in the present experiment ranged from 30 – 86 and had a median of 60.5. Of the 110 participants who took part in this experiment, 45 participants were classed as lower in Need For Cognition ($Mdn = 50$) and 46 participants were classed as higher in Need For Cognition ($Mdn = 67$). Nineteen participants with mid-range scores (57 - 63) were excluded from the analysis for the reasons justified earlier.

Need for Cognition and Choice. The above analyses were repeated using the measure of Need for Cognition in the place of Need for Closure. A Speaker Confidence \times Condition \times Need for Cognition ANCOVA found no main effects of Speaker Confidence, Condition or Need for Cognition for either the intellectual, $F(2, 162) = .19, p = .83, F(1, 81) = .10, p = .75$ and $F(1, 81) = 2.26, p = .14$, judgmental, $F(2, 162) = .35, p = .70, F(1, 81) = .11, p = .75$ and $F(1, 81) = .49, p = .48$, or external judgement tasks, $F(2, 162) = .28, p = .76, F(1, 81) = 2.90, p = .09$ and $F(1, 81) = .18, p = .67$.

Reflecting the findings from the previous chapter, that the addition of confidence cues affects choice, significant Speaker Confidence \times Condition interactions were found for the intellectualive, $F(2, 162) = 35.96, p < .001$, judgmental, $F(2, 162) = 11.32, p < .001$, and external judgement tasks, $F(2, 162) = 44.50, p < .001$.

There were no Condition \times Need for Cognition or Speaker Confidence \times Need for Closure interactions for the intellectualive, $F(1, 81) = .70, p = .41$ and $F(2, 162) = 2.89, p = .06$, judgmental, $F(1, 81) = .03, p = .87$ and $F(2, 162) = .37, p = .69$, or external judgement tasks, $F(1, 81) = .68, p = .41$ and $F(2, 162) = .54, p = .58$, nor were there any Speaker Confidence \times Condition \times Need for Cognition interactions on either the intellectualive, judgmental or external judgement tasks, after adjusting for the co-variate of conscientiousness, $F(2, 162) = 1.88, p = .16$, $F(2, 162) = 1.02, p = .36$, and $F(2, 162) = 2.39, p = .10$. Hence, Need for Cognition did not appear to affect people's use of the confidence heuristic.

Table 4.3

Mean confidence in answers (%) for each task, split by high/low Need for Cognition

Task	Need for Cognition		Overall
	High	Low	
Intellective			
Control	34.93 (20.87)	33.31 (13.18)	34.02 (16.76)
Experimental	67.82 (19.72)	46.30 (25.80)	59.02 (24.57)
Judgmental			
Control	61.30 (14.67)	63.24 (15.12)	62.39 (14.79)
Experimental	73.81 (13.76)	66.79 (14.94)	70.94 (14.51)
External Judgement			
Control	28.10 (23.43)	32.88 (21.10)	30.80 (22.02)
Experimental	72.17 (21.87)	56.80 (30.54)	47.95 (29.95)

Note. Standard deviations are in parentheses.

Need for Cognition and Confidence in Answers. Significant main effects of Task, $F(2, 172) = 51.53, p < .001$, and Condition, $F(1, 86) = 42.05, p < .001$, were found on confidence in answers, but not of Need for Cognition, $F(1, 86) = 3.75, p = .06$. There was a Task \times Condition interaction, $F(2, 172) = 16.71, p < .001$, but no Task \times Need for Cognition interaction, $F(2, 172) = 2.11, p = .13$. However, Need for Cognition did make

a difference to participants' confidence in their chosen answers (Table 4.3). A significant Need for Cognition \times Condition interaction indicated that high and low Need for Cognition groups did not differ in their confidence in the absence of confidence cues ($M = 41.44$ vs. $M = 43.14$), but when confidence cues were added the high Need for Cognition group were more confident overall in the answers they chose than the low Need for Cognition group ($M = 71.27$ vs. $M = 56.63$), $F(1, 86) = 5.99, p = .02$. The lack of a significant Task \times Condition \times Need for Cognition interaction indicated that this pattern was the same across all three tasks, $F(2, 172) = 1.00, p = .37$.

Need for Cognition and Perceptions of Speakers. Need for Cognition made no difference to participants' choice of team-mate in either the control or the experimental condition, $\eta^2 = .94, df = 1, p = .32$ and $\eta^2 = .98, df = 1, p = .32$. With the exception of the result for the control condition for they speaker perceived as being most competent, $\eta^2 = 3.54, df = 1, p = .06$, Need for Cognition had no affect on how participants perceived the three speakers in terms of who they thought was most competent, $\eta^2 = .53, df = 1, p = .47$ (experimental condition), least competent, $\eta^2 = .14, df = 1, p = .71$ and $\eta^2 = .79, df = 1, p = .38$, who they liked most, $\eta^2 = .01, df = 1, p = .92$ and $\eta^2 = .36, df = 1, p = .55$, and who they liked least, $\eta^2 = 2.58, df = 1, p = .11$ and $\eta^2 = .77, df = 1, p = .38$.

Need for Closure and Need for Cognition

The observed correlation between Need for Cognition and Need for Closure was low and negative ($r = -.18, p = .06$). Webster and Kruglanski (1994) also found a low, negative correlation between these two constructs ($r = -.28$), suggesting that these two scales do not reflect the same underlying construct.

Gender

A Speaker Confidence \times Task Type \times Condition \times Participants' Gender ANOVA was conducted, to see if there were any gender differences in the amount of times each speaker's answers were chosen. Apart from a main effect of Speaker Confidence, $F(2, 212) = 30.09, p < .001$, no other main effects were significant for either Task Type, $F(2, 212) = .28, p = .76$, Condition, $F(1, 106) = .28, p = .60$, or Gender, $F(1, 106) = .28, p = .60$. Other than significant Speaker Confidence \times Condition, $F(2, 212) = 30.06, p < .001$, and Speaker Confidence \times Task Type interactions, $F(4, 424) = 9.65, p < .001$, there were no other two-way interactions, for Speaker Confidence \times Gender, $F(1, 106)$

= .28, $p = .60$, Task Type \times Condition, $F(2, 212) = .27$, $p = .76$, Task Type \times Gender, $F(2, 212) = .28$, $p = .76$, or Speaker Confidence \times Gender, $F(2, 212) = .51$, $p = .60$. There were no significant three-way interactions for Speaker Confidence \times Condition \times Gender, $F(2, 212) = .94$, $p = .39$, Task Type \times Condition \times Gender, $F(2, 212) = .28$, $p = .76$, Task Type \times Speaker Confidence \times Gender, $F(4, 424) = .85$, $p = .49$, apart from a Task Type \times Speaker Confidence \times Condition interaction, $F(4, 424) = 8.62$, $p < .001$, nor was there a Task Type \times Speaker Confidence \times Gender \times Condition interaction, $F(4, 424) = .45$, $p = .77$. Hence, men and women did not respond differently to the confidence cues as a whole or on the three different tasks.

A Task Type \times Condition \times Participants' Gender ANOVA indicated that there were no gender differences between men and women's confidence overall or on the different tasks. The main effects of Task Type, $F(2, 210) = 43.55$, $p < .001$, and Condition, $F(1, 105) = 35.15$, $p < .001$, were significant, but not of Gender, $F(1, 105) = .67$, $p = .42$. There was a Task Type \times Condition interaction, $F(2, 210) = 12.65$, $p < .001$, but no interactions with Gender: Condition \times Gender, $F(1, 105) = .006$, $p = .94$, Task Type \times Gender, $F(2, 210) = .14$, $p = .87$, Task Type \times Condition \times Gender, $F(2, 210) = 1.61$, $p = .20$. The lack of any significant effects of gender could perhaps be due to uneven sample sizes, as the number of female participants who took part in this experiment vastly outnumbered the male participants who took part.

Summary of Results

In relation to participants' choices, there were significant Speaker Confidence \times Condition \times Need for Closure interactions on the intellectual and external judgement tasks, but not on the judgmental task. For participants' confidence in choice there was no Task Type \times Condition \times Need for Closure interaction. Hence, Need for Closure affected choice but not confidence in choice. Need for Closure also had an effect on participants' perceptions of the speakers.

There was no Speaker Confidence \times Condition \times Need for Cognition interaction for choice, but there was a Condition \times Need for Cognition interaction on confidence in choice. However there was no three-way interaction with Task Type. Hence, Need for Cognition did not affect choice but it did affect confidence in choice. Need for Cognition had no affect on participants' perceptions of the speakers.

The lack of any significant interactions with Gender indicated that participants' gender had no effect on choice or confidence in choice.

Discussion

The possibility of there being individual differences in peoples' use of the confidence heuristic was explored in this chapter. It was found that participants' Need for Closure affected the extent to which they chose the answers of a highly confident speaker and how they perceived such a speaker, whereas Need for Cognition affected participants' confidence.

Need for Closure

The extent to which individuals rely upon the confidence heuristic as a decision-making strategy was related to their Need for Closure. Those higher in Need for Closure utilised the confidence heuristic substantially more often than those who were lower in Need for Closure, who appeared in turn to be more accepting of less confident speaker's input. As Need for Closure is the general tendency to prefer certain to uncertain knowledge, a desire for confident knowledge (Kruglanski and Webster, 2000), this is as expected. However the high confidence speaker's answers were chosen most frequently by participants regardless of whether they were high or low in Need for Closure, indicating that the confidence heuristic was to some extent used by everyone. Additionally, differences between Need for Closure groups were only seen on some tasks. Why was this?

The Need for Closure can be situationally induced as well as being a stable individual difference (Webster and Kruglanski, 1994). The experimental situation used here may have led to *situational* Need for Closure on the intellectual and external judgement tasks at least, as these were difficult tasks. If they did find the tasks too hard then participants, looking for a means of closure, could have relied heavily upon the confidence heuristic as a means of making the decision-making process less cognitively taxing. This could account for why the high confidence speaker's answers were chosen most frequently regardless of how participants scored on the measure of Need for Closure – when faced with uncertainty, people operate a confidence heuristic rule, whereby they agree with the most confident advice available. However, there were differences in the extent to which the high and, to a lesser extent, the medium confidence speaker's answers were chosen which could be due to the *individual difference* of Need for Closure. Hence the extent to which someone uses the confidence

heuristic rule of ‘agree with the confident speaker’ varies according to whether they have a high or low Need for Closure.

What is it about Need for Closure that could lead to differences in one’s use of the confidence heuristic? Webster and Kruglanski (2000) suggest individuals high in Need for Closure ‘seize’ upon an initial judgement (i.e. quickly make it) and then ‘freeze’ upon it (i.e. fix on this choice). In relation to the confidence heuristic, this would indicate that individuals who are high in Need for Closure look for a means of quickly reaching closure by utilising the confidence heuristic to reach a decision and fix upon this as a decision-making strategy. Individuals lower in Need for Closure on the other hand do not stick so rigidly to this strategy, giving some consideration to alternatives. Indeed, this would appear to be the case, as the Need for Closure aspects of decisiveness and closed-mindedness were of particular importance. The more decisive and closed-minded an individual was, the more reliant they were on highly confident answers, and hence the confidence heuristic. So it would appear that participants choosing the high confidence speaker’s answers wanted to make quick and confident choices, represented by the factor of decisiveness, but with the minimum of effort, represented by the factor of closed-mindedness, whereby decisions are reached without consulting many sources. In other words, a decision-making strategy is developed by using high confidence as a heuristic, with the confidence heuristic satiating the desire for confident knowledge.

Differences between the Need for Closure groups were only seen on the intellectualive and external judgement tasks, and not on the judgmental task. In Chapter 3 the differences between these tasks was attributed to participants’ level of confidence in their chosen answers. Were the differences on these two tasks due to low Need for Closure participants being more confident in their answers (in the control group), and thus using another’s input less? Previous research suggests that the opposite should occur – high Need for Closure individuals have been found have more initial confidence in their answers, and for subsequent shifts in their confidence to be higher than low Need for Closure individuals (Mayseless and Kruglanski, 1987). This was not the case here. Control group confidence in answers was the same for both Need for Closure groups, as were subsequent changes in confidence with the addition of confidence cues. However this may be because Mayseless and Kruglanski found differences in confidence on a task where the information on which individuals were giving confidence judgments was their own, rather than coming from an outside source, as in the present experiment.

Why then were there differences between the tasks? Both Need for Closure groups were equally uncertain on the intellectual and external judgement tasks, and equally certain on the judgmental task. In Chapter 3 it was suggested that people relied upon the confidence heuristic less on the judgmental task because they could utilise their own (internal) information to a greater extent than on the other two tasks where their greater level of uncertainty led to a greater reliance on other's (external) information. Could this be why there were differences between the Need for Closure groups on the intellectual and external judgement tasks? It has been suggested that high Need for Closure individuals should be more resistant to persuasion when in possession of prior (internal) information, but less resistant to persuasion when they are lacking such information (Kruglanski et al., 1993). On this basis one would expect there to be little difference in confidence heuristic use on the judgmental task between Need for Closure groups, as participants' higher confidence levels on this task indicates that they used internal information in their choices. On the intellectual and external judgement tasks however, participants' confidence was much lower, indicating that they had less internal information to rely upon, and were more susceptible to influence from external sources of information. If Kruglanski et al.'s (1993) suggestion is correct then high Need for Closure participants were more influenced by the confidence heuristic than those who were lower in Need for Closure because this lack of prior/internal information made them less resistant to persuasion. So it may be that an individual's Need for Closure affects choice only when external information is involved.

There were also differences between Need for Closure groups in how they perceived the speakers. As expected, those higher in Need for Closure viewed the confident speaker far more positively than the speakers who expressed some element of uncertainty in their answers, associating confidence with competency and overwhelmingly choosing this speaker as their team-mate. Individuals lower in Need for Closure did not view the high confidence speaker as positively, but they did view the speakers who expressed some uncertainty in their answers far more positively than the high Need for Closure participants did. This provides some support for the argument that high Need for Closure individuals rely more on stereotypes and pay less attention to individuating information than those who are lower in Need for Closure (e.g. Dijksterhuis et al., 1996; Mayseless and Kruglanski, 1987). For high Need for Closure individuals, confidence is assumed to be a good thing, and the stereotype of confidence

equating quality, in that one's level of confidence should match the quality of one's information, applies, even when there may be evidence to the contrary.

Need for Cognition

The hypothesis that individuals who were high in Need for Cognition would choose the high confidence speaker's answers less frequently than those lower in Need for Cognition was not supported. Participants in the low Need for Cognition group did not seem to rely on confidence as a heuristic any more than those in the high Need for Cognition group. This may be due to situational factors, such as those suggested previously, as low involvement and/or task difficulty can reduce high and low Need for Cognition individuals to simpler, less cognitively demanding methods of evaluation (Cacioppo et al., 1983; Hosman et al., 2002). Hence, if the participants did not fully engage in the task or found it too hard they may have evaluated and used each speaker's answers in similar ways, in this case relying on the high confidence speaker, regardless of their Need for Cognition. Alternatively it may indicate that the confidence heuristic is a general cognitive heuristic that is used by most people, or at least most of the time. There were, however, still differences between Need for Cognition groups in the confidence they had in their answers. It may be that individuals who are high in Need for Cognition do still try and engage in more cognitive effort when choosing their answers and their higher confidence represents this – they have possibly generated more reasons for why this speaker's answers are the best, rightly or wrongly.

Gender

No gender differences were found in the present experiment. However, it may be that gender differences only emerge when the speaker's gender is apparent. For instance, the results from Chapter 3 indicated that people made stereotypical judgments of a speaker's gender on the basis of their expressed level of confidence. A confident speaker was believed to be male, whereas those expressing some element of doubt were believed to be female. Therefore further research should give consideration to the gender of both the speaker and the listener, as there may be differences in men and women's use of confidence cues (Pulford, 2002). This is addressed in Chapter 5.

Limitations

It would appear that an important factor in the extent to which the confidence heuristic is used is one's own level of uncertainty. A limitation of the present design

was that the use of a between-subjects design, rather than a within-subjects design for individual's choices and confidence in those choices in the presence and absence of confidence cues, meant that each individuals' own level of uncertainty could not be considered, instead relying on uncertainty in each condition as a whole. However, the design used here is advantageous in that participant's choices and confidence in those choices is due to the presence and absence of confidence cues and not to familiarity with the questions.

The confidence heuristic may also manifest itself in different ways in different situations. Although the task used here was designed to consider this, in terms of the type of information one can bring to a task, it does lack somewhat in realism. In day-to-day life we encounter many situations, ranging from the mundane to the life changing, where we need to turn to other sources of information. Evidence does suggest that in more realistic settings, such a simulated juries, people continue to make use of the confidence heuristic (e.g. Leippe et al., 1992). The importance of the task may also effect confidence heuristic use, as may the source of information, depending on their status, gender, age or experience, thus leaving plenty of scope for future research.

Conclusions

To conclude, people's use of confidence as a heuristic may be situationally induced, when uncertainty is high and/or motivation is low, however the extent to which confidence is used as a heuristic may be due to factors related to the individual. Some people, such as those high in Need for Closure, have a greater desire to possess confident information, regardless of the validity of that information, and so become more reliant on the confidence heuristic. Further differences in people's use of the confidence heuristic may become apparent in different situations, such as who is communicating confidence, in addition to who the recipient of the communication is.

Of particular relevance here is the gender of both the speaker and the listener. As noted earlier, results from the previous chapter indicated that a speaker's level of confidence led to stereotyped judgements of gender being made. Leading on from this, it may be that people perceive male and female speakers expressing the same level of confidence in different ways, particularly if a given level of confidence is deemed to be more appropriate to one gender than another. This may also depend on the gender of the speaker. This issue will be considered in the next chapter.

CHAPTER 5

The Influence of Expressed Confidence on Perceptions of Speakers

This study examines how speakers who express different levels of confidence are perceived. 119 participants each read the testimonies of three witnesses, expressed in the experimental condition with high, medium and low confidence. Half the participants read testimonies from male speakers and half from female speakers. Participants answered questions relating to information contained in the testimonies as well as questions relating to the speakers, measured on a series of 7-point scales. Increasing levels of speaker confidence resulted in higher ratings of factors relating to perceived speaker ability and confidence, as well as an increase in agreement with that speaker. However, too much confidence had a detrimental effect on ratings relating to the speakers' social attractiveness. Neither speaker or listener gender had an effect on the influence of a speaker's confidence on choice or perceptions of the speakers. The results are discussed in relation to peoples' basis for using another person's expressed confidence as a heuristic.

The Influence of Expressed Confidence on Perceptions of Speakers

Although the confidence of another person has been shown to act as a form of social influence (Lieppe, Manion, and Romanczyk, 1992; Sniezek and Buckley, 1995; Sniezek and Van Swol, 2001; Zarnoth and Sniezek, 1997), Zarnoth and Sniezek (1997) pointed out that why this should be so is unanswered. Why do people opt for answers or opinions that are expressed confidently at the expense of those that are expressed with some element of uncertainty?

One suggestion is that this may be due to people utilising the confidence heuristic, whereby a speaker's confidence is used as a way of differentiating between the information that one is receiving (Thomas and McFadyen, 1995). In this way a speaker expressing high confidence in their information is judged to hold more reliable information than one who expresses their information tentatively. However a lack of empirical research into the confidence heuristic still leaves the question unanswered, what exactly is it that makes us place more faith in confidently expressed information over that which contains some element of uncertainty? Is it, as Price and Stone (2004) have suggested, because people use confidence as a heuristic, "according to which they use [a speaker's] confidence as a cue to his or her knowledge, competence or correctness" (p. 40). Furthermore, are there, as Thomas and McFadyen (1995) suggest, gender differences in perceptions of speakers, which would mean that the confidence heuristic is not a general cognitive heuristic?

Speech Style and Influence/Persuasion

To begin to try to shed some light on this matter, parallels can be drawn between expressed confidence and an area that has received far more extensive empirical attention - power of speech style. Powerless speech is characterised by the frequent use of intensifiers, hedges, hesitations, questioning forms and polite forms, whereas powerful speech should be low on these categories (Erickson, Lind, Johnson, and O'Barr, 1978; O'Barr, 1982). Powerless speech indicates a tentative, uncertain approach, whereas powerful speech is more assertive, and can indicate that the communicator is confident in the position they are advocating (Erickson et al., 1978). Using a powerful speech style has been shown to lead to greater acceptance of a speaker's communication than a tentative or powerless style (Erickson et al., 1978; Holtgraves and Lasky, 1999), although it has been argued that this is dependent on other

factors, such as gender (Carli, 1990), communication modality (Sparks, Areni, and Cox, 1998) or argument strength (Hosman, Huebner, and Siltanen, 2002).

Numerous researchers argue that the influence of power of speech style may actually be mediated by how a speaker is perceived (e.g. Erickson et al., 1978; Holtgraves and Lasky, 1999; Lind and O’Barr, 1979). Indeed, Hosman et al. (2002) suggested that power of speech style does not have a direct effect on persuasion and instead acts a peripheral cue, influencing cognitive responses about a speaker’s personal attributes that in turn affect the recipient’s attitude toward the topic. Sparks et al. (1998) support this notion in part, suggesting that communication modality (e.g. written, audio, audio-visual) encourages heuristic (peripheral) processing, with power of speech style being used as a heuristic cue. Hence it is important to consider how different speech styles affect how a speaker is perceived.

Speech Style and Impression formation

The way in which we communicate may hold cues as to what sort of person we are (or are perceived to be). Scherer (1979) for instance suggested that there are two major dimensions of speech cues: one encompassing aspects relating to competency and the other relating to likeability. Indeed, power of speech style has been found to affect impression formation, with powerful speakers being viewed as more confident, competent, intelligent and knowledgeable than speakers using powerless or tentative language (Carli, 1990; Erickson et al., 1978; Holtgraves and Lasky, 1999; Sparks et al., 1998). Furthermore, Holtgraves and Lasky (1999) found that a speaker using a powerful style of speech was rated as more likeable and trustworthy than one using a powerless style. Such speech style effects have been demonstrated in many different situations, from simulated courtrooms (Lind and O’Barr, 1979) to classrooms (Haleta, 1996) and employment interviews (Parton, Siltanen, Hosman, and Langenderfer, 2002), as well as in different communication modalities (Sparks et al., 1998).

Speech Style and Gender

The notion of power of speech style is said to reflect differences in speaker status. A communicator with low social status is said to typically utilise a ‘powerless’ mode of speech, whereas communicators with high social power, such as a professional in a court setting, use ‘powerless’ speech much less frequently (Erickson et al., 1978). Following on from this suggestion, it has been argued in the past that the use of

uncertain or powerless language characterises the way in which women speak and reflects their unequal gender status with men in Western society (Bradley, 1981, Lakoff, 1975). On this basis there may be differences in how speakers are perceived, not only as a result of the power of speech style they communicate with but also because of their gender. As a powerless speech style is associated with being feminine, the assumption is that women speaking in such a way will be perceived more favourably than their male counterparts, whereas the opposite should be true for a woman using a powerful speech style. However, findings relating to this have been mixed, possibly reflecting changes in Western society that have addressed unequal gender statuses.

A number of studies have found gender differences in relation to the influence of power of speech style. Women speaking assertively have been found to be regarded as more intelligent, knowledgeable and competent than those using a tentative speech style, whereas for men language has no effect on how they are perceived in this manner (Bradley, 1981; Carli, 1990). The gender of the listener may also be important. Carli (1990) found that women liked and trusted an assertive speaker more than tentative speaker, whereas men trusted the assertive speaker less but found both speakers equally likeable. Erickson et al. (1978) have argued that differences in how a speaker is perceived may depend on whether they are the same sex or different sex as the listener, finding that differences in perceptions of powerful and powerless speakers' credibility was more apparent when the speaker and listener were of the same sex than when they were of opposite sexes. They suggest that this may be because listeners cannot refer to their own speech behaviour when the speaker is of the opposite sex and so feel less confident making attributions on the basis of their speech style.

However other studies have failed to find any significant gender effects as a result of speech style on impression formation (e.g. Holtgraves and Lasky, 1999; Lind and O'Barr, 1979; Newcombe and Arnkoff, 1979; Parton et al., 2002). Newcombe and Arnkoff (1979) argued that differences relating to how speakers using different speech styles are perceived could be due to status rather than gender. Hence, if speakers are perceived as possessing equal status, no gender differences should be apparent. Indeed, Lind and O'Barr (1979) have suggested that men *and* women using a powerful speech style elicit more favourable attributions than those using powerless speech. Powerless communicators may be perceived less favourably, not because of their gender, but because of the extra cognitive effort that it takes to understand their more complex manner of communication.

Speech Style and Expressed Confidence

While parallels can be drawn between power of speech style and the expression of confidence and uncertainty, these remain two distinctly separate constructs. Powerful speakers may be perceived as having more confidence in their stated positions due to the clarity with which they express themselves, whereas powerless language may indicate a speaker's lack of confidence or certainty (Berger and Bradac, 1982; Bradley, 1981; Erickson et al., 1978; Leippe, Manion, and Romanczyk, 1992; Parton et al., 2002). However, Parton et al. point out that whilst powerless language may signify uncertainty, in one's self or the position one is advocating, powerful language may not necessarily be indicative of confidence. In support of this they refer to Hosman and Siltanen's (1994) conclusion that powerful speech may only indicate certainty when compared to a powerless speech style. The converse may also be true. For instance, Myers (1991) has suggested that elements of powerless speech, such as tag questions and hedges, may actually serve to communicate politeness rather than uncertainty alone.

Hosman and Siltanen's (1994) conclusion is an important point to consider. Traditional research paradigms of speech style contrast two extremes (e.g. powerful/powerless; assertive/tentative) whereas natural language is much broader, and confidence and uncertainty can be seen as covering a continuum of expressions. While the speech style research reviewed here indicates that powerful, assertive speech has more of a positive influence upon how we perceive a speaker, and our attitudes towards that speaker's recommendation, than powerless, tentative speech, this is not to say that the same would apply to different levels of expressed confidence. While Price and Stone (2004) found that a communicator expressing high confidence was judged to be more knowledgeable than one expressing a more moderate confidence level, this again relies on only two levels of confidence. However, others have shown that increasing levels of confidence can lead to an increase in negative feelings towards a speaker, resulting in a more moderate expression of confidence being viewed more favourably (London, McSeveney, and Tropper, 1971; Maslow, Yoselson, and London, 1971; Pulford, 2002).

Rationale for Experiment

The aim of this experiment is to explore how speakers expressing different levels of confidence are perceived - what is our basis for using the confidence heuristic? While a confident speaker may be perceived more positively than an uncertain one, how is a speaker falling in between these two extremes perceived? On the basis of the previous

research reviewed here it is hypothesised that there will be differences in how speakers who use extreme confidence expressions are perceived, in that high confidence speakers will be perceived more positively than low confidence ones. How speakers expressing medium confidence are perceived is expected to lead to one of two results. There will either be a progression, in that increasing confidence leads to increases of a particular attribute, or an inverse U shaped relation. For example, high confidence may be rated as more knowledgeable than medium confidence, which in turn is seen as more knowledgeable than low confidence. Alternatively a speaker expressing a medium level of confidence may be perceived more positively than speakers at the extremes.

In this study gender, of both the speaker and listener, is also taken into account, to consider any differences that may result. Are there any differences here in relation to participants' attitudes towards a speaker and their recommendation? Previous results have been mixed and so it is worth re-examining this.

Method

Participants

119 undergraduate students (43 men and 76 women) from the University of Wolverhampton's participant pool took part in the study. Participants ranged in age from 18 to 52 years, with a mean age of 21.98 years ($S.D. = 5.87$). Participants were randomly assigned to either the experimental or control condition.

Materials

The previous two experiments (Chapters 3 and 4) considered the influence of confidence using speaker's single answer responses. However this may not have given participants sufficient opportunity to form impressions of each speaker. For this reason a new task was developed for use in this experiment, based on witness testimonies. Participants were required to answer a series of questions relating to a crime on the basis of the information provided. This information was presented in the form of a 'case booklet' consisting of (a) the background to the 'crime', (b) a photo line-up, (c) three witness testimonies, (d) a question sheet. Each of these are described in more detail below. Full materials can be found in Appendix G.

Background. The first page of the case booklet consisted of an information page detailing the background to the crime, outlining the scene and nature of the crime (an art gallery theft), as well as the time period during which the crime took place. Information regarding three eyewitnesses was also given. In Chapters 3 and 4 the speakers had been identified simply by the letters A, B or C. As one aim of the present study was to consider the influence of a speaker's gender when different levels of confidence were used, two versions of the questionnaire were developed – one using male speakers and one using female speakers only. 'Friend A', 'Friend B' and 'Friend C', were replaced by the names Matt/Sarah, Nick/Nikki, and Paul/Laura, respectively. The names were chosen from a list of popular baby names from 1980-1989 to reflect names common to the ages of a majority of participants to reduce any bias that may occur in participant's perceptions of the speakers (e.g. using a name such as Joan may lead to attributions of an older speaker).

Photo line-up. The second page of the booklet contained a photo line-up. Participants were given the premise that these were images taken from a working security camera in

the vicinity of the crime and the images were of all of the people who had entered the crime scene within a given time period.

Witness testimonies. Three witness testimonies were provided. In the control condition the testimonies were given in the absence of confidence cues. In the experimental condition one witness spoke with high confidence (Matt/Sarah), one with medium confidence (Nick/Nikki) and one with low confidence (Paul/Laura), using confidence cues developed in an earlier pilot study (see Chapter 2, Table 2.1).

Each of the three testimonies was of a similar format and length (approx. 200 words) and was presented in a counterbalanced order. Each testimony contained ‘slots’ for the witnesses’ answers to be inserted into, which were also counterbalanced. All the testimonies were written colloquially and presented as a transcript of each witness’s interview with the police. However each one is slightly different in wording to maintain a difference between witness testimonies, other than confidence level and answers given. Sections of the high, medium and low confidence testimonies are reproduced below. Expressions in parentheses indicate the aforementioned answers, confidence cues are reproduced in bold. The confidence cues were omitted in the control condition, an example of which is also given below.

*“**I’m certain that** there had been (8) people enter the rooms in question since the gallery had opened, although **obviously** not all of them went into the room the painting was stolen from between 10.30 and 11 a.m.”*

*“**I seem to recall that** (6) people had so far gone into those rooms you’re asking about since the gallery opening that day and some of these had **possibly** gone in there between 10.30 and 11 a.m.”*

*“**I’m guessing but I would say** that (7) visitors went into the rooms near the painting since I’d started that day, although some of these had **perhaps** gone in before 10.30.”*

“There had been (8) people enter the rooms in question since the gallery had opened, although not all of them went into the room the painting was stolen from between 10.30 and 11 a.m.” (Control Condition)

Question sheet. The final pages of the booklet contained a question sheet, of which there were two parts. The first part contained seven questions relating to the ‘crime’. Each question had three options, one taken from each of the three testimonies, which participants they were required to tick the box corresponding to the answer they thought was correct. For example Question 1 asked, “*How many visitors to the gallery had entered the rooms near the painting before 11 a.m.?*”. The answer options were “6”,

“7” or “8”, each of which had been given in one of the three testimonies. Using this method provided a less overt way of determining the influence of another person’s expressed confidence than in the previous experiment, where choice was indicated by selecting the ‘name’ of the speaker rather than the answer itself.

The second part of the question sheet asked participants about their impressions of each speaker, based on findings from previous research. Participants were asked to give ratings of the speaker’s intelligence, honesty, competence, nervousness, optimism, knowledge, politeness, friendliness, self-confidence, trustworthiness, professionalism, likeability and credibility using a series of 7-point scales, each one with a centre point of ‘average’. For analysis each scale was recoded so that a high score represented a high rating on each attribute, i.e. a score of 1 indicated that the participant thought the speaker was not very intelligent whereas a score of 7 indicated that they thought the speaker was highly intelligent.

Design and Procedure

The study was a 3 (Speaker Confidence) × 2 (Condition) × 2 (Speaker Gender) × 2 (Listener Gender) mixed-design, with repeated measures on the first variable. The dependent variables were the amount of time each speaker’s answers were chosen and the ratings given to each speaker on the perception’s dimensions.

Participants were presented with the information booklet, containing the background to the crime, a map and a photo line-up. They were asked to carefully read this information before reading the witness testimonies. Each booklet contained three testimonies, which in the experimental condition contained one high, one medium and one low confidence speaker. All three testimonies in the control condition were presented without confidence cues. Half of the participants read testimonies spoken by male witnesses, and half read the testimonies of female witnesses. After reading all three testimonies the participants were asked to answer a series of questions relating to the crime based on the information contained in the testimonies. They were allowed to refer back to the testimonies if necessary to answer the questions. When participants had completed the task they were then asked to give rate each of the three speakers on a series of 7-point scales as described in the materials section. For analysis the scores relating to each speaker were totalled to give an overall speaker preference score. After the questionnaires were completed participants were debriefed and thanked.

Results

A mixed design ANOVA was conducted on each of the dependent variables to test for the influence of Speaker Confidence, Speaker Gender and Listener Gender on choice and perceptions of speakers in the presence and absence of confidence cues.

Influence of Speaker Confidence on Choice of Answers

The percentage of times each speaker's answers were chosen was calculated, and ANOVA conducted. The ANOVA results for choice are summarised in Table 5.1. A significant Speaker Confidence \times Condition interaction indicated that the addition of confidence cues to a speaker's testimony led to shifts in participants' choice of answers. Compared to when no confidence cues were used, speaking with high confidence led to a 26.55% increase in the amount of times that speaker's answers were chosen, $t(117) = 4.38, p < .001$, whereas speaking with low confidence led to a 21.62% decrease in how often that speakers answers were chosen, $t(117) = 4.45, p < .001$. The addition of medium confidence cues to a speaker's answers made no difference to participants' choice of answers, $t(117) = 1.05, p = .30$. There were no significant main effects of listener or speaker gender upon choice, nor were there any noteworthy interactions with gender.

Influence of Speaker Confidence on Perceptions of Speakers

Participants rated the three speakers on a range of attributes to determine which of these were effected by a speaker's confidence level, thus enabling the basis for people's use of the confidence heuristic to be investigated. Ratings are shown in Table 5.2. ANOVA was conducted on the ratings to determine whether the presence of confidence cues, the level of confidence cue, a speaker's gender and a listener's gender had any effect on how speaker's were rated on each of the attributes. Table 5.1 summarises the ANOVA results.

There were significant Speaker Confidence \times Condition interactions for listeners' perceptions of speaker intelligence, nervousness, optimism, knowledge, friendliness, self-confidence and professionalism. No Speaker Confidence \times Condition interactions were found for credibility, likeability, honesty, politeness, trustworthiness or competence.

Table 5.1
ANOVA Summary Tables

DV	Source of Variation	df	F	DV	Source of Variation	df	F
Choice	Within-Subjects			Honesty	Within-Subjects		
	Confidence	2	20.82**		Confidence	2	.89
	Confidence × Condition	2	13.75**		Confidence × Condition	2	.77
	Confidence × Listener Gender	2	.08		Confidence × Listener Gender	2	.55
	Confidence × Speaker Gender	2	1.63		Confidence × Speaker Gender	2	2.56
	Confidence × Condition × Listener Gender	2	.45		Confidence × Condition × Listener Gender	2	1.60
	Confidence × Condition × Speaker Gender	2	.12		Confidence × Condition × Speaker Gender	2	.30
	Confidence × Listener Gender × Speaker Gender	2	.04		Confidence × Listener Gender × Speaker Gender	2	.32
	Confidence × Condition × Listener Gender × Speaker Gender	2	1.16		Confidence × Condition × Listener Gender × Speaker Gender	2	1.12
	Error	222			Error	222	
	Between Subjects				Between Subjects		
	Condition	1	.43		Condition	1	3.29
	Listener Gender	1	.006		Listener Gender	1	.03
	Speaker Gender	1	3.55		Speaker Gender	1	2.55
	Condition × Listener Gender	1	1.16		Condition × Listener Gender	1	1.33
	Condition × Speaker Gender	1	.25		Condition × Speaker Gender	1	.42
	Listener Gender × Speaker Gender	1	4.15*		Listener Gender × Speaker Gender	1	1.67
	Condition × Listener Gender × Speaker Gender	1	.006		Condition × Listener Gender × Speaker Gender	1	.14
	Error	111			Error	111	
Intelligence	Within-Subjects			Competency	Within-Subjects		
	Confidence	2	16.24**		Confidence	2	1.49
	Confidence × Condition	2	11.05**		Confidence × Condition	2	1.91
	Confidence × Listener Gender	2	.48		Confidence × Listener Gender	2	1.58
	Confidence × Speaker Gender	2	.98		Confidence × Speaker Gender	2	.31
	Confidence × Condition × Listener Gender	2	.53		Confidence × Condition × Listener Gender	2	.02
	Confidence × Condition × Speaker Gender	2	.23		Confidence × Condition × Speaker Gender	2	.80
	Confidence × Listener Gender × Speaker Gender	2	2.04		Confidence × Listener Gender × Speaker Gender	2	2.43
	Confidence × Condition × Listener Gender × Speaker Gender	2	1.46		Confidence × Condition × Listener Gender × Speaker Gender	2	6.88**
	Error	222			Error	222	
	Between Subjects				Between Subjects		
	Condition	1	8.20*		Condition	1	.01
	Listener Gender	1	3.95*		Listener Gender	1	7.30*
	Speaker Gender	1	.35		Speaker Gender	1	.02
	Condition × Listener Gender	1	3.52		Condition × Listener Gender	1	3.50
	Condition × Speaker Gender	1	.07		Condition × Speaker Gender	1	.62
	Listener Gender × Speaker Gender	1	10.39*		Listener Gender × Speaker Gender	1	.82
	Condition × Listener Gender × Speaker Gender	1	.008		Condition × Listener Gender × Speaker Gender	1	3.09
	Error	111			Error	111	

Table 5.1
ANOVA Summary Tables

DV	Source of Variation	df	F	DV	Source of Variation	df	F
Nervousness	Within-Subjects			Knowledge	Within-Subjects		
	Confidence	2	22.34**		Confidence	2	12.83**
	Confidence x Condition	2	16.51**		Confidence x Condition	2	9.12**
	Confidence x Listener Gender	2	.49		Confidence x Listener Gender	2	.05
	Confidence x Speaker Gender	2	4.59*		Confidence x Speaker Gender	2	1.81
	Confidence x Condition x Listener Gender	2	.39		Confidence x Condition x Listener Gender	2	.15
	Confidence x Condition x Speaker Gender	2	.21		Confidence x Condition x Speaker Gender	2	1.40
	Confidence x Listener Gender x Speaker Gender	2	1.44		Confidence x Listener Gender x Speaker Gender	2	.14
	Confidence x Condition x Listener Gender x Speaker Gender	2	.47		Confidence x Condition x Listener Gender x Speaker Gender	2	.24
	Error	222			Error	222	
	Between Subjects				Between Subjects		
	Condition	1	.001		Condition	1	.82
	Listener Gender	1	3.61		Listener Gender	1	.20
	Speaker Gender	1	.62		Speaker Gender	1	.03
	Condition x Listener Gender	1	.29		Condition x Listener Gender	1	.09
	Condition x Speaker Gender	1	.89		Condition x Speaker Gender	1	5.27*
	Listener Gender x Speaker Gender	1	4.56*		Listener Gender x Speaker Gender	1	.73
Condition x Listener Gender x Speaker Gender	1	1.18	Condition x Listener Gender x Speaker Gender	1	1.40		
Error	111		Error	111			
Optimism	Within-Subjects			Politeness	Within-Subjects		
	Confidence	2	8.11**		Confidence	2	.08
	Confidence x Condition	2	10.44**		Confidence x Condition	2	1.35
	Confidence x Listener Gender	2	.73		Confidence x Listener Gender	2	.41
	Confidence x Speaker Gender	2	2.38		Confidence x Speaker Gender	2	1.33
	Confidence x Condition x Listener Gender	2	.23		Confidence x Condition x Listener Gender	2	.99
	Confidence x Condition x Speaker Gender	2	.19		Confidence x Condition x Speaker Gender	2	1.09
	Confidence x Listener Gender x Speaker Gender	2	3.05*		Confidence x Listener Gender x Speaker Gender	2	.70
	Confidence x Condition x Listener Gender x Speaker Gender	2	.30		Confidence x Condition x Listener Gender x Speaker Gender	2	1.94
	Error	222			Error	222	
	Between Subjects				Between Subjects		
	Condition	1	.08		Condition	1	.07
	Listener Gender	1	3.34		Listener Gender	1	.96
	Speaker Gender	1	1.52		Speaker Gender	1	2.61
	Condition x Listener Gender	1	1.19		Condition x Listener Gender	1	.01
	Condition x Speaker Gender	1	.19		Condition x Speaker Gender	1	.04
	Listener Gender x Speaker Gender	1	.90		Listener Gender x Speaker Gender	1	.09
Condition x Listener Gender x Speaker Gender	1	.90	Condition x Listener Gender x Speaker Gender	1	.01		
Error	111		Error	111			

Table 5.1
ANOVA Summary Tables

DV	Source of Variation	df	F	DV	Source of Variation	df	F
Friendliness	Within-Subjects			Trustworthy	Within-Subjects		
	Confidence	2	7.23**		Confidence	2	2.47
	Confidence x Condition	2	5.82*		Confidence x Condition	2	1.94
	Confidence x Listener Gender	2	.02		Confidence x Listener Gender	2	1.12
	Confidence x Speaker Gender	2	2.83		Confidence x Speaker Gender	2	.27
	Confidence x Condition x Listener Gender	2	2.73		Confidence x Condition x Listener Gender	2	.26
	Confidence x Condition x Speaker Gender	2	1.25		Confidence x Condition x Speaker Gender	2	.03
	Confidence x Listener Gender x Speaker Gender	2	1.82		Confidence x Listener Gender x Speaker Gender	2	.01
	Confidence x Condition x Listener Gender x Speaker Gender	2	1.77		Confidence x Condition x Listener Gender x Speaker Gender	2	.30
	Error	222			Error	222	
	Between Subjects				Between Subjects		
	Condition	1	.49		Condition	1	.40
	Listener Gender	1	1.22		Listener Gender	1	.30
	Speaker Gender	1	.01		Speaker Gender	1	.004
	Condition x Listener Gender	1	.08		Condition x Listener Gender	1	.007
	Condition x Speaker Gender	1	.69		Condition x Speaker Gender	1	6.12*
	Listener Gender x Speaker Gender	1	.24		Listener Gender x Speaker Gender	1	.001
Condition x Listener Gender x Speaker Gender	1	1.90	Condition x Listener Gender x Speaker Gender	1	1.89		
Error	111		Error	111			
Self-Confidence	Within-Subjects			Professional	Within-Subjects		
	Confidence	2	21.20**		Confidence	2	22.38**
	Confidence x Condition	2	19.79**		Confidence x Condition	2	13.06**
	Confidence x Listener Gender	2	.44		Confidence x Listener Gender	2	.85
	Confidence x Speaker Gender	2	.71		Confidence x Speaker Gender	2	.33
	Confidence x Condition x Listener Gender	2	.40		Confidence x Condition x Listener Gender	2	.81
	Confidence x Condition x Speaker Gender	2	1.06		Confidence x Condition x Speaker Gender	2	.03
	Confidence x Listener Gender x Speaker Gender	2	.64		Confidence x Listener Gender x Speaker Gender	2	1.51
	Confidence x Condition x Listener Gender x Speaker Gender	2	.59		Confidence x Condition x Listener Gender x Speaker Gender	2	.35
	Error	222			Error	222	
	Between Subjects				Between Subjects		
	Condition	1	2.12		Condition	1	9.76*
	Listener Gender	1	.59		Listener Gender	1	2.60
	Speaker Gender	1	.06		Speaker Gender	1	.04
	Condition x Listener Gender	1	.19		Condition x Listener Gender	1	2.60
	Condition x Speaker Gender	1	.07		Condition x Speaker Gender	1	1.76
	Listener Gender x Speaker Gender	1	3.08		Listener Gender x Speaker Gender	1	.32
Condition x Listener Gender x Speaker Gender	1	1.33	Condition x Listener Gender x Speaker Gender	1	.90		
Error	111		Error	111			

Table 5.1
ANOVA Summary Tables

DV	Source of Variation	df	F	DV	Source of Variation	df	F
Likeability	Within-Subjects			Credibility	Within-Subjects		
	Confidence	2	.64		Confidence	2	9.14**
	Confidence x Condition	2	1.20		Confidence x Condition	2	2.63
	Confidence x Listener Gender	2	2.57		Confidence x Listener Gender	2	.23
	Confidence x Speaker Gender	2	.28		Confidence x Speaker Gender	2	.13
	Confidence x Condition x Listener Gender	2	.10		Confidence x Condition x Listener Gender	2	1.33
	Confidence x Condition x Speaker Gender	2	1.62		Confidence x Condition x Speaker Gender	2	.81
	Confidence x Listener Gender x Speaker Gender	2	.86		Confidence x Listener Gender x Speaker Gender	2	.51
	Confidence x Condition x Listener Gender x Speaker Gender	2	.13		Confidence x Condition x Listener Gender x Speaker Gender	2	.34
	Error	222			Error	222	
	Between Subjects				Between Subjects		
	Condition	1	3.96*		Condition	1	.54
	Listener Gender	1	.04		Listener Gender	1	6.33
	Speaker Gender	1	.01		Speaker Gender	1	.36
	Condition x Listener Gender	1	.75		Condition x Listener Gender	1	.03
	Condition x Speaker Gender	1	.17		Condition x Speaker Gender	1	7.50*
	Listener Gender x Speaker Gender	1	.22		Listener Gender x Speaker Gender	1	.21
Condition x Listener Gender x Speaker Gender	1	2.16	Condition x Listener Gender x Speaker Gender	1	3.00		
Error	111		Error	111			

Note. * $p < .05$ ** $p < .001$

Table 5.2

Mean ratings of speakers in the absence and presence of confidence cues

	Speaker Confidence			Total
	High	Medium	Low	
Intelligence				
Control	4.60	4.83	4.38	4.60
Experimental	5.10	4.22	3.66	4.33
Honesty				
Control	5.12	5.22	4.95	5.09
Experimental	4.88	4.81	4.76	4.82
Competence				
Control	3.92	4.00	3.93	3.95
Experimental	4.19	4.02	3.53	3.91
Nervousness				
Control	3.82	3.67	3.97	3.92
Experimental	2.66	3.66	4.97	3.76
Optimism				
Control	4.18	4.28	4.30	4.26
Experimental	4.98	4.26	3.57	4.26
Knowledgeability				
Control	4.35	4.58	4.19	4.35
Experimental	5.00	4.31	3.24	4.20
Politeness				
Control	4.45	4.33	4.48	4.42
Experimental	4.46	4.56	4.39	4.47
Friendliness				
Control	4.35	4.37	4.48	4.40
Experimental	3.88	4.51	4.47	4.29
Self-Confidence				
Control	4.50	4.83	4.38	4.57
Experimental	5.64	4.32	3.17	4.38
Trustworthiness				
Control	4.02	4.27	4.02	4.10
Experimental	4.42	4.28	3.79	4.18
Professionalism				
Control	4.90	4.87	4.65	4.81
Experimental	5.31	4.41	3.54	4.42
Likeability				
Control	4.60	4.52	4.55	4.56
Experimental	4.07	4.47	4.24	4.26
Credibility				
Control	4.33	4.32	3.87	4.17
Experimental	4.63	3.97	3.58	4.06

All of the significant Speaker Confidence x Condition interactions are illustrated in Figure 5.1, which shows that in the absence of confidence cues there was very little difference in how the three speakers were perceived, whereas consistent patterns emerged with the addition of confidence cues. This observation is confirmed after conducting separate ANOVAs on each condition. In the control group no main effects of Speaker Confidence were seen (intelligence, $F(2, 118) = 2.83, p = .06$; nervousness, $F(2, 118) = 1.16, p = .32$; optimism, $F(2, 118) = .32, p = .73$; knowledge, $F(2, 116) = 1.40, p = .25$; friendliness, $F(2, 118) = .70, p = .52$; self-confidence, $F(2, 118) = 2.89, p = .06$; professionalism, $F(2, 118) = 1.39, p = .25$). Hence, it can be assumed that participants did not perceive differences between the three speakers on any of the above attributes when they did not accompany their answers with confidence cues.

The addition of confidence cues to a speaker's answer did affect how the speakers were perceived. The strongest effect of a speaker's expressed confidence was seen on attributes relating to the speaker's *perceived* confidence, specifically ratings of speaker self-confidence, $F(2, 116) = 32.54, p < .001$, and nervousness, $F(2, 116) = 37.22, p < .001$, and, where partial Eta squared of .40 and .39 indicated that the speaker's level of confidence accounted for 40% and 39% of the overall variance respectively. This was followed by a marked effect of speaker confidence on ratings of speaker professionalism, $F(2, 116) = 27.36, p < .001, \eta^2 = .32$, intelligence, $F(2, 116) = 21.87, p < .001, \eta^2 = .27$, knowledgeability, $F(2, 114) = 20.60, p < .001, \eta^2 = .27$, and optimism, $F(2, 114) = 14.82, p < .001, \eta^2 = .21$. Speaker confidence has smaller but significant effect on ratings of speaker friendliness, $F(2, 116) = 7.88, p < .001, \eta^2 = .12$.

With the exception of ratings of speaker friendliness, Speaker Confidence produced a significant linear relationship on each attribute, indicating that the higher a speaker's confidence was, the more intelligent, $F(1, 58) = 28.35, p < .001$, optimistic, $F(1, 57) = 16.97, p = .001$, knowledgeable, $F(1, 57) = 25.99, p < .001$, self-confident, $F(1, 58) = 41.35, p < .001$, professional, $F(1, 58) = 33.79, p < .001$, and lacking in nervousness, $F(1, 58) = 57.81, p < .001$, they were perceived as being. Planned comparisons showed significant differences between ratings given to the high and medium, and medium and low, confidence speakers for intelligence, $t(58) = 4.45, p < .001$ and $t(58) = 3.08, p = .003$, optimism, $t(57) = 3.77, p < .001$ and $t(57) = 3.17, p = .002$, knowledgeability, $t(57) = 3.01, p = .004$ and $t(57) = 4.59, p < .001$, self-confidence, $t(58) = 5.33, p < .001$ and $t(58) = 4.27, p = .003$, professionalism, $t(58) = 4.98, p < .001$ and $t(58) = 4.04, p = .003$, and nervousness, $t(58) = 4.27, p < .001$ and $t(58) = 4.99, p < .001$.

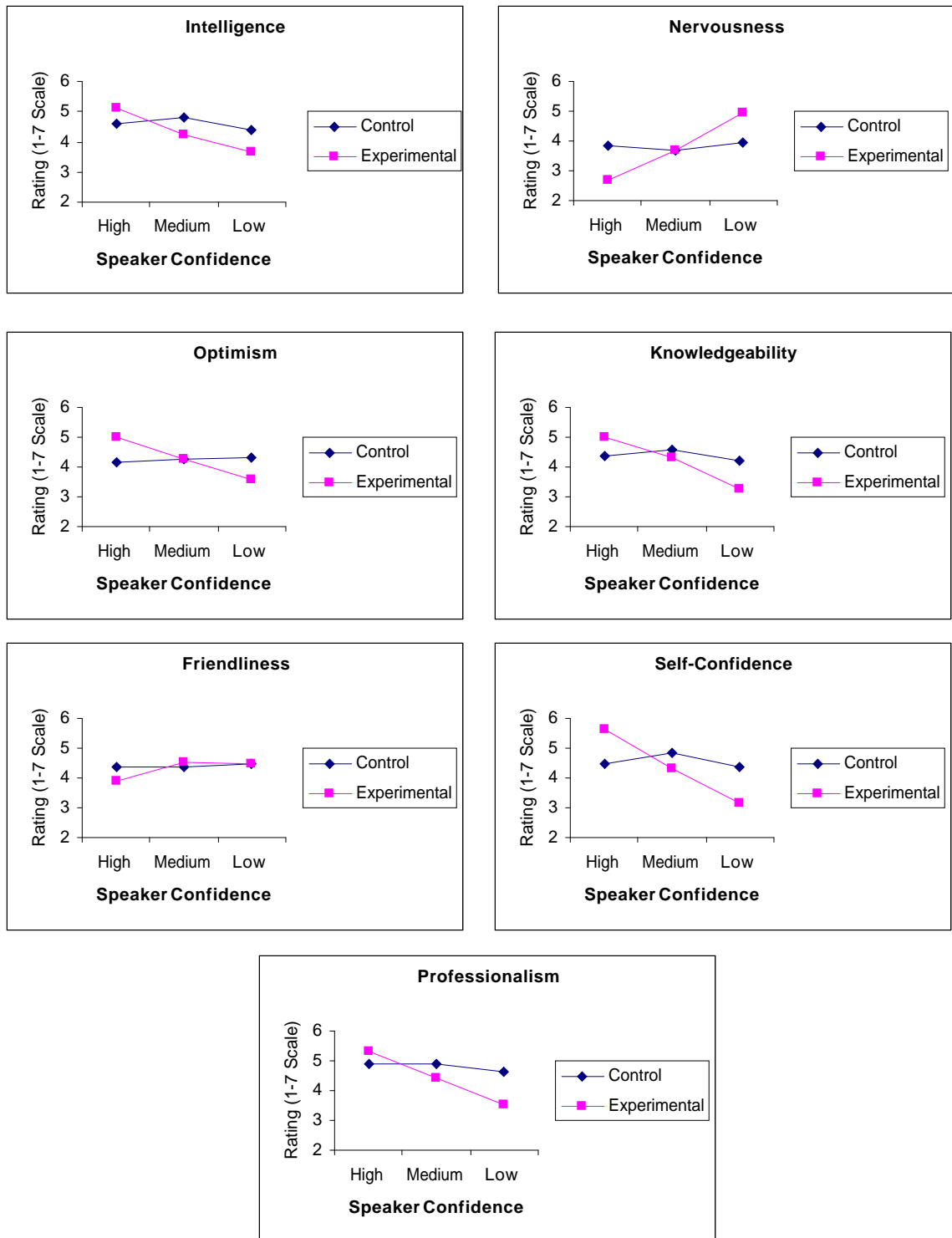


Figure 5.1. Significant interactions relating to perceptions of speakers speaking with different levels of confidence.

Ratings of speaker friendliness showed significant linear and quadratic relationships, $F(1, 58) = 7.61, p = .008$ and $F(1, 58) = 8.62, p = .005$. The high confidence speaker was rated as being significantly less friendly than either the medium or low confidence speakers, $t(58) = 3.50, p = .001$ and $t(58) = 2.76, p = .008$, with the medium and low confidence speakers both being rated as equally friendly, $t(58) = .26, p = .79$. However, from Figure 5.1 it can be seen that the ratings of speaker friendliness in the experimental condition are similar to those in the control condition for the medium and low confidence speakers both, $t(117) = .71, p = .48$ and $t(117) = .04, p = .97$, with the only difference being a slight decrease in ratings of perceived friendliness for the high confidence speaker when confidence cues were added, $t(117) = 1.92, p = .06$.

Gender Effects

There were no notable interactions between a speaker's confidence level and the gender of either the speaker or the listener, with the exception of a four-way Speaker Confidence \times Speaker Gender \times Listener Gender \times Condition interaction for ratings of competency, $F(2, 222) = 6.89, p = .001$, (see Table 5.2 for means). However, given that partial Eta squared for the four-way interaction was just .06, and therefore just 6% of the total variance in ratings of competency can be accounted for by these factors, it could be that this interaction emerged as a result of a certain amount of random error in participants' judgement processes. Furthermore, any differences could have been exaggerated owing to uneven numbers of male and female participants.

Summary of Results

In terms of the influence of confidence on choice, there was a significant Speaker Confidence \times Condition interaction, indicating that the addition of confidence cues had an effect on choice. However the lack of any significant main effects or interactions with gender indicated that a speaker's, or listener's gender did not effect choice.

Speaker Confidence \times Condition interactions for intelligence, nervousness, optimism, knowledge, friendliness, self-confidence and professionalism indicated that the addition of confidence cues effected participants' perceptions of speakers on these attributes, but had no effect on ratings of credibility, likeability, honesty, politeness, trustworthiness or competence. As with choice, lack of any noteworthy effects of indicated that a speaker's, or listener's gender did not effect participants' perceptions of the speakers.

Discussion

As in previous chapters, the addition of confidence cues had an effect on choice, in that high confidence cues led to an increase in agreement with a speaker's answers, low confidence led to a decrease in agreement, and the use of medium confidence cues made no difference to agreement. The gender of either the speaker or the listener had no effect on participants' choice of answers. While these results confirm previous findings from Chapters 3 and 4 the main aim of this chapter was to explore the reasons behind such shifts in choice behaviour – just why do people choose answers more frequently when they are expressed with high confidence, and less frequently when expressed with low confidence? What is the basis for using expressed confidence as a heuristic?

Previous research has considered the effect of a speaker's language in terms of polar opposites – powerful vs. powerless language, assertive vs. tentative and so on. This chapter explored whether the results found in these studies translates to a range of confidence/uncertainty expressions. The present results indicate that, for the most part, they do. As a speaker's expressed confidence increased so did listeners' perceptions of their intelligence, knowledge, professionalism, optimism, self-confidence, and lack of nervousness. These results lend some support to the initial hypotheses that there would be differences in how speakers using extreme confidence expressions would be perceived, and that how positively a speaker was perceived would progress as a speaker's confidence increased from low to medium to high. As indicated on the above attributes the high confidence speaker was perceived more positively than the medium confidence speaker, who in turn was perceived more positively than the low confidence speaker.

However this progression was not seen on all the attributes that were measured. Whilst it was hypothesised that there would be either a progression, such as that discussed above, or an inverse U shaped relation regarding perceptions of the medium confidence speaker, the results of the present study found that speakers expressing medium *or* low confidence in their answers were viewed as being much more friendly than a highly confident speaker. While speech style research, comparing powerful and powerless speech, has not found such effects (e.g. Holtgraves and Lasky, 1999), that which considers a broader range of expressions of confidence has done (e.g. London, McSeveney, and Tropper, 1971; Maslow, Yoselson, and London, 1971; Pulford, 2002).

Hence it would appear that too much confidence does have a detrimental effect on how a speaker is perceived in this way.

A speaker's confidence did not affect how they were perceived in terms of credibility, trustworthiness, honesty, likeability and politeness. It may be that people do not relate these attributes to a person's confidence level, or at least not in the experimental situation used here where there were no apparent motivational reasons for any of the witnesses to misrepresent the 'truth'. Alternatively it may be that these attributes are not affected by a speaker's confidence level on their own. For instance, Sparks et al. (2002) operationalised credibility as an amalgamation of honesty, credibility and trustworthiness ratings, while Holtgraves and Lasky (1999) combined ratings of intelligence, likeability, competence, knowledgeability, and trustworthiness to give an overall perception of speakers. Speech style effects were seen in both these instances.

In keeping with previous research, there were limited gender effects in the present experiment, and hence it can be assumed that in relation to gender at least, the confidence heuristic is a general cognitive heuristic (Thomas and McFadyen, 1995). Indeed, this is a promising result that has relevance in today's modern society – much of the literature referring to sex differences, often as a reflection of differences in status, goes back twenty or thirty years (e.g. Bradley, 1981; Lakoff; 1975). Hopefully we are starting to see beyond gender as an indicator of what someone knows and is capable of.

Conclusions

As would be expected by the confidence heuristic, when all else is equal, a comparison of the confidence with which different sources express their information serves as a means of differentiating between that information. Greater levels of expressed confidence leads to more influence upon the choices we make. As with speech style, the influence of confidence is mediated by how a speaker is perceived. Our basis for using confidence in such a way appears to be because we associate increasing confidence with factors relating to a speaker's ability, such as intelligence, knowledge, and professionalism, and to their level of confidence itself, for example their optimism, self-confidence and a lack of nervousness. However, too much confidence can have a negative effect on factors relating to a speaker's social attractiveness, in terms of how friendly we think they are.

In the short-term these latter factors are outweighed by perceptions of a speaker's ability and confidence, and so do not impact upon a speaker's persuasive influence. It may not matter that we do not find someone who is giving evidence in court particularly friendly as we do not need to form lasting relationships with them, indeed we may never see them again once the trial is over. In such a situation their ability to convey their information in a confident way is important. Their perceived ability and confidence allows us to turn to the confidence heuristic as a decision-making aid, particularly when there is no evidence to suggest that our perceptions may be erroneous. But in the long-term too much confidence could be detrimental to a person's influence, with this being particularly apparent, as Zarnoth and Sniezek (2002) point out, when a speaker's level of confidence is perceived as not being justified. In such cases the rules of the confidence heuristic may be perceived as being violated, and we may learn that a speaker's confidence does not necessarily represent their ability, hence making other factors such as those relating to the speaker's social attractiveness more important in the influence process. Therefore further research should consider how prior interaction with speakers who express different levels of confidence impacts upon our perceptions of them, and their subsequent influence. This issue will be addressed in the next two chapters. Chapter 6 considers how being able to view a speaker's past performance on a task affects how that speaker is perceived by listeners, and Chapter 7 considers this in relation to choice behaviour.

CHAPTER 6

Perceptions of Confident Speakers and their Judgmental Biases

This experiment considers whether people apply the confidence heuristic, taking a speaker's expressed confidence as a cue to their knowledge, competence and accuracy, when provided with information relating to the speaker's performance and hence their judgemental biases. 88 participants viewed a presentation in which three people answered general knowledge questions with different levels of confidence in their answers. After every question participants received feedback relating to the accuracy of each speaker's answers. The results indicate that people do, to a certain extent, continue to apply the confidence heuristic in their judgments of others even when there is evidence to suggest that the level of expressed confidence used by the speaker is misleading. There is some evidence to suggest that some people may be better at, or more willing to, monitor other people's judgmental biases than others, making them less reliant on the confidence heuristic.

Perceptions of Confident Speakers and their Judgmental Biases

We often make judgements and decisions on the basis of another person's advice, and how confident they say that they are in that advice. When making decisions in such a way, one would expect that highly confident advice would be frequently followed. However, the decision that we reach may involve more than a simple comparison of the confidence levels with which arguments are expressed. Recent research has argued that it is not enough to just understand what level of confidence a speaker means to convey - it is also important to be aware of how an individual decision-maker perceives speakers expressing different levels of confidence as well (Price and Stone, 2004; Sniezek and Van Swol, 2001).

Previous research has indicated that higher levels of expressed confidence made a person more influential, regardless of that person's accuracy (e.g. Sniezek and Buckley, 1995; Sniezek and Van Swol, 2001; Zarnoth and Sniezek, 1997). As people appear to be more sensitive to another's expression of confidence than to the quality of their information it has been suggested that people use confidence as a heuristic, whereby confidence is taken as a cue to a person's knowledge, competence or accuracy (Price and Stone, 2004; Thomas and McFadyen, 1995). However, for the confidence heuristic to be useful to us as decision-makers, it is important that people express their confidence appropriately, and confidence should not be too high or too low, relative to one's accuracy (Paese and Kinnaly, 1993). But while we expect people to express a level of confidence that is in proportion to their information, this is not always the case. Many people show a tendency to be overconfident: their confidence in their opinion or advice exceeds the objective accuracy of the outcome (see Lichtenstein et al., 1982).

How we interpret and use the confidence expressed by other people in situations where no information about the quality, or accuracy, of these responses is made available, has been investigated (e.g. Sniezek and Buckley, 1995; Sniezek and Van Swol, 2001; Zarnoth and Sniezek, 1997). When people have little or no reason to doubt the quality of the information they are receiving, confidence is a powerful predictor of influence. But sometimes we do get feedback regarding another's performance: we build relationships with people, and over time may come to trust or mistrust their opinions more, or less. In many real life situations we are made aware of the judgmental biases of others – most poignantly when they get it wrong, for example stock- brokers, politicians and health ministers.

Whitley (1987) demonstrated how confidence is still influential even when there is evidence to suggest otherwise, in this case information expressed by a discredited witness. Although they, reassuringly, found that a credible witness is more influential than a discredited one, when compared to producing no witness in a case, a discredited witness still exerts a considerable influence. They suggest that this is because, despite their evidence been discredited, just the very act of communicating confidence in a position, albeit an inaccurate one, influences jurors because their judgements were based on assumptions about a witness's confidence rather than on their competence.

Fox and Irwin (1998) pointed out that a listener's interpretation of a speaker's statement of confidence may be influenced by the listener's perception of the speaker's susceptibility to judgmental biases. If we find out that a speaker is consistently optimistic in their confidence, being overconfident in their opinions of a particular outcome occurring, and then often being wrong, the listener may rethink their use of this person's information. Snizek and Van Swol (2001) argue that trust is also an important function of influence. We may use another's expressed confidence as a cue to trustworthiness but if, during the course of interacting with a speaker, we discover that their confidence does not match their accuracy, our trust in that speaker may diminish.

Price and Stone (2004) questioned whether people still use the confidence heuristic when such feedback is made available. How do we perceive an overconfident individual? They found that the majority of people preferred a highly confident, but overconfident, advisor to a more moderately confident, but more well-calibrated one. Price and Stone argued that these results provide support for people's use of the confidence heuristic, in that an advisor's confidence was taken as a cue to their knowledge, competence and accuracy, even when there is evidence to the contrary. However, some participants still preferred a more moderate advisor, although here advisor preference was still associated with perceptions of advisor knowledgeability. Price and Stone suggest that this could be because only some people use the confidence heuristic, but concluded that it is more likely to be an artefact of random error in the judgement process.

Yates, Price, Lee, and Ramirez (1996) argued that this preference for extreme, overconfident advice, as opposed to more moderately confident (and well-calibrated) advice, may be because some people value good judgement discrimination, i.e. judgements that clearly differ from one another, more than good calibration. Some participants were found to have disdain for moderate judgements because, as one

participant pointed out, they had no use for such a judgement as they could say that they did not know themselves – the moderate judgements did not offer certainty. Another participant saw this moderate expression of confidence as indicative of incompetence. For the people that preferred the overconfident judgements, high confidence was seen as a positive quality – confidence is good, and is assumed to also be appropriate as we expect people to express a justifiable level of confidence. But some people are more sceptical of extreme confidence, seeing too much confidence as overcompensating for a lack of knowledge (Yates et al., 1996). Indeed, other researchers have found that too much expressed confidence can be detrimental to how a speaker is perceived, even in the absence of feedback (London, McSeveney, and Tropper, 1971; Pulford, 2002).

It may also be the case that one's own judgmental biases are important too. Paese and Kinnaly (1993) found that people were not only unaware of their own overconfidence, but were also insensitive to it in others. "This lack of awareness may mean that we are, to some extent, indiscriminating consumers of one another's knowledge when faced with difficult judgement problems" (p. 2009).

Rationale for Experiment

The aim of this experiment is to investigate whether people use the confidence heuristic, when they are made aware of a speaker's judgmental biases via performance feedback. It is hypothesised that the availability of feedback will lead to a reduction in confidence heuristic use, and specifically that a highly confident speaker will be perceived more negatively when such feedback is available compared to when it is not. Consideration is also given to the listener's own judgmental biases – does this effect people's use of the confidence heuristic? Do we make use of the confidence heuristic to a greater or lesser extent when we abuse the underlying principles of it ourselves? It is hypothesised that there will be differences in confidence heuristic use according to an individual's own over/underconfidence.

The present experiment uses a similar paradigm to that of Price and Stone (2004), where participants view judgements made by different speakers, and then evaluate those speakers, stating a preference for one. A number of modifications are made however. Firstly, three levels of confidence are used, as opposed to two used by Price and Stone, to consider the effect of a broader range of confidence. Secondly, verbal expressions of confidence are used, as opposed to numerical estimates of confidence, as these are more representative of how we communicate confidence and uncertainty in everyday life.

Method

Participants

22 male and 66 female undergraduate students from the University of Wolverhampton's participant pool took part in the study (N = 88). Participants' ages ranged from 18 to 39 years of age, with a mean age of 20.06 years (*S.D.* = 4.24).

Materials

A computer presentation was prepared consisting of thirty PowerPoint slides. On each slide a general knowledge question appeared, followed one-by-one with three responses each given by a 'friend'. Figure 6.1 shows an example slide.

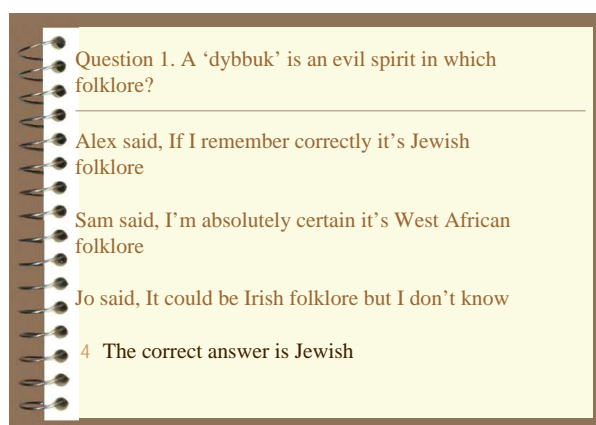


Figure 6.1. Example slide from PowerPoint presentation

Neutral names were used for the three speakers - 'Alex', 'Jo' and 'Sam' – in an attempt to eliminate speaker gender variables. One response was spoken with high confidence (Sam), one with medium confidence (Alex) and one with low confidence (Jo), using the cues developed in a previous pilot study (Table 2.1, Chapter 2). The presentation order of each speaker's response was counterbalanced, so that each speaker's answers were viewed first, second and third an equal number of times. After all three responses had appeared the correct answer was revealed with each speaker giving the correct answer ten times, i.e. 33% accuracy for each speaker. By keeping accuracy constant across the three speakers, but with each speaker expressing a different level of confidence, the high confidence speaker can, in essence, be viewed as being extremely overconfident since they constantly express certainty in their answers but are not constantly accurate. The medium confidence speaker can be seen as being

moderately overconfident, as they still express a level of confidence that suggests a higher level of accuracy than is warranted. The low confidence speaker may be seen as being the most well-calibrated of the three speakers, if not a little underconfident, as their expressed level of confidence best matches their true level of accuracy. Examples of questions used in the presentation are shown in Appendix I.

Participants were also presented with a 20-item general knowledge questionnaire (Appendix I), designed by Dr Pulford at the University of Wolverhampton to measure overconfidence. Participants were required to select the correct answer to each question from one of three alternatives. For each question they were also asked to indicate how confident they felt that their chosen answer was correct, on a scale of 0 (no confidence that your answer) to 100 (total confidence that your answer is correct) and the probability that their chosen answer was correct, by using any number from .33 to 1.0.

Design and Procedure

Three levels of speaker confidence were used (high; medium; low), each of which were presented simultaneously. The dependent variables were listeners' perceptions of the three speakers, including a judgement of each speaker's accuracy. As in Price and Stone's (2004) experiment, on which the current methodology was based, no control condition was included as the variables of interest were differences in participants' perceptions of the three speakers when expressing different levels of confidence, rather than considering these differences in the absence and presence of confidence cues. Furthermore, as Chapters 3 and 5 have shown, there are no differences in how speakers are perceived in the absence of confidence cues.

Further analysis was conducted to take into account the between-subjects variable of over/under-confidence. To determine if participants were under- or over-confident, the mean accuracy for each participant on the general knowledge questionnaire was calculated and subtracted from their mean probability estimate, giving an overconfidence score for each participant. Using this measurement a score of 0 would represent perfect calibration, where mean accuracy matched mean probability, whereas deviations from 0 represent either over- or under-confidence. Hence, participants with overconfidence scores below 0 were classed as underconfident, as this indicated that their mean probability estimate on the general knowledge questionnaire was lower than their mean accuracy, and scores above 0 were classed as overconfident, as this indicated that their mean probability estimate was higher than their mean accuracy.

After entering the computer laboratory in which the experiment was conducted and giving informed consent to taking part in the experiment, participants were first asked to complete the 20-item general knowledge questionnaire. Upon completion of this they watched the presentation on a computer monitor. At the beginning of the presentation a series of short instructions appeared on the screen detailing the task. Participants were instructed as follows:

Imagine that you are planning on entering a quiz. The quiz covers general knowledge questions and has a top prize for the winning team. Teams consist of two people. Before you enter the quiz you need to decide who is going to be your team mate. You are trying to decide between three of your friends - Alex, Jo and Sam - each of whom you think are good at general knowledge. To help you decide which of your friends will perform best in the quiz, and therefore maximise your chances of winning the top prize, you test each of them on their general knowledge skills. The friend you think has performed the best will join your team.

You ask each of your three friends 30 difficult general knowledge questions to assess their performance. After asking each question you will see how each of your three friends responded. Please pay attention to how each friend answers. You will then see the correct answer. Please pay attention to the performance of each friend. After all 30 questions have been answered you will decide which friend you are going to ask to join your team. You will also be asked questions about the performance of each friend. Please do not make any notes.

Although the presentation of each slide's questions and answers was timed to ensure that none were missed out, the presentation of each complete slide was self-paced so that participants could study each set of questions and answers for as long as they required. At the end of the presentation participants were told to turn over the sheet in front of them on which there was a series of questions relating to the three speakers. Participants were asked to indicate which of the three speakers they would ask to join their team, which friend they liked the most and the least, who was most/least intelligent, most/least trusted, most/least competent and most/least optimistic. Finally participants were asked to indicate the percentage of questions they thought each friend has answered correctly. All participants were tested in small groups, without interaction, each facing a separate computer monitor. Participants were debriefed and thanked upon completion of the experiment.

Results

Perceptions of Speakers

Participants were asked a series of questions relating to their perceptions of the three speakers after receiving feedback regarding their performance. Table 6.1 summarises these results, presenting these as percentages for ease of comparison.

Table 6.1

Perceptions of speakers using different confidence levels (% participants)

	Speaker Confidence			2
	High	Medium	Low	
Chosen Team-mate	36.4	47.7	15.9	13.73**
Most Liked	29.5	35.2	35.2	.57
Least Liked	54.5	20.5	25.0	18.09**
Most Intelligent	39.8	40.9	19.3	7.80*
Least Intelligent	29.5	19.3	51.1	13.93**
Most Trusted	23.9	47.7	28.4	8.48*
Least Trusted	53.5	22.7	23.9	15.98**
Most Competent	43.2	45.5	11.4	19.18**
Least Competent	21.6	23.9	54.5	17.89**
Most Optimistic	63.6	20.5	15.9	36.64**
Least Optimistic	17.0	12.5	70.5	54.84**

Note. * $p < .05$ ** $p < .001$. Degrees of Freedom = 2

Table 6.1 shows that different levels of speaker confidence affected participants' choice of team-mate, with the medium confidence speaker being the most popular choice, followed by the highly confident speaker ($M = 47.7\%$ vs. $M = 36.4\%$). The low confidence speaker was the least popular choice of team-mate, being chosen by only 15.9% of participants.

A speaker's level of expressed confidence also affected how they were perceived by participants, with the exception of the speaker participants liked the most, where none

of the speakers were liked any more than the others (Table 6.1). The high and medium confidence speakers were both equally seen as being the most intelligent and most competent of the three speakers, with the low confidence speaker being seen as least intelligent and competent. However, despite being viewed as being both intelligent and competent, the high confidence speaker was the least liked and least trusted of the three speakers, by over half of the participants in both cases. The medium confidence speaker was trusted the most.

The different speakers were also perceived differently in terms of their optimism. The high confidence speaker was seen as the most optimistic of the speakers by two thirds of participants (63.6%), and the low confidence speaker is seen as the least optimistic by a majority of participants (70.5%).

Perceived Accuracy

Although each speaker was correct the same number of times (33.33%), participants still perceived differences in the accuracy of the three speakers, as indicated by a significant main effect of Speaker Confidence, $F(2, 174) = 12.02, p < .001$. Paired-samples t-tests showed significant differences between the perceived accuracy of the high and medium confidence speaker (46.20% and 41.82%), $t(87) = 2.13, p = .04$, high and low confidence speaker (46.20% and 36.57%), $t(87) = 4.62, p < .001$, and the medium and low confidence speaker (41.82% and 36.57%), $t(87) = 3.01, p = .003$.

In relation to their actual accuracy levels (33.33%), the high confidence speaker's accuracy was overestimated by 12.87%, the medium confidence speaker's by 8.49%, with the low confidence speaker's by 3.24%, thus the participants' perceptions of the low confidence speaker's accuracy were the most realistic.

Choice of Team-mate and Perceptions of Speakers

Participants' perceptions of each speaker's accuracy were related to their choice of team-mate. There was a significant main effect of Speaker Confidence on perceived accuracy regardless of whether participants choose the high, medium, or low confidence speaker to join their team, $F(2, 62) = 45.51, p < .001$, $F(2, 82) = 15.95, p < .001$, and $F(2, 26) = 5.53, p = .008$, respectively (Figure 6.2). Paired t-tests showed that when the high confidence speaker was the chosen team-mate this speaker was seen as being more accurate than the medium confidence speaker (56.50% vs. 36.37%), $t(31) = 7.00, p < .001$, and the low confidence speaker (56.50% vs. 33.69%), $t(31) = 9.28, p < .001$. No

differences were perceived in the accuracy of the medium and low confidence speakers (36.37% vs. 33.69%), $t(31) = 1.31, p = .20$. When the medium confidence speaker was the chosen team-mate, this speaker was viewed as being more accurate than the high confidence speaker (45.77% vs. 38.10%), $t(41) = 3.56, p = .001$, and the low confidence speaker (45.77% vs. 32.67%), $t(41) = 6.39, p < .001$. However, the high confidence speaker was not seen as being more accurate than the low confidence speaker by these individuals, (38.10% vs. 32.67%), $t(41) = 1.99, p = .053$. For the small proportion of participants choosing the low confidence speaker as their team-mate, this speaker was seen as being more accurate than the medium confidence speaker (54.86% vs. 41.07%), $t(13) = 4.06, p = .001$, but not the high confidence speaker (54.86% vs. 46.93%), $t(13) = 1.73, p = .11$. No differences were apparent in the perceived accuracy of the high and medium confidence speakers, $t(13) = 1.43, p = .18$.

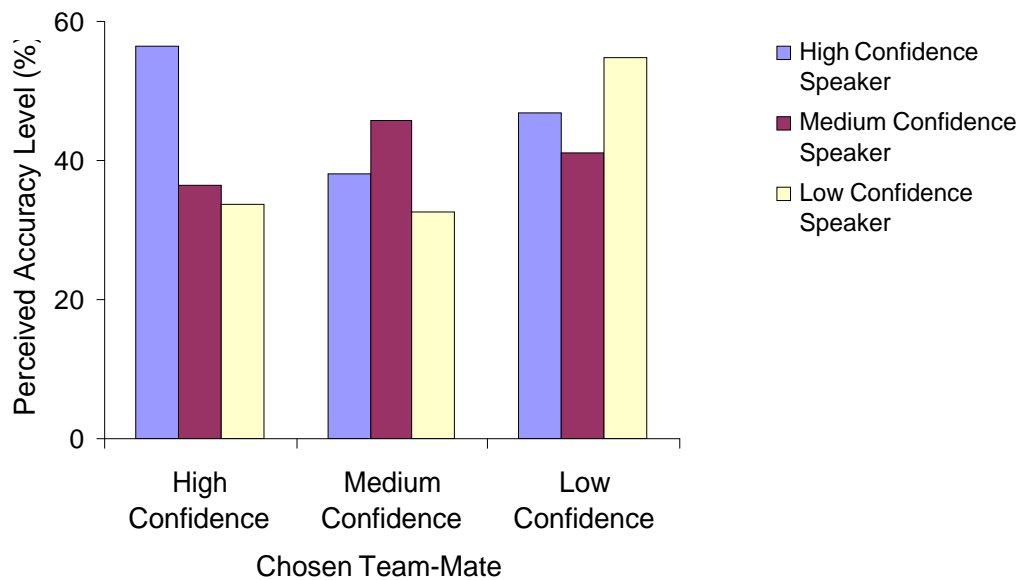


Figure 6.2. Perceptions of speaker accuracy according to chosen team mate.

For the majority of participants the medium and high confidence speakers were the preferred choice of team-mate. To further investigate participants' reasons for this, how all three speakers were perceived was looked at in relation to chosen team-mate, with analyses concentrating on participants who chose the high or medium confidence speaker as their team-mate.

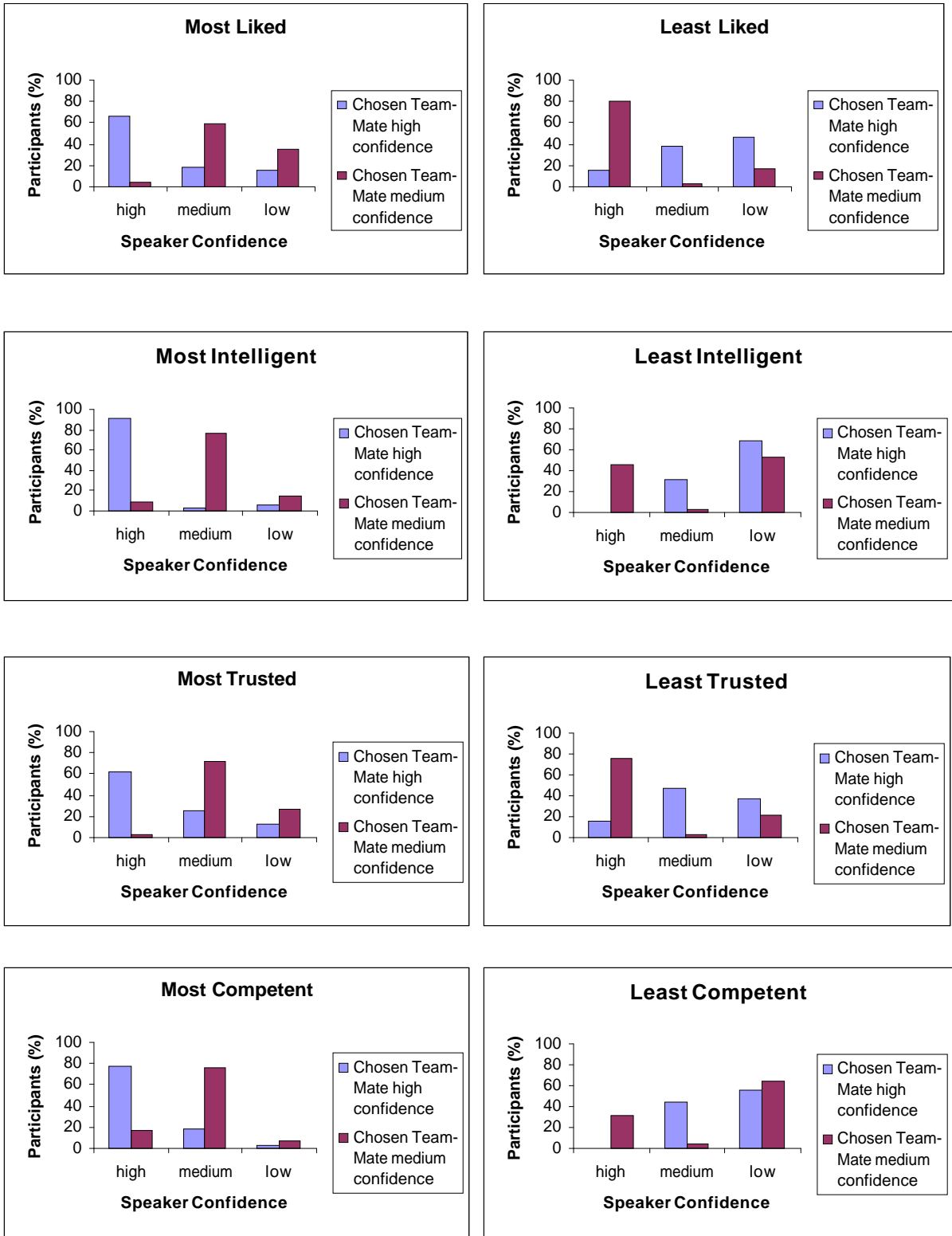


Figure 6.3. Perceptions of speakers according to chosen team-mate.

In addition to perceived accuracy, chi-squared tests indicated that participants' choice of team-mate (being either the high or medium confidence speaker) was also associated with the speaker who they liked the most, $\chi^2 = 15.06$, $df = 2$, $p = .001$, and whom they thought was most intelligent, $\chi^2 = 47.31$, $df = 2$, $p < .001$, trustworthy, $\chi^2 = 13.00$, $df = 2$, $p = .002$, and competent, $\chi^2 = 30.06$, $df = 2$, $p < .001$, (Figure 6.3). The exception to this was speaker optimism. Participants viewed the high confidence speaker as most optimistic, whether they chose the high or medium confidence speaker as their team-mate (56% and 74%), $\chi^2 = 8.31$, $df = 2$, $p = .02$ and $\chi^2 = 31.29$, $df = 2$, $p < .001$, and the low confidence speaker as the least optimistic, (69% and 81% respectively), $\chi^2 = 18.25$, $df = 2$, $p < .001$ and $\chi^2 = 43.43$, $df = 2$, $p < .001$.

Overall then participants chose the speaker who they viewed most positively. The reasons behind participants' choice of team-mate may therefore be related to how they perceived the speakers they did *not* choose. As Figure 6.3 shows, participants choosing the high confidence speaker as their team-mate demonstrate a somewhat equal disliking of the medium and low confidence speakers (37% and 47%), $\chi^2 = 4.94$, $df = 2$, $p = .09$, a similar distrust of these two speakers, $\chi^2 = 4.94$, $df = 2$, $p = .09$, and a view that both of these speakers were equally lacking in competence, $\chi^2 = .50$, $df = 2$, $p = .48$. However, the participants who chose the medium confidence speaker as their team-mate showed a strong dislike for the high confidence speaker (81%), $\chi^2 = 44.14$, $df = 2$, $p < .001$, as well as a strong mistrust of this speaker (76%), $\chi^2 = 37.00$, $df = 2$, $p < .001$.

Overconfidence

Participants mean overconfidence score was -2.25 ($S.D. = 12.89$). 63.6% of participants were underconfident ($M = -10.16$, $S.D. = 7.64$), having scores ranging from -0.21 to -27.47 underconfidence, and 36.4% of participants were overconfident ($M = 11.67$, $S.D. = 7.08$), having scores ranging from 1.54 to 30.00 overconfidence.

Overconfidence made no difference to choice of team-mate, with over- and underconfident participants both showing a preference for the medium confidence speaker (53.1% and 44.6%), $\chi^2 = .67$, $df = 2$, $p = .72$. The only significant difference between under- and over-confident participants in how they perceived the three speakers, with the exception of accuracy reported later, was related to which speaker they liked the most, $\chi^2 = 6.38$, $df = 2$, $p = .04$. Overconfident participants chose the high and medium confidence speakers equally often (40.6%) as being the speaker they liked the most, choosing the low confidence speaker least often (18.8%). Underconfident participants

chose the low confidence speaker as being the speaker they liked the most (44.6%), followed by the medium confidence (32.1%) and high confidence speakers (23.2%). No significant results were found for the speaker participants least liked, $\eta^2 = 2.89$, $df = 2$, $p = .24$, found most or least intelligent, $\eta^2 = .86$, $df = 2$, $p = .65$ and $\eta^2 = .65$, $df = 2$, $p = .72$, trusted most or least, $\eta^2 = .60$, $df = 2$, $p = .74$ and $\eta^2 = 1.57$, $df = 2$, $p = .46$, found most or least competent, $\eta^2 = .48$, $df = 2$, $p = .79$ and $\eta^2 = 2.51$, $df = 2$, $p = .28$, or found most or least optimistic, $\eta^2 = 1.61$, $df = 2$, $p = .45$ and $\eta^2 = 1.53$, $df = 2$, $p = .46$.

Figure 6.4 shows how accurate the underconfident and overconfident participants perceived each speaker to be. A repeated measures ANOVA found a main effect of Speaker Confidence on perceptions of speaker accuracy for overconfident participants, $F(2, 110) = 8.68$, $p < .001$, and underconfident participants, $F(2, 62) = 4.74$, $p = .01$. Paired t-tests showed that overconfident participants perceived the high and medium confidence speakers to be of equal accuracy (48.16% vs. 46.91%), $t(31) = .33$, $p = .74$, but the high and medium confidence speakers to be more accurate than the low confidence speaker (37.66%), $t(31) = 2.64$, $p = .01$ and $t(31) = 2.74$, $p = .01$. However, underconfident participants did perceive differences between the accuracy of the high and medium confidence speakers (45.08% vs. 38.92%), $t(55) = 2.59$, $p = .01$, and between the high and low confidence speakers (45.08% vs. 35.95%), $t(55) = 3.82$, $p < .001$, but between the medium and low confidence speakers (38.92% vs. 35.95%), $t(55) = 1.56$, $p = .13$.

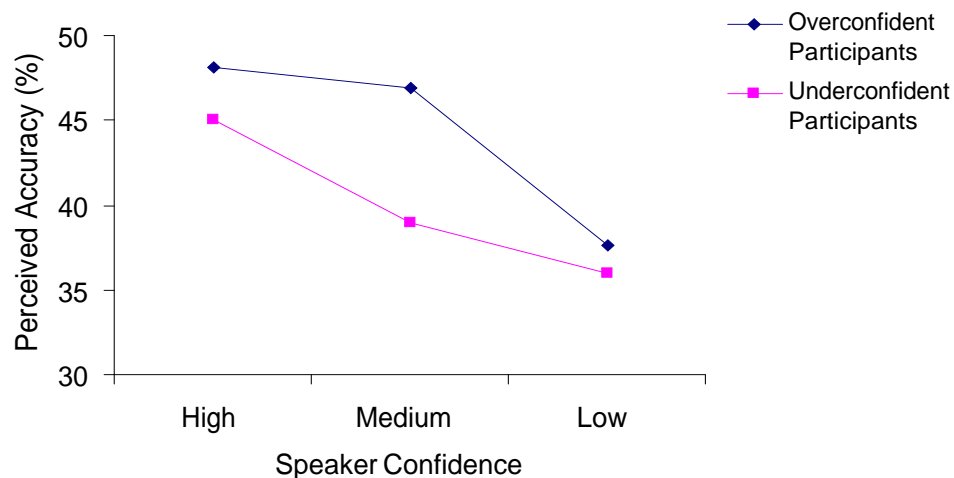


Figure 6.4. Perceptions of speaker accuracy according to under/overconfidence.

As would be expected from the above results, a Speaker Confidence \times Overconfidence ANOVA, with repeated measures on the first variable, showed a

significant main effect of Speaker Confidence, $F(2, 172) = 11.80, p < .001$. However, there was no main effect of Overconfidence, $F(1, 86) = 1.81, p = .18$, and while the earlier results showed that overconfident participants viewed each of the three speakers as being more accurate than underconfident participants did, there was no significant Speaker Confidence \times Overconfidence interaction, $F(2, 172) = 1.31, p = .27$.

Summary of Results

With the exception of which speaker participants liked the most, significant differences in participants' perceptions of the three speakers were found, in terms of speaker likeability, intelligence, trustworthiness, competency, optimism and accuracy. These results were found to be related to participants' choice of team-mate, which was predominantly either the high or medium confidence speaker. Participants' overconfidence had little effect on their perceptions of the speakers.

Discussion

The results provide some support for peoples' use of the confidence heuristic when feedback is made available. Higher levels of confidence were still associated with perceptions of competence, intelligence and accuracy, even when there was evidence to the contrary. The accuracy of the speakers was consistently overestimated, with the higher a speaker's confidence being the higher the level of accuracy attributed to that speaker. However, although higher confidence was associated with higher accuracy, the perceived accuracy of the high confidence speaker, and to a lesser extent the medium confidence speaker, was still lower than those speakers expressed confidence would suggest. The highly confident speaker displayed extreme overconfidence, with the medium confidence speaker showing a more moderate level of overconfidence. In fact the most accurate judgement of a speaker's accuracy was for the low confidence speaker, whose level of expressed confidence was more appropriate for the low accuracy level of their answers, but this speaker was perceived negatively in terms of competency related factors (least intelligent/least competent/least accurate).

Although the high and medium confidence speakers were both seen as being the most intelligent and competent of the three speakers, the medium confidence speaker was the most popular choice of team-mate. This may be because, despite the positive perceptions of the high confidence speaker in terms of competency related factors (most intelligent/competent/accurate), they were perceived negatively in other areas related to likeability (least liked/trusted). The medium confidence speaker on the other hand was perceived positively in relation to factors of competency *and* likeability, being trusted the most. As Scherer (1979) has suggested, to be truly persuasive one should be seen as both competent *and* trustworthy. Furthermore, prior interaction can affect how we perceive a speaker (Fox and Irwin, 1998; Sniezek and Van Swol, 2001), and repeatedly expressing too much confidence or optimism that is not justified can lead to mistrust, and hence a reduction in influence. This appears to have been the case here. However, both the high and medium confidence speakers expressed too much confidence in their answers than could be justified by their accuracy level. It could be that participants found the discrepancy between a speaker's expressed level of confidence and their accuracy more salient for the speaker expressing high confidence than for the speaker expressing medium confidence. The high confidence speaker's extreme overconfidence could have led to antagonism towards the high confidence speaker, whereas the medium

confidence speaker's more moderate level of overconfidence was less salient, perhaps not detected at all, resulting in this speaker being the most trusted and most common choice of team-mate.

Although the medium confidence speaker was the most common choice of team-mate, many chose the high confidence speaker instead. Whichever speaker was chosen though, it was always the one that those participants thought was the most accurate, competent, intelligent, trustworthy and likeable. Why then did some participants choose the high confidence and some the medium confidence speaker as their team-mate? Price and Stone (2004) found that a majority of participants preferred an extremely overconfident advisor to a more moderately confident one, but that a sizeable minority did prefer the latter. They argue that this is still consistent with the confidence heuristic being used by all, and that their results are due to a certain amount of error in the judgement process. However as more participants in the present experiment preferred the medium confidence speaker to the high confidence speaker, this would indicate that their finding is not attributable to random error as some people do prefer this speaker.

There were a number of methodological differences between the present experiment and Price and Stone's which could have led to the differences in the findings. Firstly, confidence in the present experiment was expressed verbally, using expressions such as "I know", rather than as a probability estimate (e.g. 86%). Verbal expressions of confidence can be vague and ambiguous, not clearly denoting a particular amount as probability estimates do (Sniezek and Henry, 1989), which could have made it harder for participants to interpret differences between the three speakers in terms of their confidence in the present experiment. However it is unlikely that this led to differences in the results when considering that the overall accuracy of each speaker was much lower in the present experiment (33.33% vs. 75%). This resulted in the three speakers in the present experiment displaying different levels of overconfidence – extreme overconfidence, moderate overconfidence and underconfidence. A final difference between the present experiment and Price and Stone's was that the each speaker gave simultaneous judgements to each question in the former, rather than giving separate judgements to separate questions in the latter. This meant that the three speakers, and their judgmental biases, could be more readily compared in the present experiment.

The results relating to participants' choice of team-mate may be attributable to differences in how people evaluated the speakers, possibly due to the amount of effort put in to differentiating between the speakers different levels of expressed confidence.

For those participants choosing the high confidence speaker as their team-mate, this speaker was seen as being more accurate than either of the other two speakers, but the speakers they did not choose were seen as having the same accuracy as one another. However, the participants who did not choose the high confidence speaker, in particular those choosing the medium confidence speaker differentiated far more between the speakers. These participants did perceive differences in the accuracy of all three speakers, whether it was their chosen team-mate or not. Further differences were seen in how the speakers they did *not* choose were perceived. For those choosing the high confidence speaker as their team-mate, the *unchosen* speakers were, by and large, seen as equally disliked, mistrusted and incompetent. For those choosing the medium confidence speaker as their team-mate, there were differences in how the *unchosen* speakers were perceived: a strong dislike and mistrust of the high confidence speaker was found.

So for the participants choosing the high confidence speaker, this speaker was assumed to be most accurate, competent, intelligent and so on, and it would appear that little consideration was given to differentiating between the other two speakers. Therefore these participants could have utilised the confidence heuristic, attending to the speaker's confidence level, and taking high confidence as the best option. High confidence was seized upon, and meant that other differentiating information did not need to be taken into account. For those choosing the medium confidence speaker it would appear that some consideration was given to differentiating between the speakers, regardless of whether these perceptions were accurate or not. But it does seem that these participants were sensitive to the extreme overconfidence of the high confidence speaker, resulting in a strong dislike and mistrust of the high confidence speaker. They may have seen that this speaker's certainty was not justified by the feedback that they received.

What led to this difference? The possibility of it being the listeners' own tendency to judgmental biases was considered. Are we drawn to those who display levels of over/underconfidence to ourselves? There were no differences in over/under-confident participants choice of team-mate, but overconfident participants liked the *higher* (high and medium) confidence speakers the most, whereas the underconfident participants liked the low confidence speaker the most, followed by the medium, and then high confidence speakers. So it may be that we are to some extent attracted to people who display similar overconfidence to our own. Overconfident participants also perceived

higher confidence speakers to be more accurate than the low confidence speaker, whereas underconfident participants saw the high confidence speaker to be more accurate than both of the *lower* (medium and low) confidence speakers, who were seen as being equally accurate.

Limitations

There are a number of issues relating to the nature of the feedback provided in this experiment. In reality one may build up a picture of another person's judgmental biases over a period of time, rather than following a short observation period such as that which was provided here. Hence, people's perceptions of others may change over time. This issue would be worth further consideration. In the present experiment participants were also asked not to make any notes regarding the speakers' performances on the task. Whether this would occur in real-life can be questioned. In some situations, perhaps where the outcome is relatively unimportant, it is reasonable to assume that people would not always make notes. In other situations where the outcome is more important, it is more likely that notes would be taken, for example in a job interview, where interviewers make notes regarding each candidate's performance.

Conclusions

It would seem that one's ability to monitor another's judgmental biases is important in how we perceive them (and perhaps their subsequent influence), regardless of our ability to monitor our own judgmental biases. Some people may be better at this than others, making them less reliant on the confidence heuristic. Rather than the confidence heuristic being used by all, as suggested by Price and Stone, it may be that only some people use the confidence heuristic. Alternatively it may be that the confidence heuristic is used differently by different people. The confidence heuristic may work by matching confidence with quality, but some people are better at this than others – or more willing to put in the extra cognitive effort that is required. Those who do put the effort in realise that the high confidence speaker's accuracy is not justified, but still look for confidence on which to base their decision, hence the compromise of medium confidence. Others continue to equate confidence with quality, ignoring information to the contrary.

Although the results from the present experiment indicate that the availability of feedback affects how speakers expressing different levels of confidence are perceived, in that the most confident speaker is no longer automatically viewed most favourably, it

is not clear what the wider influence of this is, and its effects on people's use of the confidence heuristic. For instance, how does such information influence the decisions we make, in particular do we take someone's advice even when we have seen their information to be of disputable quality, compared to what their level of expressed confidence would suggest? This issue is considered in the next chapter, where the methodology used in the present experiment is adapted to consider participants' choice behaviour when speaker feedback is provided.

CHAPTER 7

Prior Interaction, Feedback and the Influence of Confidence

This study investigates whether we are insensitive to other people's judgmental biases, and whether feedback reveals this bias to observers or if the influence of a speaker's confidence prevails. 86 participants observed three speakers answering general knowledge questions, with each speaker demonstrating a different level of confidence and bias. Half the participants also received feedback about the speakers' performance. Participants then completed a general knowledge questionnaire, choosing from answers given by the three speakers. A speaker's level of confidence had a greater effect on choice when no feedback was given than when it was. The addition of feedback led to a reduction in the influence of a highly confident, but overconfident, speaker and increases in the influence of the medium and low confidence speakers. Feedback did not have any significant effects on participants' confidence in their answers, but it did result in a slight increase in accuracy. Feedback also affected participants' choice of team-mate.

Prior Interaction, Feedback and the Influence of Confidence

When we have a choice to make we tend not to turn to complete strangers for their advice. Where possible we will seek the advice of someone who we have had some contact with before – perhaps a friend or acquaintance, a colleague who we recall having an interest in a particular area, or a family member. Over time we may build up a picture of the style with which they express their advice or information - they may always be extremely confident in the advice they proffer or they may be uncertain in what they say. Since previous research has proposed that we utilise confidence heuristically, whereby we associate a person's confidence with attributes relating to a speaker's competency (Price and Stone, 2004; Thomas and McFadyen, 1995), we may, perhaps, seek out the advice of the highly confident person and stop asking the person who expresses their uncertainty. In doing so we believe that we are using an effective decision-making strategy, using confidence as a heuristic which allows us to determine the quality of another person's information. However, as we interact with other people we may also become aware not only of the way in which they express themselves and how confident they are, but also of their tendency to judgmental biases. We may learn that the highly confident person is not always justified in being so confident as they are actually not as accurate as their confidence would suggest, whereas perhaps our uncertain friend actually knows more than their chosen level of confidence would suggest. How does this affect our use of the confidence heuristic?

Zarnoth and Snizek (1997) found that the most confident individual in a group exerted the greatest influence even when they were inaccurate, although other than utilising their own knowledge participants had no way of knowing whether an individual was accurate or not. Hence, participants *assumed* that a speaker was accurate because they expressed confidence in what they were saying. Such overconfidence, and conversely underconfidence, on the part of the speaker may be an intentional or unintentional bias, with people miscommunicating their confidence for reasons such as impression management, motivational factors or individual differences (Thomas and McFadyen, 1995). People may therefore use the confidence heuristic to their advantage, arguing confidently so as to appear more knowledgeable, competent or credible than they really are. However, when feedback regarding a speaker's performance is made available surely the illusion of expertise is shattered? As Thomas and McFadyen warn, the future ramifications of exploiting the confidence heuristic may be costly: if the same

people interact repeatedly, then arguing confidently when one's information is unreliable could result in a loss of reputation. Hence, even though such a person may offer reliable information as often as the next person their, at times, inappropriate confidence could mean that their input is no longer sought.

Price and Stone (2004) considered how we evaluate speakers when feedback is provided about the quality of their judgements, finding that an extremely confident, but overconfident, advisor was still preferred to a more moderately confident, well-calibrated, one. A speaker's confidence was found to have an influence on participants' perceptions of speaker knowledge and accuracy, indicating that people do still use the confidence heuristic when they have an awareness of the true state of the world (e.g. a speaker's susceptibility to judgmental biases).

However, Chapter 6 showed that feedback had more of an effect on how speakers were perceived for some people than others, with an individual's ability to monitor the judgmental biases of another person being important. Some people continued to associate high confidence with competency, intelligence and accuracy even when there was evidence to the contrary, whereas others preferred a speaker who used a more moderate expression of confidence. Both high and medium confidence speakers were seen as being equally intelligent and trustworthy, but too much confidence was detrimental to perceptions of speaker likeability and trust.

Whilst both of these studies consider how feedback affects our use of the confidence heuristic in terms of how we perceive speakers, the question was raised in Chapter 6 as to how one's ability to monitor the judgmental biases of a speaker also affects our acceptance of a speaker's advice. Concurring with previous research (e.g. Sniezek and Buckley, 1995; Sniezek and Van Swol, 2001; Zarnoth and Sniezek, 1997), Chapter 3 has already shown that we do rely on another person's confidence as a decision-making aid when we have no other information available to us. But having previous experience of a speaker may affect this. We may not rely so heavily on a speaker's confidence once we get used to the way in which they express their information. Furthermore, if we are also made aware of a speaker's judgmental biases we may rely less on their advice, regardless of how confidently they express it. Although the role of feedback regarding one's own performance on a task had been considered in relation to how this effects the confidence that we hold in our own decisions (e.g. Bradfield, Wells, and Olson, 2002; Sharp, Cutler, and Penrod, 1988), how the receipt of feedback regarding another's

performance affects our decisions, and the confidence that we hold in those decisions, has not.

Rationale for Experiment

The present experiment will therefore consider how prior interaction, in the form of observation, with speakers affects the influence of their expressed level of confidence on a) the choices that we make, b) the confidence that we have in those choices and, c) our choice of team-mate. Whereas the experiment reported in Chapter 6 looked at the effect of prior interaction with feedback on how a speaker was perceived, the present experiment considers how the presence, compared to the absence, of feedback affects the influence of confidence on the three dependent variables noted above. As Paese and Kinnaly (1993) have suggested, people appear to be insensitive to the judgmental biases of others and so we indiscriminately consume other people's knowledge when faced with uncertainty ourselves. Not being able to receive feedback regarding the performance of another person intensifies this, leaving us with few ways of determining the quality of another person's information. To investigate whether we are insensitive to other people's judgmental biases, in the present experiment the three speakers demonstrate different levels of bias, being either extremely overconfident, moderately overconfident, or low in confidence but fairly well-calibrated. The question is asked as to whether feedback reveals this bias to the listeners/observers, or whether the influence of a speaker's confidence prevails. It is hypothesised that a speaker's confidence will have more of an influence on the above variables when no feedback is available compared to when it is, as no evidence will be provided to suggest that a speaker's confidence level is not justified. In particular it is expected that high confidence will exert a greater influence in the absence of feedback, with this influence being reduced when feedback is made available.

Method

Participants

86 students (26 men and 60 women), ranging in age from 18 to 39 years ($M = 20.98$, $S.D. = 4.28$) were recruited from the University of Wolverhampton's participant pool to take part in the experiment. Participants were randomly assigned to one of the two feedback conditions.

Materials

Prior interaction with the speakers was provided in the form of a PowerPoint presentation, of which two versions were used in the present experiment: one with and one without feedback. The presentation used in the Feedback condition was identical to that described in Chapter 6. The presentation used in the No Feedback condition had the feedback, in the form of the correct answers appearing, removed.

A 24-item general knowledge questionnaire was also used. This consisted of difficult general knowledge questions, to encourage confidence heuristic use, followed by three possible answers. Each of the three speakers who had been shown answering questions in the PowerPoint presentation provided an answer to each of the 24 questions, so that every question was followed by one answer expressed with high confidence, one with medium confidence and one with low confidence. Accuracy was kept constant across the questionnaire, with each speaker giving a correct answer an equal number of times, resulting in a 33.33% accuracy rate for each speaker. Hence, the high confidence speaker displayed extreme overconfidence, the medium confidence speaker showed a more moderate level of overconfidence whilst the low confidence speaker was the most well-calibrated of the three. The correct answers and the order in which the three speakers gave their answers were counterbalanced.

Design and Procedure

A 3 (Speaker Confidence) \times 2 (Feedback Condition) mixed design, with repeated measures on the first variable was used. The dependent variables were; the percentage of time each speaker's answers were chosen, the participant's mean confidence in their answers, and their perceptions of each speaker in terms of choice of team-mate.

Participants were seated at separate computer monitors and asked to watch a PowerPoint presentation. At the beginning of the presentation a series of short instructions appeared on the screen detailing the task, which were as follows:

Imagine that you are planning on entering a general knowledge quiz. Three of your friends - Alex, Jo and Sam - will be taking part in the quiz with you. You decide to sit the first round out but your three friends do take part in the first round. Watch the following presentation to see how your three friends performed in the first round. You will then be given instructions for the next round.

In the first round your three friends are asked 30 difficult general knowledge questions. After each question you will see how each of your three friends responded. Please pay attention to how each friend answers. You will then see the correct answer. Please pay attention to the performance of each friend. After all 30 questions have been answered you will then join the next round of the quiz. Further instructions will be given. Please do not make any notes during the presentation.

At the end of the presentation participants were issued with the 24 item general knowledge questionnaire along with the following instructions:

You ask each of your three friends 24 general knowledge questions. After every question you will read each friend's response. You must decide which friend has given the correct answer. You do not need to choose the same friend every time, just choose who you think has given the correct answer. Only choose one answer. Please read the responses carefully. Please indicate your selection to each question by circling the name of the appropriate friend (Alex, Jo or Sam).

Then please indicate how confident you are that the answer you have chosen is correct by choosing any number between 0 and 100, where a score of 0 means that you have no confidence at all in that answer being correct and 100 means that you know beyond doubt that the answer you have chosen is correct. Please answer each question in turn. Once you have answered a question, go on to the next one. Do not return to any previous questions. Please pay attention to how each friend answers.

Finally participants were asked to choose one of the three speakers as their teammate, by circling the name of the appropriate friend.

Results

Influence of Feedback and Confidence on Choice

The percentage of times each speaker's answers were chosen was calculated. A Speaker Confidence x Feedback Condition Analysis of Variance was then conducted, with repeated measures on the first variable.

Table 7.1

Mean percentage of agreement with each speaker in each Feedback Condition

	Speaker Confidence		
	High	Medium	Low
No Feedback	54.54 (23.57)	26.70 (13.81)	18.56 (13.48)
Feedback	38.49 (23.57)	35.12 (13.59)	26.29 (14.16)
Total	46.70 (23.26)	30.81 (14.27)	22.33 (14.29)

Note. Standard deviations in parentheses

There was no main effect of Feedback Condition, $F(1, 84) = 1.77, p = .67$, but the analysis did reveal a main effect of Speaker Confidence, $F(2, 168) = 29.84, p < .001$, and a Speaker Confidence x Feedback Condition interaction, $F(2, 168) = 9.70, p < .001$. Table 7.1 shows that across the two conditions, as a speaker's confidence increased so too did the percentage of times that speaker's answers were chosen, although the extent to which this occurred depended upon the Feedback Condition. Separate analyses on each condition illustrated this. The main effect of Feedback Condition was largely due to the pattern of results in the No Feedback condition, where a significant main effect of Speaker Confidence was found, $F(2, 86) = 33.11, p < .001, \eta^2 = .44$. A significant linear relationship here indicates that there are distinct increases in agreement with a speaker as their level of confidence increases, $F(1, 43) = 43.26, p < .001$. Paired t-tests confirmed that there were significant differences in the extent of agreement between the high and medium confidence speakers, $t(43) = 5.14, p < .001$, the high and low confidence speakers, $t(43) = 6.58, p < .001$ and the medium and low confidence speakers, $t(43) = 3.54, p = .001$, in the No Feedback condition. When feedback was provided the results, whilst still significant, were not as pronounced as for when no feedback was given, $F(2, 82) = 4.33, p = .02, \eta^2 = .10$. Again a significant linear relationship indicated that speaker agreement increased as speaker confidence increased,

$F(1, 41) = 6.32, p = .02$. However, here there were significant differences in agreement between the high and low confidence speakers, $t(41) = 2.51, p = .02$, and the medium and low confidence speakers, $t(41) = 3.15, p = .003$, but not between the high and medium confidence speakers, $t(41) = .69, p = .49$. These results support the hypotheses that a speaker's confidence will have more of an influence in the absence of feedback, where greater distinctions between each speaker can be seen, than in the presence of feedback, where differences between speakers are reduced.

The hypothesis that the high confidence speaker will exert a greater influence in the absence of feedback, with this being reduced when feedback is provided was also supported. Figure 7.1 illustrates the Speaker Confidence \times Feedback Condition interaction. This shows that feedback had a detrimental effect on the influence that a speaker expressing high confidence has on choice, with agreement with this speaker's answers dropping by 16.05% when feedback was given compared to when it was not, $t(84) = 3.39, p = .001$. For the medium and low confidence speakers, feedback led to significant increases in agreement, by 8.42% for the medium confidence speaker and 7.73% for the low confidence speaker, $t(84) = 2.85, p = .006$ and $t(84) = 2.59, p = .011$ respectively.

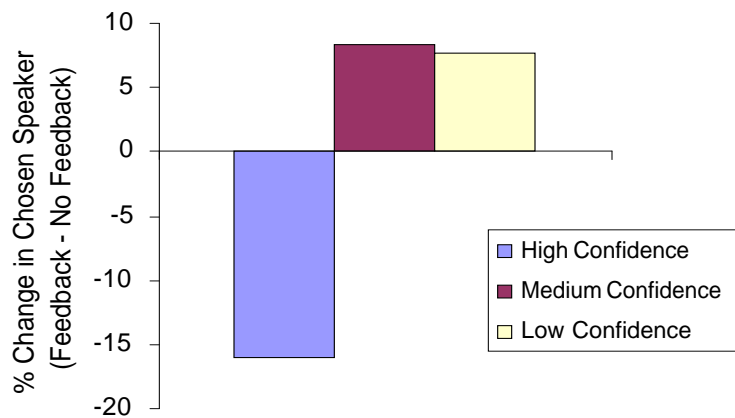


Figure 7.1. Mean percentage change in agreement with speakers between feedback conditions.

Influence of Feedback and Confidence on Confidence in Answers

From Table 7.2 it appears that participants were more confident in their chosen answers when feedback was given than when it was not, but their confidence in answers does not vary according to the confidence of the speaker whose answers are chosen.

However, no main effects of either Speaker Confidence, $F(2, 146) = .39, p = .68$, or Condition, $F(1, 73) = 2.05, p = .16$, were seen, and the Speaker Confidence \times Feedback condition interaction was not significant, $F(2, 146) = .94, p = .39$.

Table 7.2

Mean percentage of confidence in answers for agreement with each speaker in each Feedback Condition.

	Speaker Confidence		
	High	Medium	Low
No Feedback	37.54 (21.49)	37.79 (19.09)	38.42 (22.89)
Feedback	45.94 (20.90)	44.00 (19.86)	41.86 (17.35)
Total	41.79 (21.47)	40.94 (19.60)	40.16 (20.21)

Note. Standard deviations in parentheses

Influence of Feedback on Accuracy

Participants in the No Feedback condition showed accuracy levels no better than would be expected by chance ($M = 33.75, S.D. = 8.55$) whereas those in the Feedback condition showed a slight, but significant, improvement in accuracy levels ($M = 37.85, S.D. = 9.43$), $t(84) = 2.11, p = .04$. It may be that participants considered the questions more carefully in the Feedback Condition, after learning that a speaker's confidence did not necessarily mean that they were giving a correct answer, and subsequently chose the correct answers more often themselves. Alternatively, the slight improvement in accuracy may be because the high confidence speaker's answers were relied on less heavily when feedback was given, and as a result participants simply happened to chose the correct answer given by one of the other two speakers.

Influence of Feedback and Confidence on Choice of Team-Mate

The availability of feedback affected participants' choice of team-mate, leading to a shift in the preferred team-mate from the high confidence speaker in the No Feedback condition to the medium confidence speaker in the Feedback condition, $\chi^2 = 8.36, df = 2, p = .02$. When feedback was made available the high confidence speaker was chosen as team-mate 30% less frequently than when no feedback was available (26.8% vs. 56.8%), whereas the medium confidence speaker was chosen 26.4% more frequently

when feedback was available (53.7% vs. 27.3%). The frequency with which the low confidence speaker was chosen as team-mate was largely unaffected by the presence or absence of feedback (19.5% vs. 15.9%). Hence, the hypothesis that a speaker's confidence will have more of an influence when feedback is not provided than when it is was supported for the high and medium confidence speakers, but not for the low confidence speaker.

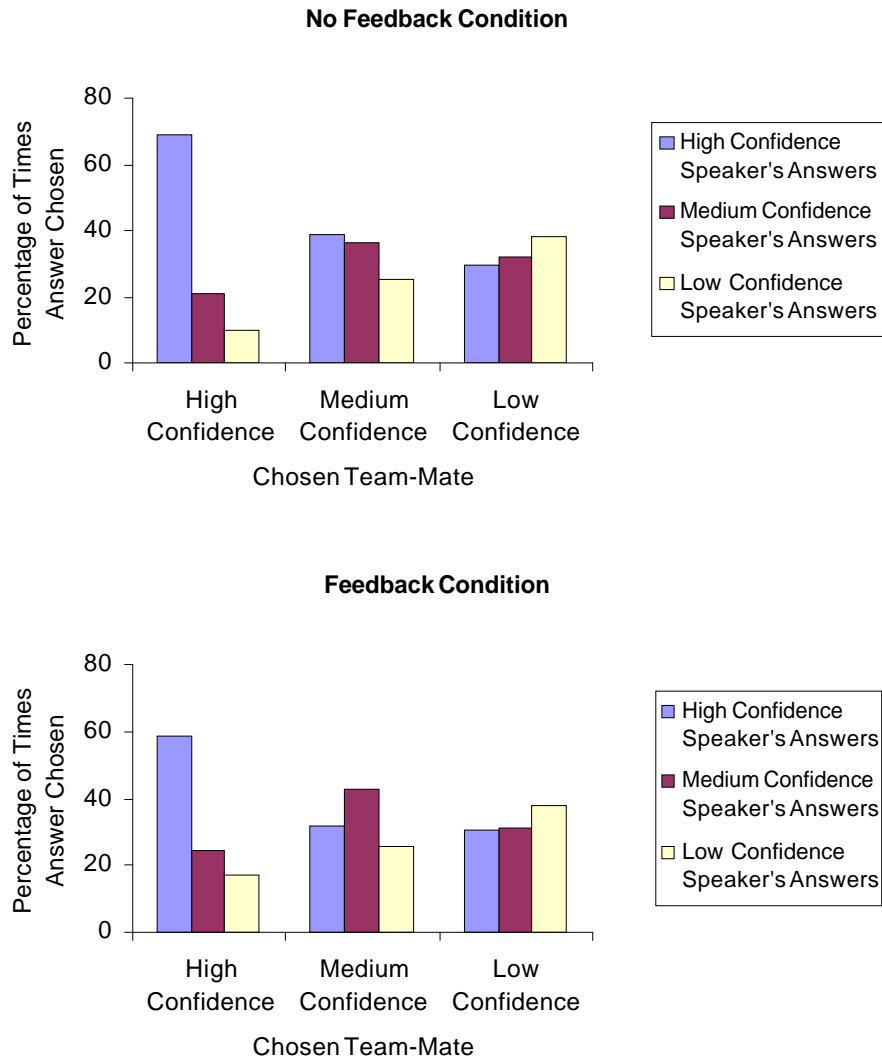


Figure 7.2. Percentage agreement with each speaker according to chosen team-mate.

Choice of Team-Mate and Speaker Agreement

To investigate how participants' choice of team-mate was related to the amount of times they chose each speakers' answers a Speaker Confidence x Chosen Team-Mate

ANOVA was carried out, with repeated measures in the first variable, on each Feedback Condition. There was no significant main effect of Chosen Team-Mate in either the No Feedback, $F(2, 41) = .37, p = .70$, or the Feedback conditions, $F(2, 38) = .12, p = .89$, but main effects of Speaker Confidence were seen in these two conditions, $F(2, 82) = 16.57, p < .001$ and $F(2, 76) = 5.70, p = .005$, reflecting the earlier results relating to choice. Speaker Confidence \times Chosen Team-Mate interactions were found for both the No Feedback, $F(4, 82) = 19.14, p < .001, \eta^2 = .48$, and Feedback conditions, $F(4, 76) = 9.75, p < .001, \eta^2 = .34$, and are illustrated in Figure 7.2. To further understand these interactions the remaining analyses in this section consider the extent to which each of the three speaker's answers are chosen according to participants' choice of team-mate. Differences between each speaker are examined through paired t-tests.

In the No Feedback and Feedback Conditions, main effects of Speaker Confidence were found when participants favoured the high confidence speaker as their team-mate, $F(2, 48) = 89.22, p < .001, \eta^2 = .79$ and $F(2, 20) = 9.78, p = .001, \eta^2 = .50$. From Figure 6.2 it can be seen that these participants chose the high confidence speaker's answers a majority of the time, approximately 70% when no feedback was available and 60% when it was, whereas the answers given by the medium and low confidence speakers were chosen much more infrequently. In the No Feedback condition the differences between the high and medium confidence speakers and medium and low confidence speakers were significant, $t(24) = 8.43, p < .001$ and $t(24) = 4.10, p < .001$. In the Feedback condition the differences between the high and medium confidence speaker was significant, $t(10) = 2.98, p = .01$, but not between the medium and low confidence speakers, $t(10) = 1.80, p = .10$.

When participants chose the medium confidence speaker as their team-mate in the absence of feedback, a main effect of Speaker Confidence was again seen on choice in the No Feedback and Feedback Conditions, $F(2, 22) = 2.19, p = .14, \eta^2 = .17$ and $F(2, 42) = 10.46, p < .001, \eta^2 = .33$. When there was no feedback available the answers given by the high and medium confidence speakers were chosen equally often (39% and 36%), $t(11) = .33, p = .75$, with those given by the low confidence speaker being chosen less frequently than the medium confidence speaker's (25%), $t(11) = 2.33, p = .04$. However, when feedback was made available the medium confidence speaker's answers were chosen significantly more often (43%) than either the high or low confidence speakers' answers were (32% and 26%), $t(21) = 2.95, p = .008$ and $t(21) = 4.77, p < .001$. For the relatively small number of participants choosing the low confidence

speaker as their team-mate, none of the three speakers answers appeared to be favoured over the others in either the No Feedback or Feedback condition, $F(2, 12) = 1.25, p = .32, \eta^2 = .17$, and $F(2, 14) = .61, p = .56, \eta^2 = .08$.

Summary of Results

In relation to the influence of confidence upon choice, a significant main effect of Speaker Confidence, and a Speaker Confidence \times Feedback Condition interaction indicated that as confidence increased so did the extent to which those speaker's answers were chosen, but the extent of this depended upon whether feedback was given or not. When feedback was given there was much less difference in the extent to which each speaker's answers were chosen than when it was not given.

There were no effects of Feedback Condition in relation to participants' confidence in answers, although there was a slight increase in accuracy when feedback was given. Feedback condition did influence participants' choice of team-mate, in that there was a shift towards the medium confidence speaker and away from the high confidence speaker when feedback was given compared to when it was not. Participants' choice of team-mate was reflected in their choice of each speaker's answers.

Discussion

The results indicate that receiving feedback about the quality of a speaker's performance affects the influence that a speaker's confidence had upon the choices participants made, in terms of answers and team-mate, but had a minimal effect on the confidence they had in their choice of answer.

In the absence of feedback, the extent to which speakers expressing different levels of confidence had their answers chosen largely reflected previous findings (see Chapters 3 and 6). The high confidence speaker's answers were chosen more than twice as frequently as those given by the medium confidence speaker, who in turn had their answers chosen more often than a speaker expressing low confidence. As hypothesised, the provision of feedback had a detrimental effect on the high confidence speaker's influence upon choice, whose loss was the medium and low confidence speakers' gain, and upon participants' choice of team-mate. Feedback led to a shift in people's favoured team-mate, from the high confidence speaker, when no feedback is available, to the medium confidence speaker when it is; results which confirm previous findings in both the absence and presence of feedback (see Chapters 3 and 6). However, the hypothesis that a speaker's confidence will have more influence in the absence than the presence of feedback was not supported in relation to participants' confidence in choice. Overall the results lend support to Paese and Kinnaly's (1993) suggestion that not being able to receive feedback regarding another's performance compounds our insensitivity to the judgmental biases of others, hence leading to a great reliance on the confidence heuristic. If we do not know an answer ourselves, we will not be able to detect other people's inaccuracies. But when feedback is made available people do appear to pick up on the discrepancy between their overall confidence and their accuracy, leading to a seemingly reduced, but not obsolete, use of the confidence heuristic.

However, although the use of confidence as a heuristic appears to be reduced when feedback is made available this may not necessarily be the case, or at least not for everyone. For instance, people choosing the high confidence speaker as their team-mate continue to show a strong reliance on the confidence heuristic, whether feedback is given or not. A majority of participants chose the high confidence speaker as their team-mate when no feedback was given regarding this speaker's performance, and a substantial minority did so when feedback was given, and these participants also opted for this speaker's answers a majority of the time. This would indicate that for these

participants at least, the confidence heuristic is deemed a useful decision-making strategy, whether this is a conscious decision or not.

There is less association between participants' choice of team-mate and the speaker's answers chosen when they choose a speaker other than the high confidence speaker as their preferred team-mate. When the medium confidence speaker was the chosen team-mate and no feedback was given about their performance, the high and medium confidence speakers had their answers chosen equally often. However, when feedback was given, the medium confidence speaker's answers were favoured. It is possible that people feel there is some reason for not relying on the highly confident speaker, hence the equal spread of answers across the high and medium confidence speakers in the absence of feedback. In other words they may pick up on a speaker's judgmental biases, in this case their extreme overconfidence. When feedback is given they may feel more justified in this belief, picking up on the high confidence speaker's continued misuse of their chosen confidence level relative to their actual accuracy.

Although it may appear that the participants choosing the medium confidence speaker are less reliant on a speaker's confidence this is not necessarily the case. As in Chapter 6, it is actually the low confidence speaker whose confidence level best represents their level of accuracy – the high confidence speaker is extremely overconfident with the medium confidence speaker being moderately so – but the low confidence speaker's answers are chosen least often and they are the least favoured choice of team-mate. So why is this speaker not considered? These results would indicate that we do use a speaker's confidence as a way of differentiating between the information we are receiving, hence in one way or another utilising the confidence heuristic. Although each speaker was correct an equal amount of times their answers were not chosen equally often. In the feedback condition the accuracy level was available, if participants chose to attend to this information, but the results suggest that they did not fully utilise this information. Instead a speaker's confidence seems to have had more of an influence than their accuracy, as has been suggested in other research (Zarnoth and Sniezek, 1997). We tend to disregard the low confidence speaker's information, certainly far more than that offered by the other, more confident speakers, possibly because we have little use for uncertain information – if we are uncertain ourselves what use is equally uncertain information to us?

So it does seem that we are influenced by a speaker's expressed level of confidence but we may possibly use it in different ways. As suggested in Chapter 6, such

differences may arise from the amount of effort we put in to differentiating between the information that we are receiving. For some people, such as those choosing the high confidence speaker as their team-mate, a straightforward use of the confidence heuristic is seen whereby they indiscriminately rely on that speaker's high level of confidence, seemingly ignoring their accuracy, particularly when feedback was given. For others, such as those choosing the medium confidence speaker as their team-mate, more effort is given to differentiating between the speakers' information, causing us to readjust our use of the confidence heuristic in that we search for the best apparent match between confidence and accuracy. Both the speaker's confidence and their accuracy is given some consideration, in that they notice that the high confidence speaker was overconfident. This would support the suggestion in Chapter 6 that the participants choosing the medium confidence speaker as their team-mate did so because they were sensitive to the extreme overconfidence of the high confidence speaker. However, whilst the high confidence speaker's extreme overconfidence was detected the less extreme overconfidence of the medium confidence speaker was not. Not only is the confidence-accuracy discrepancy more salient for the high confident speaker, the medium confidence speaker still provides some level of confidence – possibly more than one's own at least – rather than the doubt expressed by the low confidence speaker. As mentioned previously, we would have little use for the latter as it offers us no new useful differentiating information.

Contrary to the hypotheses, the only notable effect of a speaker's confidence level on participants' confidence in their chosen answers was, surprisingly, in the feedback condition, with participants' confidence in answers increasing as the speaker's confidence did. One would expect confidence to be lower here because the speaker's judgmental biases have been revealed. However, it may be that revealing such biases leads to increased confidence because participants are aware of this fact and so have less uncertainty about the speaker's biases. If we are unsure whether a speaker is appropriately portraying their confidence, we may be less certain when choosing their answers. But conversely if we are aware of such biases, we may feel that we are making a more informed choice and so subsequently may be more confident in that choice.

Limitations

Accuracy was kept constant across the three speakers in this experiment, as it was in all the experiments reported in this thesis, and so it may be worthwhile considering how

different levels of accuracy would affect participants' perceptions of the three speakers. A useful method to use may be one similar to that of Paese and Kinnaly's (1993) which compared the influence of: a high confidence and high accuracy speaker; a high confidence and low accuracy speaker; a low confidence and high accuracy speaker; and a low confidence and low accuracy speaker.

Questions were also raised in the previous chapter regarding the nature of the feedback provided, where some issues of ecological validity surrounding this were discussed. However, the method used does provide a useful starting point, in that it has allowed initial questions to be addressed, and has highlighted future directions that can be investigated. In real-life the nature of feedback would be much richer than that which was provided in the experiments reported in these two chapters. For instance, in real-life feedback may not be limited simply to observing another's performance, and interaction may be two-way: questions can be asked and verifications requested.

Conclusions

The results confirm the suggestion from Chapter 6 that repeatedly expressing too much confidence can lead to a reduction in influence – but only when we know that too much confidence is being expressed. The addition of feedback led to a reduction in the influence that a high confidence speaker had, but increases in the level of influence exerted by medium and high confidence speakers.

The experiments reported so far in this thesis that directly relate to choice behaviour have clearly shown that the addition of confidence cues to a speaker's answers affects the level of influence that speaker has over listeners' choices when compared to speaker's answers given in the absence of confidence cues. However, by comparing control and experimental conditions, true choice shifts have not been investigated. In Chapter 3 it was noted that the greater our own uncertainty, the more reliant we may become on the confidence of another person as a decision-making aid. To investigate this issue further it is necessary to adopt a within-subjects design, which would enable participants' own choice shifts to be monitored, and the relation of this to their own level of confidence. Chapter 8 adopts this methodology to take these issues into account.

CHAPTER 8

How Does One's Own Uncertainty Affect the Influence of Confidence?

When seeking advice, a determining factor in whether or not we take heed of that advice is how confidently it is expressed. However, the extent to which we are influenced by another's confidence may be mediated by our own level of uncertainty. In a within-subjects design, 79 participants answered 36 questions of varying difficulty, once without advice attached and again with a speaker's advice attached. In the experimental condition the advice was accompanied with confidence cues indicating that the speaker had either high, medium or low confidence in their recommended answer. The results showed that participants changed their chosen answers towards those expressed with high confidence and away from those expressed with low confidence. The extent of these changes depended on how confident the participants were in their initial choices. The higher the participants' initial uncertainty was, the more their choices, and confidence in those choices, were influenced by a speaker's confidence.

How Does One's Own Uncertainty Affect the Influence of Confidence?

We often seek information and advice from others to help us in our decisions. In seeking advice we aim to improve the accuracy, or quality, of our judgements, and expect advice to fulfil this function (Harvey and Fischer, 1997; Yaniv, 2004). Furthermore, in seeking, and accepting advice, we may feel that we are sharing responsibility for our decisions, a factor that is of particular importance when the decisions are important or risky (Harvey and Fischer, 1997; Yaniv, 2004).

When receiving advice we have three options – we can choose to completely ignore it, completely rely on it, or meet somewhere in the middle and integrate it with our own opinions. So do we follow the advice that is given to us? Harvey and Fischer (1997) believe that we do to a degree, and that we are loathe to totally reject advice that is offered to us, even when it comes from a source that is not more experienced than ourselves. However, Yaniv (2004) suggests that receiving advice can lead to conflict between a decision-maker's initial opinions and the advice they are receiving, and propose a self/other effect, where more weight is placed on one's own opinion than on another's. The reason for this, it is suggested, is because we can better assess what we know, and how strongly we hold that belief than we can assess other's knowledge and strength of that knowledge. A decision-maker is likely to feel more confident about their own opinion than they would of another's opinion, and hence place more weight on what they know.

But what about when we know, or believe we know, how knowledgeable an advisor is in their information? Do we still discount this advice? Evidently not, as Yaniv (2004) found that people who knew less placed more weight, and hence were more influenced, by the advice that they received than those who knew more.

So how then can we determine what another person knows? The level of confidence with which someone expresses their knowledge or opinions is frequently relied upon as indicative of the quality of that information (Brennan and Williams, 1995; Harvey and Fischer, 1997; Wells and Murray, 1984). Using another person's confidence to such ends indicates the utilisation of a confidence heuristic (Thomas and McFayden, 1995). As a result, if someone is very confident in their information, we take that as meaning they have the relevant knowledge or expertise in that area, and as such may be more inclined to follow their advice than someone who is not so confident. Indeed, many studies have found that a determining factor in whether we follow someone's

advice/recommendation is how confidently they express that advice (Lee, 2005; Leippe, Manion, and Romanczyk, 1992; Pulford and Colman, 2005; Sniezek and Van Swol, 2001; Thomas and McFayden, 1995; Zarnoth and Sniezek, 1997).

The extent to which we follow confidently expressed advice is not always the same; sometimes we are far more influenced by another person's confidently expressed information than at other times. For example, Zarnoth and Sniezek (1997) found that task type mediated the influence of confidence, whereas Sniezek and Buckley (1995) found the decision-making environment to be important. A common factor in both of these situations however seems to be how much information one can bring to a task. Zarnoth and Sniezek (1997) found confidence to exert more influence on intellectual tasks, such as difficult maths problems, than on more judgmental tasks, such as opinion based questions on which it is easier to generate a 'best guess' answer. Similarly, Sniezek and Buckley (1995) found that in a situation where a decision-maker can bring no knowledge of their own, the influence of confidence was far greater than in situations where the decision-maker could utilise their own knowledge.

The key factor in these different situations appears to be the decision-maker's level of confidence. If we know something, then we are entitled to feel confident in that knowledge. If we feel that we can bring some information to the task in hand to help us reach a solution, then again we may feel confident. Visser, Krosnick, and Simmons (2003) suggest that the more confident a person is in a given opinion or piece of information, the less they may feel the need to collect or attend to other information regarding the topic. Indeed, it does seem that the social influence of confidence is determined by one's own subjective uncertainty, in that people who hold their attitudes with certainty are less susceptible to the influence of others (Sniezek and Buckley, 1995; Visser et al., 2003).

Rationale for Experiment

When receiving advice, a determining factor in whether or not we follow that advice is how confidently it is expressed. But how does a speaker's confidence interact with our own level of confidence? Whether or not we are influenced by another person's advice also appears to depend on how confident we are ourselves about the task in hand. It seems that the more confident we are, the less susceptible we are to the influence of another person, but we are more influenced when we are more uncertain.

The previous experiments reported in this thesis so far do not allow for this issue to be fully considered. Whilst there has been evidence to suggest that one's own uncertainty does mediate the influence of another's confidence, for example in relation to the task type results from Chapter 3, the methodology used was a between-subjects design, comparing control group choices and confidence in choices to that of an experimental group. This meant that participants' true confidence/uncertainty in their choices was not measured. The use of a within-subjects design would address this issue. In such a situation the individual would make their initial decision in the absence of advice, and then make a final decision in the presence of advice, with (experimental condition) or without confidence cues (control condition) being attached to that advice. It could be argued that this latter method has the disadvantage of familiarity with the questions but the advantage of being able to look at true choice and confidence shifts outweighs this. In Chapter 3, and previous research (e.g. Sniezek and Buckley, 1995; Zarnoth and Sniezek, 1997), the extent to which confidence influenced the individual seemed to depend upon how much information the individual could bring to the task. Therefore, to keep task type consistent this experiment uses general knowledge questions only, but across a range of difficulties, to induce a variety of confidence levels.

The aim of this experiment is to find out how our own confidence interacts with that of a speaker's, to find out how uncertain one must be to be influenced by another, and how confident that speaker must be to influence us. It is hypothesised that the confidence heuristic will be used more the lower a participant's confidence is and, in turn, the higher their confidence is, the less they will use the confidence heuristic. As the methodology allows for accuracy information to be taken into account, the effects of overconfidence on this are also considered. Specifically, are overconfident people more or less influenced by the confidence heuristic than people who are less overconfident?

Method

Participants

79 undergraduate students (20 men and 59 women), ranging in age from 18 to 43 years ($M = 22.77$, $S.D. = 6.43$) were recruited from the University of Wolverhampton's participant pool to take part in the experiment. Participants were randomly assigned to either the control or experimental condition.

Materials

A 36-item multiple-choice general knowledge questionnaire was constructed, where each answer was followed by three alternative answers, one of which was correct. The questions ranged in difficulty and included a selection of easy, medium and hard difficulty items, which were presented in a random order. A range of questions of varying difficulty was included to represent a situation where the confidence of another person may be relied upon more or less, as one aim of the present experiment was to determine how confident or uncertain one must be to be influenced by another's confidence. Hence questions needed to be selected that would elicit a wide range of participant confidence in answers.

To check that the questions did represent a range of difficulties a pilot study was conducted. 20 participants completed a questionnaire containing the 36 items, choosing their answer from three available alternatives, one of which was correct. This confirmed that the questions covered a range of difficulties with the pilot group's mean accuracy on the 36 items ranging from 5% to 100% (Appendix L).

Two questionnaires were used in the main study. The first consisted of each of the 36 questions followed by the three alternative answers. This was designed to give a baseline measurement of participants' chosen answers and the confidence that they held in those answers. In the second questionnaire the three alternatives were presented as the answers given by different speakers, each of whom was correct an equal number of times, giving an overall accuracy rate of 33.33% for each speaker. In the experimental condition the three speakers accompanied their answers with confidence cues, so that one speaker expressed high confidence, one medium confidence and one low confidence in all their given answers. In the control condition the three speakers did not use confidence cues to accompany their answers. This second questionnaire was designed to monitor shifts in participants' answers and confidence in answers, when

speaker's expressed confidence in those answers. A control condition, without the use of confidence cues, was included to determine and control for the effects of repeating the same questionnaire twice. An example from each version of the questionnaire is given below. (Confidence cues added to the experimental condition are underlined).

Questionnaire 1:

Which planet in our solar system was discovered most recently?

Neptune Jupiter Pluto

Questionnaire 2:

Which planet in our solar system was discovered most recently?

Alex said, I suspect it was Neptune

Sam said, I'm sure it was Jupiter

Jo said, I guess it was Pluto

Design

3 (Speaker Confidence) × 2 (Questionnaire) within-subjects design was used. Data for the experimental and control conditions were analysed separately, unless stated otherwise. The dependent variables were the magnitude of change in chosen answer from the first to the second administration of the questions for agreement with each of the three speakers, changes in participants' confidence in their chosen answers, as well as changes in participant's accuracy and overconfidence.

Procedure

Upon arrival each participant was given written instructions and the first part of the experimental booklet, containing the first version of the questionnaire. Participants were told that the booklet contained a series of general knowledge questions of varying difficulties, some being very easy and some being very hard. They were asked to read each question and then choose the correct answer from the three alternatives that were provided, as well as indicating how confident they were in their chosen answer and the probability that this answer was correct (the probability rating was used to calculate the participants' degree of overconfidence). The following standardised instructions were issued to participants detailing how to do this:

1. Indicate your CHOICE by circling ONE of the three answers. Only one answer is correct.

2. Then indicate how CONFIDENT you feel that your answer is correct (for each question) by choosing any number between 0 (no confidence that your answer is correct) and 100 (total confidence that your answer is correct). Write this number in the gap in the sentence after the question:

I feel _____% sure that I've chosen the correct answer (0 to 100 scale)

3. After that could you estimate the PROBABILITY/ODDS that the answer you've chosen is correct (again for each question). As there are three answers and one of them is correct you have a .33 chance of being correct (1 in 3), so this is the lowest number you should put, and it reflects that you are guessing at random and have no idea which is the right answer. If you do know the right answer then the probability of being correct is obviously nearer to 1.0 (which is the maximum number you can put). Write this number in the gap in the sentence after the question:

The probability that this is the right answer is _____. (.33 to 1.0 scale)

Participants were asked to answer all the questions, even if it meant guessing, in the order that they were presented. Upon completion of the first part of the experimental booklet, participants were asked to notify the experimenter that they had finished. The booklets were then collected from the participants and the second part of the experiment was issued. Participants were told that they were to complete another general knowledge questionnaire, containing the same questions that they had already answered. However;

This time the answers are given by three of your friends – Alex, Jo and Sam. Read each question and then choose the correct answer from the three alternatives that your friends provide. Please read each friend's response carefully before making your choice. Indicate your CHOICE by circling the name of the friend who has given the correct answer. Only one of them is correct. You do not have to choose the same answer as before – just choose the answer that you think is correct. You do not have to choose the same friend's answers on each question.

All further instructions were the same as for the first part of the experiment. Upon completion of the second questionnaire participants were asked to notify the experimenter again, who collected the questionnaire and debriefed the participants before they left.

Results

Influence of Confidence on Choice

Participants answered the same set of questions twice, either with (experimental condition) or without (control condition) confidence cues attached to the second set of answers. For purposes of analyses a new variable was calculated to take into account changes in participants' choice of answer from initial to final choice. Participants' mean agreement with each speaker on the first questionnaire was subtracted from their mean agreement with each speaker on the second questionnaire to give a mean change score for agreement with each speaker. Table 8.1 shows the mean percentage of agreement with the three speakers' answers and changes in agreement between the two administrations of the questionnaire. Significant choice changes between the two questionnaires were established using paired samples t-tests. As a within-subjects design was employed for this experiment, data from the control and experimental groups was analysed separately.

Table 8.1

Initial, final and change in choice in the absence and presence of confidence cues

	Speaker Confidence					
	High		Medium		Low	
Control						
<i>Initial (Questionnaire 1)</i>	40.97	(7.41)	27.62	(7.27)	31.40	(7.59)
<i>Final (Questionnaire 2)</i>	42.05	(9.30)	27.39	(10.50)	30.48	(9.52)
<i>Change (Q2 – Q1)</i>	1.08	(6.97)	-.23	(6.75)	-.92	(6.96)
Experimental						
<i>Initial (Questionnaire 1)</i>	41.28	(6.98)	26.74	(5.25)	31.97	(6.92)
<i>Final (Questionnaire 2)</i>	52.71	(16.09)	25.84	(9.82)	21.25	(9.71)
<i>Change (Q2 – Q1)</i>	11.43	(15.15)*	-.90	(8.72)	-10.72	(11.24)*

Note. Standard deviations are in parentheses. t-test results show significant changes at

* $p < .001$

Repeated measures ANOVA on the change scores were conducted. In the control condition the main effect of Speaker Confidence was not significant, $F(2, 70) = .52, p = .60, \eta^2 = .02$, whereas it was in the experimental condition, $F(2, 84) = 24.56, p < .001, \eta^2 = .37$, indicating that the addition of confidence cues to a speaker's answers made a

difference to the amount of times a speaker's answers were chosen. As Figure 8.1 shows, when no confidence cues accompanied either questionnaire (control condition) participants did not tend to change their answers from their initial choices. However, when confidence cues were used (experimental condition) participants did change their answers from their initial choices, which were made in the absence of confidence cues. Planned comparisons showed that the extent of change in answers for the high confidence speaker was significantly more than for the medium and low confidence speakers, $t(42) = 3.68, p = .001$ and $t(42) = 5.78, p < .001$, with the difference between these latter two speakers also being significant, $t(42) = 4.81, p < .001$. Hence, different levels of speaker confidence resulted in a significant linear trend which is illustrated in Figure 8.1, $F(1, 42) = 33.36, p < .001$. The mean changes scores showed an 11.43% increase in the amount of times answers expressed with high confidence were chosen, virtually no change to the amount of times answers expressed with medium confidence were chosen and a 10.72% decrease in the amount of times answers expressed with low confidence were chosen.

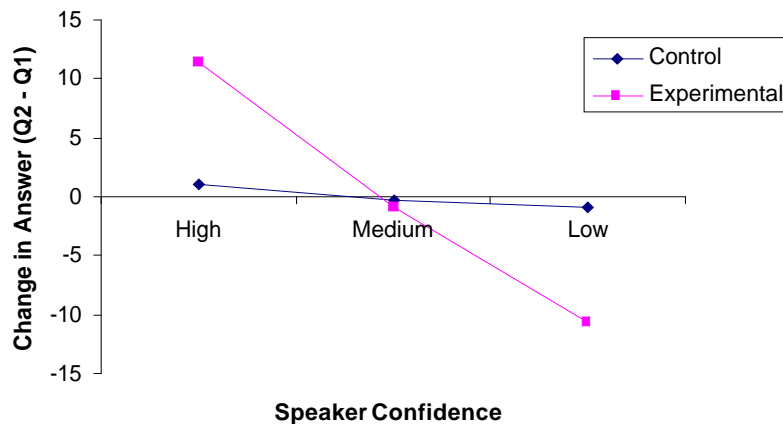


Figure 8.1. Mean percentage change in agreement with speakers.

Influence of Confidence on Confidence in Answers

As with the results for participants' choice of answers, a new variable was calculated for the confidence that participants had in those answers, signifying their change in confidence between their initial and final answers. Table 8.2 shows participants' initial and final mean confidence in both conditions as well as the changes in confidence.

Table 8.2

Initial, final and change in mean confidence in answers in the absence and presence of confidence cues

	Speaker Confidence		
	High	Medium	Low
Control			
<i>Initial (Questionnaire 1)</i>	60.62 (16.93)	52.10 (17.66)	54.58 (18.16)
<i>Final (Questionnaire 2)</i>	63.27 (16.80)	55.59 (20.79)	56.32 (19.37)
<i>Change (Q2 – Q1)</i>	2.65 (9.00)	3.49 (9.17)*	1.74 (11.46)
Experimental			
<i>Initial (Questionnaire 1)</i>	61.88 (13.48)	55.97 (16.38)	57.28 (16.53)
<i>Final (Questionnaire 2)</i>	73.26 (15.42)	67.91 (18.44)	67.42 (17.89)
<i>Change (Q2 – Q1)</i>	10.66 (11.12)**	9.92 (12.52)**	9.16 (14.00)**

Note. Standard deviations are in parentheses. *t*-test results show significant changes at * $p < .05$ ** $p < .001$

Repeated measures ANOVA on the confidence change scores found no main effect of Speaker Confidence in either the control, $F(2, 70) = .35, p = .71$, or experimental condition, $F(2, 70) = .25, p = .78$, indicating that in each condition there were comparable increases in confidence for agreement with the high, medium and low confidence speakers.

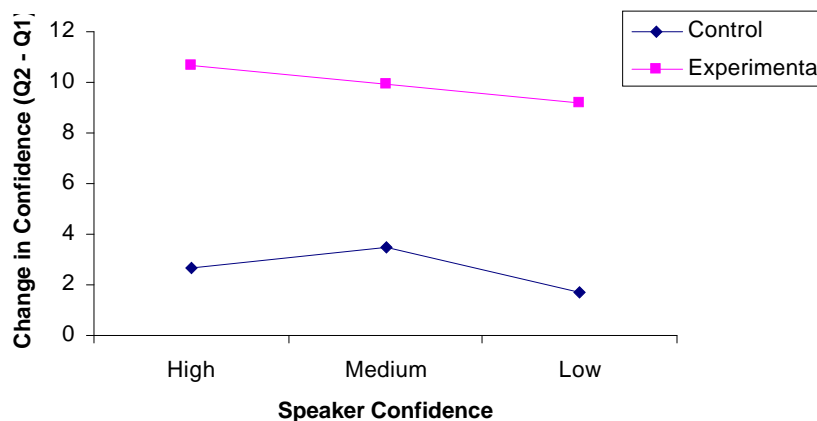


Figure 8.2. Mean percentage change in confidence in answer

However, as Figure 8.2 illustrates, confidence increased more in the experimental condition than in the control condition. This observation was confirmed by conducting a

Speaker Confidence \times Condition mixed ANOVA, with repeated measures on the first variable. The main effect of Speaker Confidence was not significant, $F(2, 148) = .45, p = .64$, but the main effect of Condition was, $F(1, 74) = 13.66, p < .001$, indicating that participants' confidence increased more in the experimental condition than in the control condition overall, regardless of which speakers' answers were being chosen, ($M = 9.91$ vs. $M = 2.63$). The Speaker Confidence \times Condition interaction was not significant, $F(2, 148) = .14, p = .87$.

Accuracy

Table 8.3 shows the mean accuracy scores obtained on the two administrations of the questionnaire in each condition. A Questionnaire \times Condition ANOVA, with repeated measures on the first variable was conducted. A significant main effect of Condition, $F(1, 77) = 5.92, p = .02$, indicated that overall, participants in the experimental condition were more accurate in their answers than those in the control condition (53.70% vs. 47.32%). The fact that the difference in accuracy between the control and experimental conditions occurs with questionnaire 1 shows that this was caused by chance even though random allocation of participants to conditions was used. However, the lack of a significant main effect of Questionnaire, $F(1, 77) = .04, p = .85$, and lack of a significant Questionnaire \times Condition interaction, $F(1, 77) = .39, p = .53$, indicated that participants did not become any more, or less, accurate in their answers by repeating the same questionnaire.

Table 8.3

Mean accuracy scores

	Questionnaire 1	Questionnaire 2	Total
Control	47.61 (12.08)	47.03 (13.02)	47.32 (12.27)
Experimental	53.55 (11.46)	53.86 (11.64)	53.70 (11.04)

Note. Standard deviations are in parentheses

Influence of Confidence on Choice according to Levels of Overconfidence

It may be that people who are overconfident are more, or less, influenced by another person's confidence. To investigate this, changes in choice and confidence in choice, were reanalysed according to participants' initial overconfidence on questionnaire 1.

Although overconfidence was 13.47% on average, participants were divided into three even groups based on their overconfidence scores on the first questionnaire. Participants who were less than 7.00% overconfident were grouped as ‘low overconfidence’, those between 7.00% and 17.12% overconfidence were grouped as ‘medium overconfidence’ and those who were more than 17.12% overconfident were grouped as ‘high overconfidence’.

A Speaker Confidence \times Overconfidence Level ANOVA, with repeated measures on the first variable, found no main effect of Speaker Confidence in the control condition, $F(2, 64) = .36, p = .70$, but did in the experimental condition, $F(2, 78) = 24.61, p < .001$. However the lack of any significant main effects of Overconfidence Level in either control, $F(1, 32) = .53, p = .47$, or experimental condition, $F(1, 39) = 3.25, p = .08$, and any Speaker Confidence \times Overconfidence Level interactions, $F(4, 64) = 1.05, p = .39$ and $F(4, 78) = .70, p = .60$, showed that participants’ overconfidence made no difference to participants’ choices.

Influence of Confidence on Choice according to Initial Confidence

The extent to which the confidence heuristic is used may depend upon how confident one is in the first place. As was outlined previously, the questions used in this experiment were of varying difficulties to elicit a range of participant confidence in answers, thus allowing this suggestion to be investigated. One would expect participants to be more influenced by a speaker’s confidence on difficult questions, those that should produce low confidence in answers, than on easier questions, where participants should be more confident in their choice of answers. By administering the same set of questions twice, this could be considered.

Participants’ mean confidence in answers, across the two conditions, on the first administration of the questionnaire was calculated. The questions were then rank ordered based on these initial confidence scores (Appendix M). To consider the influence of different levels of speaker confidence upon different levels of participant confidence, a tripartite split was then performed on the rank ordered questions to create three categories, each containing 12 questions, which represented different levels of participant confidence: *high initial confidence questions* (Mean confidence = 80.16%; Mean accuracy = 71.31%); *moderate initial confidence questions* (Mean confidence = 55.40%; Mean accuracy = 54.32%); and *low initial confidence questions* (Mean confidence = 33.86%; Mean accuracy = 31.43%). In creating these three categories,

subsequent shifts in choice on the second questionnaire from the first could be considered in relation to initial levels of confidence. It was hypothesised that changes in choice of answer, and therefore participants' use of the confidence heuristic, would be the least on the category of questions that participants had reported the highest confidence in initially, and greatest on the category of questions participants had reported the lowest initial confidence in.

All initial, final and change in answer results are shown in Table 8.4. Owing to the large number of t-tests carried out an alpha level of .01 was set for the change scores to protect against Type 1 error. Speaker Confidence ANCOVAs, with participants' mean initial confidence as a covariate, were conducted on the change scores for each of the three categories of questions. After adjusting for participants' initial confidence there were no significant main effects of Speaker Confidence in the control condition for either the high, moderate and low initial confidence questions categories, $F(2, 68) = .82, p = .45$, $F(2, 68) = 1.58, p = .21$, and $F(2, 68) = .30, p = .75$.

In the experimental condition, the main effect of Speaker Confidence was nearing significance when participants' initial mean confidence was high, $F(2, 82) = 2.70, p = .07, \eta^2 = .06$, with there being a slight shift (3.88%) towards answers expressed with high confidence, and a 3.10% shift away from those expressed with low confidence on the second questionnaire. Figure 8.3 illustrates the changes, in the experimental condition, in participants' answers according to their initial confidence (based on the three question categories) and the speakers' confidence. There were significant main effects of Speaker Confidence for the questions on which there was moderate, $F(2, 82) = 4.01, p = .02, \eta^2 = .09$, and low initial mean confidence, $F(2, 82) = 5.72, p = .005, \eta^2 = .12$. Here significant linear relationships indicated that the choice shifts here were higher than those seen when initial confidence was high, for both the moderate and low initial mean confidence questions, $F(1, 41) = 5.03, p = .03$ and $F(1, 41) = 8.61, p = .005$. As Table 8.4 shows, there was a 14.34% shift towards answers expressed with high confidence on the category of questions that participants reported a moderate level of initial confidence on, and a 16.08% shift towards the high confidence speaker's answers on the category of questions where there was low initial confidence. These results indicate that although different levels of speaker confidence led to differences in the extent of change from the first to the second administration of the questionnaire, the magnitude of these shifts *was* dependent on the participants' initial confidence.

Table 8.4

Initial, final, and changes in agreement with each speaker according to initial confidence in questions category

Initial Confidence in Questions Category	Speaker Confidence					
	High		Medium		Low	
Control						
High Confidence						
<i>Initial</i>	50.46	(10.34)	26.16	(10.19)	23.38	(10.88)
<i>Final</i>	50.46	(9.95)	25.69	(12.01)	23.84	(12.62)
<i>Change</i>	0.00	(5.98)	-0.46	(8.20)	0.46	(7.73)
Medium Confidence						
<i>Initial</i>	35.88	(10.51)	27.31	(12.69)	36.81	(11.85)
<i>Final</i>	37.96	(12.19)	27.08	(13.12)	34.72	(12.52)
<i>Change</i>	2.08	(10.42)	-0.23	(9.45)	-2.08	(10.42)
Low Confidence						
<i>Initial</i>	36.57	(14.26)	29.40	(13.43)	34.03	(14.14)
<i>Final</i>	37.73	(17.98)	29.40	(17.76)	32.87	(15.29)
<i>Change</i>	1.16	(16.44)	0.00	(14.23)	-1.16	(11.98)
Experimental						
High Confidence						
<i>Initial</i>	53.10	(11.79)	25.97	(8.76)	20.93	(7.13)
<i>Final</i>	56.98	(15.21)	25.19	(9.87)	17.83	(8.25)
<i>Change</i>	3.88	(9.85)*	-0.77	(6.25)	-3.10	(7.28)*
Medium Confidence						
<i>Initial</i>	37.21	(11.97)	24.23	(9.76)	38.57	(13.12)
<i>Final</i>	51.55	(18.83)	23.06	(13.47)	24.81	(13.17)
<i>Change</i>	14.34	(18.12)**	-1.16	(12.14)	-13.76	(15.63)**
Low Confidence						
<i>Initial</i>	33.53	(12.79)	30.04	(11.52)	36.43	(14.44)
<i>Final</i>	49.61	(24.86)	29.26	(18.04)	21.12	(16.80)
<i>Change</i>	16.08	(25.55)**	-0.77	(16.75)	-15.31	(18.27)**

Note. Standard deviations are in parentheses. t-test results showing significant changes at * $p < .01$ ** $p < .001$

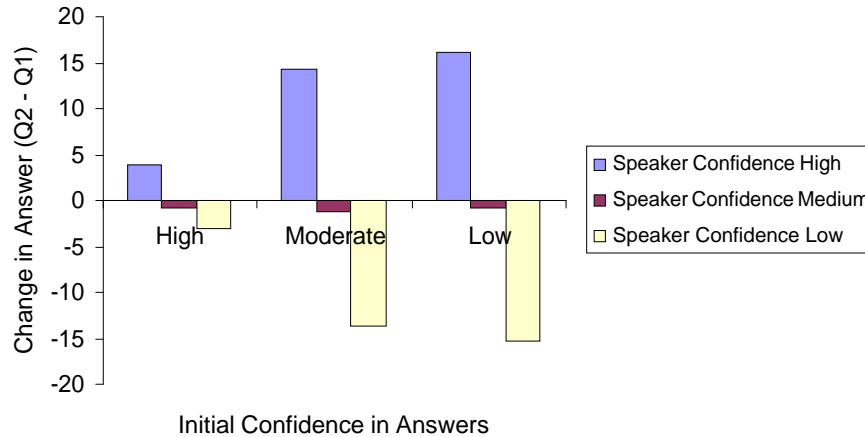


Figure 8.3. Change in answers according to initial confidence in answers in experimental condition.

Changes in Confidence according to Initial Confidence

Repeated measures ANOVA showed main effects of Initial Confidence Level in both the control and experimental condition, $F(2, 70) = 10.25, p < .001, \eta^2 = .28$, and $F(2, 84) = 47.90, p < .001, \eta^2 = .53$, indicating that answering the same set of questions twice led to increases in participants' confidence. Table 8.5 shows that confidence in answers increased significantly when there was moderate and low initial confidence, but not where there was high initial confidence, which is to be expected given the high level of confidence in these answers anyway.

The increases in confidence were not to the same extent in the two conditions. The small increases in confidence seen in the control condition could have been due to the act of answering the questions twice. Alternatively, it may be that in having another 'person' giving answers to the questions, albeit in the absence of confidence cues, raised participants' confidence because they felt that they were agreeing with someone else. In the experimental condition the increases were far more substantial, and participants' initial confidence seemed to have a bearing on their final confidence. As Table 8.5 shows, here there was a non-significant 2.43% increase in confidence when initial confidence was high, a 13.06% increase when initial confidence was moderate, and a 21.82% increase when initial confidence was low.

Table 8.5

Initial, final, and changes in confidence in answers according to initial confidence

	Initial Confidence Level		
	High	Moderate	Low
Control			
<i>Initial</i>	78.03 (17.36)	53.50 (17.99)	34.73 (16.18)
<i>Final</i>	76.15 (18.56)	60.89 (22.48)	40.03 (17.93)
<i>Change</i>	-1.88 (8.06)	7.38 (10.57)**	5.30 (11.51)*
Experimental			
<i>Initial</i>	81.85 (12.12)	56.99 (16.76)	33.13 (18.86)
<i>Final</i>	84.38 (12.56)	70.05 (16.98)	54.95 (20.43)
<i>Change</i>	2.43 (9.69)	13.06 (13.59)**	21.82 (17.56)**

Note. Standard deviations are in parentheses. t-test results showing significant changes at * $p < .05$ ** $p < .001$

Summary of Results

In terms of choice behaviour, there was a significant main effect of Speaker Confidence in the experimental condition but not in the control condition. Significant main effects of Speaker Confidence were also seen in the experimental condition when the questions were broken down according to participants' initial confidence levels. This indicates that the addition of confidence cues influenced participants in their choice of answers, an effect that is mediated by participants' initial confidence.

In relation to the influence of confidence on confidence in answers, there were no significant main effects of Speaker Confidence in either condition. However, further analysis showed a main effect of Condition, with participants' confidence increasing more in the experimental condition than the control condition. After breaking the questions down according to initial confidence levels, a significant main effect of Initial Confidence Level indicated that confidence increased more the lower participants' initial confidence was.

The lack of any significant main effects of, or interactions with, Overconfidence Level indicated that participants' overconfidence did not effect their choice of answers, or confidence in those answers.

Discussion

The way in which we use the advice that is offered to us depends on how confidently expressed that advice is, and how confident we are ourselves in the first place. We change our choices, and confidence in those choices, in the direction of advice that is confidently expressed, but the extent to which we use this confidently expressed advice is mediated by our own initial level of confidence.

What was the effect of receiving advice? After receiving advice regarding a speaker's recommendations in an answer, participants only revised their initial choices when the speakers explicitly expressed some level of confidence in those answers, and hence it is not the mere presence of advice that influences our choices as suggested by Harvey and Fischer (1997) but the level of confidence with which that advice is expressed. From the initial choices participants made, there were choice shifts towards the answers expressed with high confidence and away from those expressed with low confidence. As a rule, repeating the task did not lead to significant increases in confidence when advice was given in the absence of confidence cues but participants' confidence in answers did increase when the speaker's expressed confidence in their answers, regardless of the level of that confidence. Hence, the results regarding choice and confidence in choice from the previous experiments using a between-subjects design were replicated when the within-subjects factor of questionnaire was introduced.

A speaker's confidence evidently exerts a considerable amount of social influence, but the question was asked, to what extent is this mediated by one's own confidence/uncertainty? The results indicate that the greater one's initial level of uncertainty is, the more we are susceptible to the influence of another's confidence, supporting previous suggestions (Lee, 2005; Sniezek and Buckley, 1995; Visser et al., 2003), and in turn supporting the hypothesis that the lower one's confidence was the more reliance there would be on the confidence heuristic, with this reliance reducing as one's own confidence increased. Regardless of the participants' initial confidence levels, the patterns of changes in choice were the same – towards the high confidence speaker's answers and away from those given by the low confidence speaker. On the questions that participants had low initial confidence in, indicating that they found these questions difficult, there were substantial changes in choice towards the answers given by the high confidence speaker (16.08%). When participants reported a more moderate level of confidence, indicating that they found the questions fairly difficult, notable

shifts in choice towards the high confidence speaker were again found (14.34%), although these were not to the same magnitude as for when initial confidence was low. For the questions that participants reported high initial confidence, meaning that they found these questions fairly easy, much smaller choice changes were seen (3.88%), although these were still following the same pattern, being towards the high confidence speaker, and were still significant, indicating that people were still influenced even when fairly confident in their first choice of answer. Hence there does appear to be some interaction between one's own uncertainty and another's confidence in using the confidence heuristic. As the amount of information we can bring to a task decreases, the social influence of another person's confidence increases (Sniezek and Buckley, 1995; Zarnoth and Sniezek, 1997).

It has been suggested that a purpose of seeking advice is the expectation that it will improve decision accuracy (Harvey and Fischer, 1997; Yaniv, 2004), although this was not the case here. Participants' accuracy did not improve whether they followed a confident speaker's advice or not, and so utilising the confidence heuristic was not an efficient strategy. However, the expectation that accuracy will increase is based on the belief that a speaker's confidence gives some indication of their accuracy. In real-life confident speakers *may* be more accurate than those who are less confident, but in the context of this experiment, and the other experiments reported in this thesis, they were not, and so choosing to follow the high confidence speaker's advice on this basis could not lead to an improvement in accuracy.

In addition to the results mentioned earlier regarding the increases in confidence when confidence cues were used, overall changes in confidence in answers were also seen on the questions that participants had high, moderate or low initial confidence in. This was seen in both the control (with the exception of the high initial confidence set) and experimental conditions. Previous research has shown that confidence increases with practice (Paese and Sniezek, 1991), which could explain the small increases in confidence seen in the control condition. For the experimental group however, the changes in confidence were more substantial and followed a more consistent pattern. As with the control group, no significant increases were seen when initial confidence was high, which is to be expected given the high confidence here anyway (81.85%), although confidence did still increase slightly by 2.43%. For the other two sets of questions (moderate and high initial confidence), participants' confidence in answers

increased more the lower their confidence was initially, by 13.06% when initial confidence was moderate and by 21.82% when initial confidence was low.

Clearly then it is not just the act of answering twice that led to these increases in confidence in answers. Given the results relating to choice changes for the different levels of initial confidence, it is fair to assume that these increases are due to the speaker's confidence as well as the participants' confidence, given that the lower the participants' initial confidence was, the more they relied on the high confidence speaker's answers. In other words, when there was greater reliance on the confidence heuristic, participants' own confidence increased more. Hence, it would seem that the less confident one is initially, the more one's subsequent confidence increases after seeing a speaker's answer and finding out how confident they are in that information.

Limitations

A certain amount of variance in the results could be due to the act of repeating a task, rather than the influence of confidence. However, the use of a control group in the present experiment indicates that such changes, if and when they do occur, are small. Furthermore as the results replicate those found when using a between-subjects design, and hence where repetition was not a factor, it is safe to conclude that the results found were indeed due to the influence of confidence.

However, to more fully explore how one's own uncertainty interacts with another's confidence it could be beneficial to design an experiment where a correlational analysis of these two factors could take place. For instance, if a speaker were to express their confidence numerically, then these estimates could be correlated with the participants' own subsequent numerical estimates of confidence in their chosen answers to see whether increases in speaker confidence produce parallel increases in participant confidence. The problem with using verbal expressions to indicate confidence is that, whilst more ecologically valid in terms of their association with daily communication, they do not allow for such objective measures of confidence to occur. However, their advantages outweigh their disadvantages and the design used in this experiment did go some way to addressing this issue.

Conclusions

How do we use the advice that is available to us? It seems that we take how confidently expressed the advice is as indicating the quality of that advice, and this

confidence in turn determines how we use it. The more confident an advisor is the more likely we are to follow their advice. Furthermore, the greater our own uncertainty is, the more we are susceptible to the social influence of another's confidence, in turn leaving us more reliant on the confidence heuristic. Subsequently, the more reliant we are on the confidence heuristic, the more our own confidence increases.

The results from this experiment, as with those from previous chapters, have shown shifts in choice towards a high confidence speaker's answers, which has been largely to the detriment of those answers offered by a speaker expressing low confidence. This chapter has shown that the extent of these shifts depends on participants' own level of confidence, in this case determined by question difficulty, and as their confidence increases, the magnitude of the choice shifts decreases. However, it may be that the size of the choice shifts seen so far have been artificially inflated on account of participants having to make forced-choices, leading to one speaker's gain being another's loss. The remaining two experimental chapters of this thesis use methodologies to counteract this. Chapter 9 addresses the question raised in Chapter 3 regarding confidence heuristic use. Specifically, do we use the confidence heuristic to identify the most confident speaker, thus ignoring all other speakers, or to eliminate the least confident speaker, and perhaps attending to all the speakers and their confidence levels. Introducing a rating methodology in Chapter 9 allows for this issue to be considered whilst also addressing the methodological problem raised above.

CHAPTER 9

The Confidence Heuristic: A Positive or Negative Influence of Confidence?

While it is generally assumed that the influence of confidence is due to the most confidently expressed information exerting the most influence, it is conceivable that there is a negative influence of confidence, whereby the least confidently expressed information exerts an equal if not greater level of influence. This possibility is explored in this experiment. 70 participants rated the likelihood that the answers given by three speakers to a series of 30 difficult general knowledge questions were correct, before selecting the correct answer. Speakers' answers were expressed with high, medium, or low confidence in the experimental condition, with no level of confidence in answers being stated in the control condition. Participants' choice of answer shifted towards the high confidence speaker's answers and away from the low confidence speaker's. However, ratings of the correctness of answers increased when both high and medium confidence cues were used, marginally decreasingly only for the low confidence speaker. A speaker's level of confidence also affected how they were perceived, and expressing low confidence was found to have the most detrimental effect. It is suggested that the confidence heuristic can be put to positive and negative use, in turn eliminating useless information and searching for useful information to aid our decisions.

The Confidence Heuristic: A Positive or Negative Influence of Confidence?

The experiments reported so far in this thesis have shown that when faced with a choice between a high, medium, or low confidence speakers' answers, people's choices shift in the direction of the high confidence speaker's answers and away from those given by a low confidence speaker. In Chapter 3 a number of possible reasons for these shifts were proposed. Firstly it was suggested that it may be that it is only the high confidence speaker that has any real influence, and the low confidence speaker loses out simply because the high confidence speaker's gain must come from somewhere. Hence the high confidence speaker's answers are simply the most appealing. However, if this were the case one might expect the shifts in choice to be away from both the low and medium confidence speakers' answers. Alternatively it may be that the shifts in choice are not due to the high confidence speaker's answers being the most appealing, but that the low confidence speaker's are the least appealing. In this case shifts in choice would be due, not to the positive influence of high confidence, but the negative influence of low confidence. However, again one would expect to see some gain for the medium confidence speaker. Nevertheless, it is feasible that the low confidence speaker is the most influential, albeit in a negative sense.

Additionally the question can be asked as to whether, when we are choosing the most confident speaker's answers, we just identify the most confident speaker and go along with them, or do we consider the other speakers and their level of confidence and try and distinguish between them? Thomas and McFadyen's (1995) model of the confidence heuristic states that decisions are made following a comparison of the confidence with which arguments are presented. The context of this model is within dyads where a comparison is fairly straightforward – A is more confident than B, so A's answer is right. But when there are more than two people offering advice what happens? Do we just identify A as being more confident than B and C, and so follow their advice, or do we compare confidence across all three speakers and conclude that B is more confident than C, but A is more confident than B *and* C? Or do we just compare A and C, ignoring the intermediate speaker? Conversely, it may be that C is viewed as being less confident than A and B, leaving a comparison just between these two more confident speakers before a decision can be made, which ultimately favours the most confidently expressed answer.

When making judgements under uncertainty we rely on heuristics to reduce this uncertainty (Tversky and Kahneman, 1974). These allow us to take cognitive shortcuts, where we generate the easiest solution to the problem, and then move on to the next one. In terms of the confidence heuristic it has been suggested that this involves identifying the most confident individual on which to base our decision in dyads (Thomas and McFadyen, 1995), in groups (Zarnoth and Sniezek, 1997), or in situations of advisor conflict (Sniezek and Buckley, 1995). These all relate to the use of the confidence heuristic as a final outcome. However, as discussed above, we may sometimes be faced with more than a simple comparison of arguments. It may be that there is a more elaborate use of the confidence heuristic involved before reaching this final stage whereby we have identified a 'confidence is best' strategy.

Rationale for Experiment

This experiment reported in this chapter aims to see if people's use of the confidence heuristic is positive or negative, and if consideration is given to all available answers, or whether the availability of highly confident, or conversely highly uncertain, information over-rides this. The methodology used in earlier experiments meant that one speaker's gain was another's loss, with a forced-choice methodology being used where one answer had to be selected out of the three alternatives. However, in using this methodology, it is still unclear whether the choice shifts in the high confidence speaker's favour were due to this speaker's positive influence, or to the low confidence speaker's negative influence. Therefore, a new methodology was added to the present experiment as a way of addressing this issue, whereby prior to making a final forced-choice, as before, the likelihood of each speaker's answers being correct is rated. In doing so it is hoped that some of the questions raised here can be answered. The use of the forced-choice methodology, in addition to the rating scales, was kept to allow for comparisons to be made with the previous experiments.

It is hypothesised that choice behaviour will reflect that shown in previous chapters, in that there will be a shift towards answers given by a high confidence speaker and away from those given by a low confidence speaker when confidence cues are used compared to when they are not. It is hypothesised that there will be differences in the ratings given to the accuracy likelihood of all three speakers answers when confidence cues are used.

Method

Participants

70 students (20 men and 50 women) took part in the experiment in return for participant pool time credit. These students ranged in age from 18 to 40 years old, with the mean age being 21.63 years ($S.D. = 4.58$).

Materials

A PowerPoint presentation was prepared showing, in written format, the responses of three speakers to a series of 30 difficult general knowledge questions. Difficult general knowledge questions were used to maximise reliance on the confidence heuristic. Each question appeared at the top of the screen, followed by the answers given by each of the three speakers. The presentation order of the three speaker's answers was counterbalanced across the experiment. As this experiment used general knowledge questions, a correct answer existed for each question. As the variable of interest was speaker confidence and not speaker accuracy, accuracy was kept constant across the three speakers, with each speaker being correct an equal amount of times.

Two versions of the presentation were prepared – one with confidence cues (experimental condition) and one without (control condition). Figure 9.1 shows an example slide from each condition. In the experimental condition one speaker always answered with high confidence, one with medium confidence and one with low confidence, using the cues developed in a previous pilot study (see Chapter 2, Table 2.1). In the control condition each speaker gave the same responses as in the experimental condition, with the omission of the confidence cues.

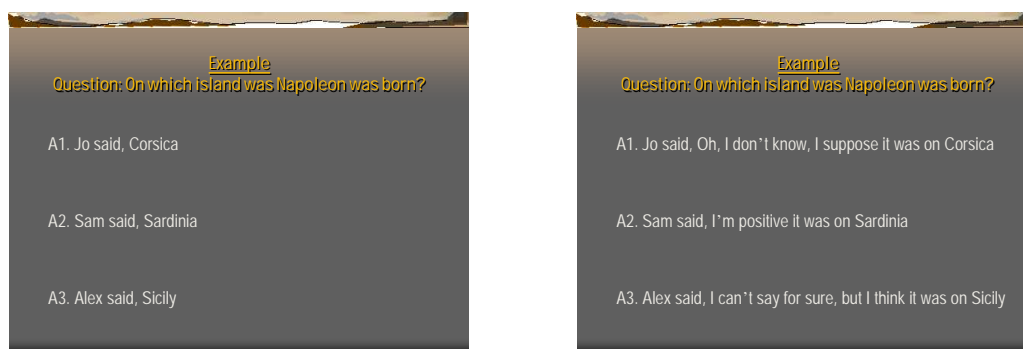
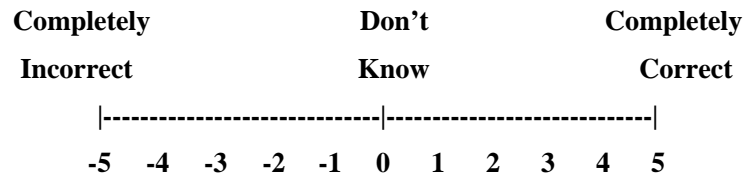


Figure 9.1. Example slides from control and experimental conditions.

Design and Procedure

A 3 (Speaker Confidence) × 2 (Condition) mixed design was used, with repeated measures on the first variable. The dependent variables were; the mean likelihood accuracy rating given to each of the three speaker’s answers, the percentage of times each speaker’s answers were chosen, the participant’s mean confidence in their answers, and the ratings of the speakers on a series of questions relating to how they were perceived by participants.

Participants were seated at separate computer monitors and asked to watch a PowerPoint presentation. They were informed that the presentation consisted of three speakers answering a series of general knowledge questions and their task was to rate the likelihood of each person’s answer to each question being correct by choosing any number between –5 and 5 using the following 11-point scale:



Participants were asked to rate each answer independently, being told that they could give the same rating to more than one answer to a particular question. After rating all three answers to each question participants were asked to indicate which answer they thought was correct and how confident they were in their chosen answer being correct on a scale of 0 to 100, where 0 = not at all confident and 100 = completely confident. All three sets of responses (ratings, chosen answer, and confidence in answer) to each question were recorded on an answer sheet, set out as follows:

<i>The likelihood that this answer is correct is:</i>	<i>I think the correct answer is:</i>
A1. -5 -4 -3 -2 -1 0 1 2 3 4 5	⊙
A2. -5 -4 -3 -2 -1 0 1 2 3 4 5	⊙
A3. -5 -4 -3 -2 -1 0 1 2 3 4 5	⊙

I am ____% confident that the answer I have chosen is correct.

After responding to all 30 questions, participants were asked a series of further questions relating to their perceptions of the three speakers on the basis of how they had answered the questions in the presentation. Firstly, participants were asked to estimate the percentage of questions each speaker answered correctly overall. Finally, they were asked to rate each speaker according to how confident, trustworthy, intelligent, likeable, competent, honest, knowledgeable, friendly and professional they appeared to be on a series of 11 point scales, where 0 = not at all and 10 = extremely. Upon completion of the experiment, all participants were debriefed and thanked for their participation.

Results

Confidence Heuristic Use on Choice of Answer

After calculating the percentage of times each speaker's answers were chosen, a Speaker Confidence x Condition ANOVA was conducted, with repeated measures on the first variable. There was no main effect of Condition, $F(1, 68) = .68, p = .41$, but a significant main effect of Speaker Confidence, indicated that there were differences in the amount of times each speakers answers were chosen. A significant Speaker Confidence x Condition interaction showed that this was dependent on condition, $F(2, 136) = 39.93, p < .001$. To investigate this interaction further, repeated measures ANOVAs were conducted on each condition. As Table 9.1 shows, without confidence cues accompanying the answers, each speakers' answers were chosen a similar number of times, $F(2, 68) = 2.73, p = .07$. Although this main effect of Speaker Confidence was nearing significance, the effect size was small ($\eta^2 = .08$), and the results do show a fairly even distribution of chosen answers across the three speakers that would be expected by chance alone. When confidence cues were used however, Speaker Confidence had a significant main effect on which speaker's answers were chosen, $F(2, 68) = 40.46, p < .001, \eta^2 = .54$. From Table 9.1 it can be seen that the high confidence speaker's answers were chosen more than twice as often as the medium confidence speaker's answers, $t(34) = 5.30, p < .001$, which in turn were chosen twice as often as the answers given by the low confidence speaker, $t(34) = 5.72, p < .001$. Hence, Speaker Confidence followed a linear trend, with a speaker's answers being chosen more often as their confidence increased, $F(1, 34) = 54.03, p < .001$.

Table 9.1

Mean percentage agreement with each speaker in control and experimental conditions

	Speaker Confidence					
	High		Medium		Low	
Control (Without Cues)	29.14	(10.83)	35.05	(9.02)	35.71	(11.73)
Experimental (With Cues)	60.00	(24.72)	26.19	(14.10)	13.52	(13.77)

Note. Standard deviations are in parentheses

Compared to when confidence cues were not used, Figure 9.2 shows that adding high confidence cues to a speaker's answer led to substantial 30.86% increase in the number

of times this speaker's answers were chosen, $t(68) = 6.76, p < .001$. The addition of medium confidence cues led to a 8.86% decrease in how frequently that speaker's answers were chosen, whereas the addition of low confidence cues resulted in a much larger decrease of 22.19%, $t(68) = 3.13, p = .003$ and $t(68) = 7.26, p < .001$ respectively. Hence, the initial hypothesis that there will be a shift towards answers given by a high confidence speaker and away from those given by a low confidence speaker when confidence cues are used compared to when they are not, was supported.

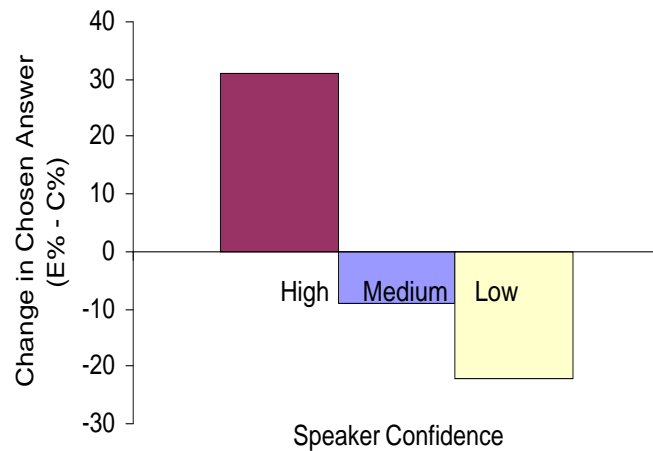


Figure 9.2. Percentage change in choice of speakers' answers between the control (C) and experimental (E) conditions.

Accuracy

The addition of confidence cues were not intended to provide any cues to the accuracy of the answers, with each speaker being correct an equal amount of times. The lack of any significant differences in the accuracy rate of participants in the control ($M = 35.33, S.D. = 8.53$) and experimental conditions ($M = 33.24, S.D. = 9.98$) confirmed that this was the case, $t(68) = .94, p = .35$. Therefore it can be assumed that the differences between the frequency with which the speaker's answers were chosen was due to their expressed confidence and not the accuracy of their answers.

Confidence in Choice of Answer

A significant main effect of Condition indicated that the addition of confidence cues to the speakers' answers led to participants being more confident in their chosen answers overall than when no confidence cues were used ($M = 48.30\%$ vs. $M =$

28.97%), $F(1, 61) = 22.58, p < .001$. However, there was no main effect of Speaker Confidence, $F(2, 122) = 1.81, p = .17$, nor a Speaker Confidence \times Condition interaction, $F(2, 122) = .08, p = .93$. As Table 9.2 shows, different levels of speaker confidence did not lead to differences in participants' confidence in their answers, with participants being equally confident whether choosing the high, medium or low confidence speaker's answers, or equivalent answers, in either condition.

Table 9.2

Mean confidence in answers for agreement with each speaker

	Speaker Confidence		
	High	Medium	Low
Control (Without Cues)	28.93 (16.76)	30.28 (15.03)	27.70 (14.80)
Experimental (With Cues)	47.95 (16.87)	49.40 (19.51)	47.56 (18.96)

Note. Standard deviations are in parentheses

Ratings of Speakers' Answers

Participants rated the likelihood of each speakers' answers being correct on an 11-point scale, where negative ratings indicated that a speaker's given answer was judged as being more likely to be incorrect than correct and positive ratings indicated that a speaker's given answer was judged as being more likely to be correct than incorrect. Neutral ratings of zero indicated no judgement either way.

Table 9.3

Mean ratings of accuracy likelihood for each speaker

	Speaker Confidence		
	High	Medium	Low
Control (Without Cues)	0.55 (0.88)	0.71 (0.84)	0.51 (0.85)
Experimental (With Cues)	2.62 (1.52)	1.57 (1.09)	0.06 (1.66)

Note. Standard deviations are in parentheses

Table 9.3 shows the mean ratings for each speaker in the absence and presence of confidence cues. Speaker Confidence \times Condition ANOVA on the ratings revealed a main effect of Condition, $F(1, 68) = 13.08, p = .001$, showing that overall (irrespective of the speaker's confidence level) the ratings given to the answers in the control

condition were fairly neutral ($M = 0.59$) whereas those in the experimental condition were significantly higher ($M = 1.38$). A significant main effect of Speaker Confidence, $F(2, 136) = 39.13, p < .001$, and a Speaker Confidence \times Condition interaction, $F(2, 136) = 35.58, p < .001$, indicated that different levels of Speaker Confidence contributed to this difference.

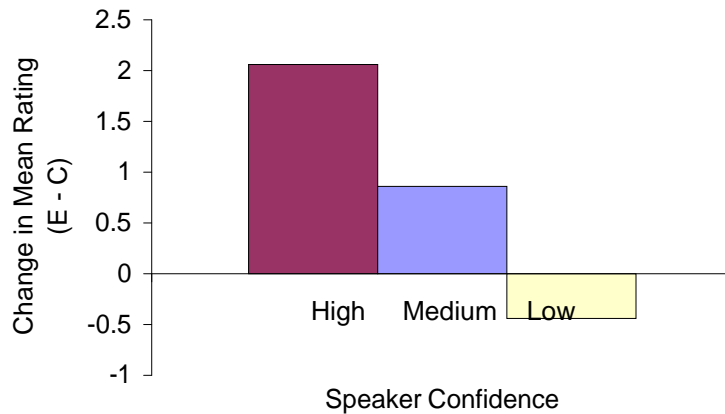


Figure 9.3. Percentage change in accuracy likelihood ratings of speaker’s answers between the control (C) and experimental (E) conditions.

Repeated measures ANOVA were conducted to explore this interaction further. In a similar way to the results relating to confidence heuristic use on the choice of answer, a main effect of Speaker Confidence was seen in the control condition (where ‘Speaker Confidence’ refers to the speaker and their given answers, where there were no cues used, rather than the actual level of speaker confidence, as in the experimental condition), $F(2, 68) = 3.55, p = .033, \eta^2 = .09$, which although significant, again only had a small effect size. This result simply shows that some of the answers given by the medium confidence speaker, in the absence of confidence cues, were judged as slightly more appealing and likely to be correct than the other others. However, as Table 9.3 shows, the ratings given to answers in the control condition were all fairly neutral. In the experimental condition however, the addition of confidence cues to a speaker’s answers had a substantial influence on the ratings of accuracy likelihood given, $F(2, 68) = 39.64, p < .001, \eta^2 = .54$, with a speaker’s confidence contributing to 54% of the variance in ratings. Planned comparisons using paired samples t-tests showed significant differences in the ratings assigned to the high and medium, $t(34) = 5.30, p <$

.001, high and low, $t(34) = 7.35, p < .001$, and medium and low confidence speakers, $t(34) = 5.72, p < .001$. Hence, the subsequent linear trend, as can be seen in Table 9.3, shows that increases in speaker confidence leads to increments in accuracy likelihood ratings, $F(1, 34) = 41.99, p < .001$.

The speakers' use of high and medium confidence cues led to higher ratings relating to the accuracy likelihood of the answers being correct than when they did not use confidence cues, with ratings increasing by 2.07 points for the high confidence speaker, $t(68) = 6.99, p < .001$, and by .86 points for the medium confidence speaker, $t(68) = 3.72, p < .001$. A speaker's use of low confidence cues led to a non-significant .57 point decrease in likelihood ratings, $t(68) = 1.80, p = .08$. Figure 8.3 illustrates the extent of these changes in accuracy likelihood ratings following the addition of confidence cues. These results support the hypothesis that there will be differences in the ratings given to the accuracy likelihood of all three speakers answers when confidence cues are used.

Perceptions of Speakers' Overall Accuracy

Participants were asked to estimate the percentage of questions they thought each speaker had answered correctly (see Table 9.4 and Figure 9.4). One participant in the control condition did not provide accuracy estimates and so was excluded from the analysis. A Speaker Confidence \times Condition ANOVA showed no main effect of Condition, $F(1, 37) = .04, p = .84$, but a main effect of Speaker Confidence, $F(2, 134) = 12.14, p = .002$, and a significant Speaker Confidence \times Condition interaction, $F(2, 134) = 6.51, p < .001$, signified that the addition of different levels of confidence cue made a difference to the speakers' perceived accuracy. Separate repeated measures ANOVA on each condition showed that when no confidence cues were used, each speaker was seen as being equally accurate, $F(2, 66) = 1.43, p = .25, \eta^2 = .04$, whereas when confidence cues were added a main effect of Speaker Confidence showed that there were differences between the speakers' accuracy rates, $F(2, 68) = 13.17, p < .001, \eta^2 = .28$. The subsequent linear trend indicated that increasing confidence was taken as indicative of greater overall accuracy on the general knowledge test, $F(1, 34) = 17.83, p < .001$. Planned comparisons showed that the high confidence speaker was seen as being more accurate than the medium confidence speaker, $t(34) = 2.54, p = .02$, who in turn was more accurate than the low confidence speaker, $t(34) = 3.36, p = .002$.

Table 9.4

Mean estimates of perceived speaker accuracy (%)

	Speaker Confidence		
	High	Medium	Low
Control (Without Cues)	36.12 (19.39)	34.50 (14.06)	39.50 (15.41)
Experimental (With Cues)	48.23 (21.76)	38.03 (15.84)	25.57 (16.12)

Note. Standard deviations are in parentheses

The addition of confidence cues led to the high and medium confidence speakers being perceived as being more accurate than when they did not accompany their answers with confidence cues, with accuracy estimates significantly increasing by 12.11% for the high confidence speaker, $t(67) = 2.44, p = .02$, and non-significantly increasing by 3.53% for the medium confidence speaker, $t(67) = .98, p = .33$. Low confidence cues had a detrimental effect on a speaker's perceived accuracy, leading to a 13.93% decrease in estimates of accuracy for that speaker, $t(67) = 3.67, p < .001$.

Perceptions of Speakers' Characteristics

Participants also rated the three speakers on a series of 11-point scales, and Speaker Confidence \times Condition ANOVAs were conducted on the ratings. Significant main effects of Speaker Confidence were seen for ratings of confidence, $F(2, 136) = 15.13, p < .001$, knowledge, $F(2, 136) = 8.73, p < .001$, friendliness, $F(2, 136) = 3.74, p = .03$, and professionalism, $F(2, 136) = 3.79, p = .025$, but not for trustworthiness, $F(2, 136) = 1.71, p = .19$, intelligence, $F(2, 136) = 1.74, p = .18$, likeability, $F(2, 136) = 2.21, p = .11$, competency, $F(2, 134) = 2.17, p = .12$, or honesty, $F(2, 136) = 2.76, p = .07$. There was a significant main effect of Condition for ratings of competency, $F(1, 67) = 6.13, p = .02$, honesty, $F(1, 68) = 8.99, p = .004$, and friendliness, $F(1, 68) = 4.46, p = .04$, but not for confidence, $F(1, 68) = 3.52, p = .06$, trustworthiness, $F(1, 68) = 1.52, p = .22$, intelligence, $F(1, 68) = .66, p = .42$, likeability, $F(1, 68) = 1.45, p = .23$, knowledgeability, $F(1, 68) = 1.89, p = .17$, or professionalism, $F(1, 68) = .33, p = .57$.

Significant Speaker Confidence \times Condition interactions were seen for ratings of speaker confidence, $F(2, 136) = 24.24, p < .001$, trustworthiness, $F(2, 136) = 7.16, p = .001$, intelligence, $F(2, 136) = 9.24, p < .001$, competency, $F(2, 134) = 12.28, p < .001$, knowledge, $F(2, 136) = 20.56, p < .001$, friendliness, $F(2, 136) = 3.20, p = .04$, and professionalism, $F(2, 136) = 10.43, p < .001$, but not for likeability, $F(2, 136) = .62, p =$

.54, or honesty, $F(2, 136) = 1.90, p = .15$. Figure 9.4 illustrates the significant Speaker Confidence \times Condition interactions, showing that the interactions result from differences in ratings given to speakers in the experimental condition, with few differences emerging in the control condition as expected. Separate ANOVAs on each condition confirm this (see Table 9.5 for F -values). In the control condition, there is little variation in the ratings given to the speakers, with no main effects of Speaker Confidence emerging (with the exception of competence, $F(2, 68) = 3.45, p = .04, \eta^2 = .10$, and professionalism, $F(2, 68) = 3.05, p = .05, \eta^2 = .08$).

Table 9.5

Ratings of speakers in the absence and presence of confidence cues

	Speaker Confidence			Total	$F(2, 68)$
	High	Medium	Low		
Confidence					
Control	5.03	5.66	5.63	5.44	2.94
Experimental	7.63	6.54	3.68	5.95	23.79**
Knowledgeability					
Control	5.20	5.43	5.86	5.49	2.20
Experimental	7.17	6.31	4.11	5.87	19.66**
Competence					
Control	4.71	4.88	5.47	5.02	3.44 ^a *
Experimental	6.63	5.74	4.77	5.71	9.21**
Professionalism					
Control	5.17	5.23	5.66	5.35	3.08
Experimental	6.43	5.97	4.40	5.60	7.74**
Intelligence					
Control	5.09	5.23	5.77	5.36	2.06
Experimental	6.40	5.74	4.63	5.59	7.52**
Trustworthiness					
Control	4.46	4.77	5.11	4.78	2.40
Experimental	5.91	5.46	4.14	5.17	4.97*
Friendliness					
Control	4.63	4.57	4.71	4.64	.40
Experimental	4.80	5.77	6.14	5.57	3.78*

Note. ^a $F(2, 66)$. * $p < .05$ ** $p < .001$

The addition of confidence cues contributed to differences in how the three speakers were perceived. This was most apparent for speaker confidence, $F(2, 68) = 23.79, p < .001$, with partial Eta squared indicating that the different levels of confidence cue contributed to 41% of the variance in the ratings. A similarly strong effect of Speaker Confidence was seen on ratings of knowledgeable, $F(2, 68) = 19.60, p < .001, \eta^2 = .37$. Main effects of Speaker Confidence were also seen for competence, $F(2, 68) = 9.21, p < .001, \eta^2 = .21$, professionalism, $F(2, 68) = 7.74, p < .001, \eta^2 = .19$, and intelligence, $F(2, 68) = 7.52, p < .001, \eta^2 = .18$, as well as trustworthiness, $F(2, 68) = 4.97, p = .01, \eta^2 = .13$, and friendliness, $F(2, 68) = 3.79, p = .03, \eta^2 = .10$, although the effects sizes were quite small in these latter two cases.

Speaker Confidence produced a significant linear relationship on all the above attributes, indicating that the higher a speaker's expressed confidence was, the more confident, $F(1, 34) = 30.74, p < .001$, knowledgeable, $F(1, 34) = 27.54, p < .001$, competent, $F(1, 34) = 13.40, p = .001$, professional, $F(1, 34) = 30.711.424, p = .02$, intelligent, $F(1, 34) = 8.56, p = .006$, and trustworthy, $F(1, 34) = 5.66, p = .02$, they were perceived as being. The exception to this pattern was seen on ratings of speaker friendliness, where higher levels of expressed confidence led to *lower* ratings of friendliness being given, $F(1, 34) = 4.81, p = .04$.

Planned comparisons, using paired t-tests, were made, setting an alpha level of .01 to protect against Type 1 error. At this level, differences in ratings given to the high and medium confidence speakers did not reach a sufficient level of significance for confidence, $t(34) = 2.13, p = .04$, knowledgeable, $t(34) = 2.15, p = .04$, competence, $t(34) = 2.48, p = .02$, professionalism, $t(34) = .88, p = .39$, intelligence, $t(34) = 1.89, p = .07$, trustworthiness, $t(34) = 1.08, p = .29$, or friendliness, $t(34) = 2.22, p = .03$. Ratings of trustworthiness did not reach sufficient significance when comparing the high and low, $t(34) = 2.38, p = .02$, and medium and low confidence speakers, $t(34) = 2.46, p = .02$, nor did ratings of friendliness, $t(34) = 2.19, p = .03$ and $t(34) = .84, p = .41$. Significant differences between the high and low, and medium and low confidence speakers were seen for confidence, $t(34) = 5.54, p < .001$ and $t(34) = 5.41, p < .001$, intelligence, $t(34) = 2.93, p = .006$ and $t(34) = 2.85, p = .007$, knowledgeable, $t(34) = 5.25, p < .001$ and $t(34) = 4.29, p < .001$, and professionalism, $t(34) = 3.38, p = .002$ and $t(34) = 3.18, p = .003$. Ratings of competency reached significance when comparing the high and low confidence speakers, $t(34) = 3.66, p = .001$, but not when comparing the ratings given to the medium and low confidence speakers, $t(34) = 2.31, p = .03$.

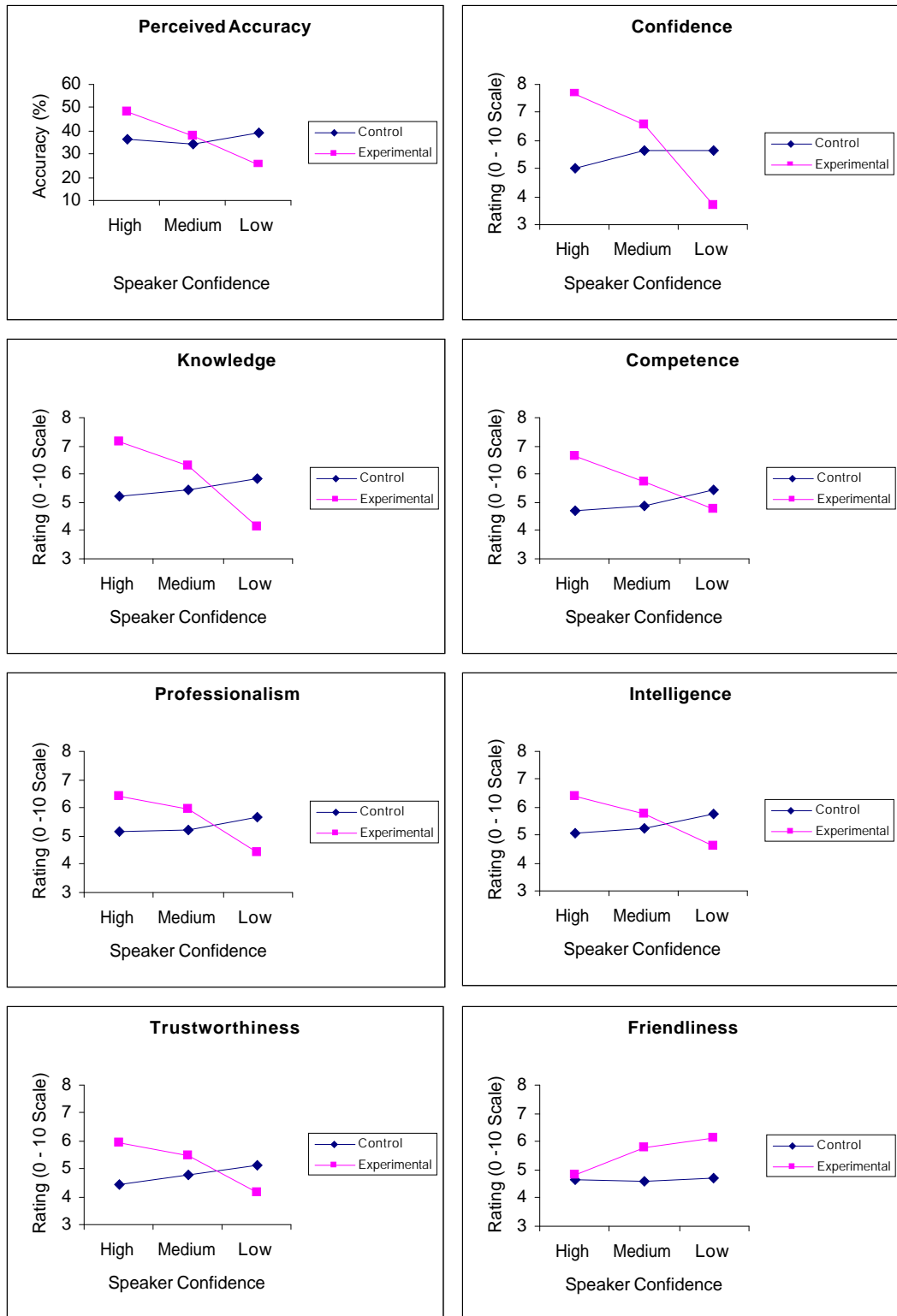


Figure 9.4. Significant interactions relating to perceptions of speakers expressing different levels of confidence.

Summary of Results

In relation to the influence of confidence cues on chosen answers, there was no main effect of Condition but there was of Speaker Confidence, as well as a significant Speaker Confidence \times Condition interaction, indicating that the addition of confidence cues has a strong influence upon chosen answers. A main effect of Condition was found for participants' confidence in answers, but the lack of a main effect of Speaker Confidence, or a significant Speaker Confidence \times Condition interaction indicates that although confidence was higher when confidence cues were added, this was not effected by a speaker's confidence level. For the ratings of speaker's answers, main effects of Condition and Speaker Confidence, and a significant Speaker Confidence \times Condition interaction indicated that higher ratings were given to answers when confidence cues were added, with the answers being given higher ratings the higher a speaker's confidence was.

The addition of confidence cues also had significant effects on participants' perceptions of the speakers, in terms of how accurate, confident, knowledgeable, competent, professional, intelligent, trustworthy and friendly each speaker was perceived as being. With the exception of friendliness, a speaker was viewed more positively as their confidence increased. The addition of confidence cues made no difference to how speakers were perceived in terms of honesty and likeability.

Discussion

The addition of confidence cues, compared to their absence, affected participants' choice of answer, the confidence they had in those answers, their accuracy likelihood ratings of the speaker's given answers and their perceptions of the speakers. In general, the higher a speaker's confidence was the more of a positive influence was seen, whereas a detrimental effect was seen the lower a speaker's confidence was. The question was, is this due to the positive influence of high confidence or the negative influence of low confidence, in that we find confident answers appealing or uncertain answers unappealing?

The hypothesis relating to choice was supported, in that the answers given by the high confidence speaker were chosen a majority of the time, replicating the findings from previous chapters. Here, the high confidence speaker's answers were chosen more than twice as frequently as those given by the medium confidence speaker, who in turn had their answers chosen twice as often as those given by the low confidence speaker. Hence there are marked differences in the influence of different levels of expressed confidence. Compared to when no cues were used, where no notable differences were seen in terms of choice, the addition of confidence cues resulted in an increase in the amount of times the high confidence speaker's answers were chosen, and decreases for the medium and to a greater extent low confidence speakers answers being chosen. Why then was there a shift towards confidently expressed answers, and away from those that were more uncertain?

Firstly, participants' accuracy was not a contributory factor to these shifts, as this remained at the chance level both in the presence and absence of confidence cues. Neither was participants' confidence. Although the addition of confidence cues led to increases in the confidence that participants had in their answers overall, this was not affected by the actual level of the speakers' confidence, and just the very presence of confidence cues of any level was enough to cause such increases.

How we perceive and interpret different levels of confidence is clearly a contributory factor to the extent of influence that different levels of confidence have on choice. Despite there being no improvement in participant's accuracy when cues were added, higher levels of speaker confidence were taken as indicating higher levels of speaker accuracy, an issue that will be returned to later. Furthermore, a speaker's confidence was taken as a cue to their level of knowledge and intelligence, competence and

professionalism as well as their trustworthiness, and the higher a speaker's level of confidence was, the more positively they were rated on these attributes. However, the only significant differences were those relating to the low confidence speaker, in that this speaker was seen as less trustworthy, intelligent, competent, knowledgeable, and professional than both the high and medium confidence speakers. The differences between these latter two speakers were not significant in any case, although the high confidence speaker was seen as being slightly less friendly than both of the other speakers. This latter result can be related to London, McSeveney, and Tropper's (1971) finding that expressing too much confidence can have a detrimental effect in terms of feelings of antagonism towards said speaker.

Besides the finding regarding perceived speaker friendliness, the other results relating to the perceptions of the speakers indicate that a greater distinction is made between the low confidence speaker and the more confident speakers, than between the high confidence speaker and the less confident speakers. This may indicate then that, in relation to how the speakers are perceived at least, there is a negative use of the confidence heuristic, as this is where the greater distinction on the basis of the speakers' confidence is seen. In other words, the low confidence speaker's confidence clearly marks them out as being (perceived as) the least knowledgeable speaker, for example, and hence their information may be discounted on this basis.

How does this relate, if at all, to the ratings of the speakers' likelihood of being correct? Recall that here the pattern of results was slightly different to those found in relation to choice, both in this experiment and in the previous experiments reported in this thesis. Whereas for choice there were shifts to the high confidence speaker's answers, away from the low confidence speaker's answers, with there being no change for medium confidence, the ratings of accuracy likelihood increased for both the high and medium confidence speakers, decreasing for the low confidence speaker when these confidence cues were added.

Does this mean that we do actually attend to all the information that we have available to us? It would seem so. The high confidence speaker's answers were rated as being most likely to be correct and so it is not surprising that this speaker's answers were chosen most often. However, consideration is given to all three speakers' answers, with some distinctions being made between them. If only the high confidence speaker's answers were attended to, one might expect this speaker to receive higher ratings than the other two who would both receive similar ratings because their answers do not need

to be especially considered as the objective had been reached, i.e. the most confident speaker had been found and so the others could be disregarded. However the medium and low confidence speakers' answers are attended to, with differences in ratings between these two speaker's reflecting their different levels of confidence.

The subsequent ratings indicated that the low confidence speaker's answers were not seen as being completely incorrect. Instead they were viewed as being fairly neutral, leaving open the possibility that that speaker may actually be in possession of the correct answer. The speaker is expressing low confidence in their given answer, suggesting that they think there may be a possibility that they are correct, rather than suggesting that they may be incorrect, as an overt expression of no confidence at all could convey. Hence, participants do not interpret this speaker's low confidence as indicating incorrectness, which would account for the lack of negative ratings relating to this speakers perceived accuracy likelihood. Yet the confidence with which they express their answer provides no useful information, still leaving the listener in receipt of that advice uncertain. Given these results and those relating to how this speaker was perceived, it may be that the general negativity towards this speaker led to their answers being discounted. In this case a listener would be left with a straightforward comparison between two options – the answers of the high and medium confidence speakers.

Whereas the accuracy likelihood ratings for the low confidence speaker decreased when confidence cues were added, they increased for the high *and* medium confidence speakers. Both of these speakers were viewed as having answers that were more likely to be correct than incorrect, although this was more so for the high confidence speaker. In fact they were both perceived fairly equally on all accounts, and the only significant difference between these two, besides that relating to friendliness which itself did not quite reach significance, was how accurate they were perceived as being overall. Here the high confidence speaker was seen as most accurate, more so than the medium and low confidence speakers, with the difference between the last two also being significant.

Limitations

Although this experiment introduced a rating scale to determine how participants' perceived the accuracy likelihood of each speaker's answer, the previous forced-choice method was also kept. This may however have had some influence upon participants' ratings of answers as they could have felt it necessary to justify their choice of answer,

by giving a much higher rating to their favoured choice than they may have given if a forced-choice was not also required.

The investigation of people's use of the confidence heuristic is also limited to three levels of differing confidence. To more fully consider this issue it would be useful to include a choice between a greater number of speakers. This would also allow consideration to be given to the use of the confidence heuristic when there is also some level of consensus between speakers. For example, participants' choice behaviour could be investigated where two or three medium or low confidence speakers in agreement, but one highly confident dissenting speaker.

Conclusions

What does the results tell us about people's use of the confidence heuristic? It is effortful to distinguish between all the information we are receiving but when making our decisions we need to first weight up all the available information. We look for easy ways of doing this to make life easier, and making decisions quicker. This is why we deploy the confidence heuristic. Yet is it a positive or negative use? It could be argued that it is both. Previous research has suggested that we may utilise a confidence heuristic strategy to identify the most confident group member (e.g. Sniezek and Buckley, 1995; Thomas and McFadyen, 1995; Zarnoth and Sniezek, 1997). However, the results from the present experiment indicate that we may also use the confidence heuristic in a negative sense to eliminate information that we deem to be of little use to us – in this case that offered by the low confidence speaker. We reach this conclusion on the basis of how we perceive the speakers, with this being the only speaker to significantly stand out from the rest. By doing so we have already simplified the decision-making process, cutting down our options from three to two. We may then use the confidence heuristic in a positive sense, searching for the information we believe to be most useful. By all accounts, the remaining two options are fairly equal. Both the high and medium confidence speakers are thought to be knowledgeable and so on. Yet it comes down to the most basic aspect of the confidence heuristic, that is the assumption that confidence equals accuracy. Whatever else we think of the speakers, we still view the high confidence speaker as more accurate than the others. Given the nature of the task, general knowledge questions, fundamentally an intellectual task, one on which there is a correct answer whether we know it or not, it is not surprising that perceived accuracy is the deciding factor. As previous research has noted, informational

influence is strongest on intellectual tasks, influence that is based on the belief that the information one is receiving is accurate, and confidence are a means by which this is transmitted (Thomas and McFadyen, 1995; Turner, 1991; Zarnoth and Sniezek, 1997). It would be interesting to see if similar results were obtained for a non-intellectual task.

The methodology used in this experiment allowed for participants' use of the confidence heuristic to be more fully explored through the use of a ratings system. As with the previous experiments reported in this thesis, the methodology involved making choices following a comparison being made between speakers and the level of confidence with which they expressed their answers. The results showed that people still favour answers given by a highly confidence speaker, but this does not mean that they totally dismiss other levels of confidence, with the results indicating that some consideration is given to all three speakers. However, we do not always consult more than one source when making decisions, and if we do it is not necessarily simultaneously. Therefore, it would be worthwhile considering the use of confidence heuristic, and what extent of influence is exerted by speakers expressing different levels of confidence, when such a comparison is not required. This issue is investigated further in Chapter 10.

CHAPTER 10

Influence of Confidence in Different Decision-Making Situations

The extent to which we are influenced by another person's advice, and confidence in that advice, may depend upon when that advice is received. 86 participants answered 60 two-alternative questions in one of two experimental decision-making conditions. In the Independent condition, participants answered the questions twice – once without advice and once with advice attached. In the Cued condition participants answered the questions once only, with advice attached. The advice was the same in both conditions and was in the form of a speaker's recommendation as to which answer was correct, and was accompanied by a high, medium or low confidence cue. The results showed that while advice was taken when expressed with any level of confidence level, the confidence heuristic was also employed, with the most confident speaker being seen as the most accurate, confident, knowledgeable and competent. In turn, this speaker's advice was followed the most frequently, and induced the highest confidence in the subsequent choices. A speaker's advice was followed to different degrees in the Independent and Cued conditions and it is suggested that situations that induce greater uncertainty make people more susceptible to the influence of another's confidence.

Influence of Confidence in Different Decision-Making Situations

When we are uncertain we may turn to other people for their opinions and advice, the expectation being that by doing so the quality of our judgments and decisions will improve, although in reality this strategy can be erroneous (Harvey and Fischer, 1997; Heath and Gonzalez, 1995; Sniezek and Buckley, 1995; Yaniv, 2004). Nevertheless, we do base many of our decisions on the information we have been provided by others, from lawyers and doctors to friends and family. In addition to improving decision accuracy, we may seek advice for reasons of self-presentation, in that advice may be sought to justify decisions, and to share responsibility for those decisions (Yaniv, 2004). However, the question can be asked, when is the best time to seek advice, or indeed give it? Should we seek it before we even attempt to answer a question, or should we make a tentative choice first and then seek help? And, if we are the advice giver when should we offer advice to maximise its impact?

When making a decision we have two sources of information available to us – internal and external (Sniezek and Buckley, 1995). If we attempt to solve a problem ourselves we are accessing internal information, or one's own knowledge concerning the task in hand. If we are seeking advice from others, then we are utilising external information, or another's knowledge. In the case of the latter situation, the information we receive may serve as a cue, directing us to an answer we may or may not have previously considered. Researchers studying overconfidence have shown that cueing makes people less accurate, but more confident in their choices, because it reduces information processing about the uncued alternative (Ronis and Yates, 1987; Sniezek, Paese, and Switzer, 1990). But what is the effect on our decisions when the cue comes from another person in the form of advice?

Sniezek and Buckley (1995) suggest that *when* we receive another's input, and thus when we are cued, is an important factor in the extent to which we are influenced by another person's advice. If we seek advice after we have tried to come up with a solution ourselves, then we will have already accessed our internal information, and may have come up with a tentative answer. We can then choose to use or ignore any subsequent advice received (external information). In other words, before being cued towards one of the alternatives, we will (probably) have considered the uncued alternative(s). Sniezek and Buckley class this as an independent decision-making condition. If, on the other hand, we receive or seek advice before we have even tried to

solve a problem ourselves, we have the opportunity to use information from internal and external sources. However this means we could forgo our own knowledge completely and just follow the information provided by another – we do not have to access internal information at all. In this case, we may attend only to the cue provided, although we could still consider the alternatives. This can be seen as a cued decision-making condition. In other situations we may have to make a decision blindly, having only external information to rely upon, for example when we have no knowledge in a particular domain. Here we rely heavily on the cues available to us, and are in a dependent decision-making condition.

A further factor that can affect the weight we place on the advice we receive, and thus whether we follow that advice or not, is how confidently it is expressed (Leippe, Manion, and Romanczyk, 1992; Sniezek and Van Swol, 2001; Thomas and McFayden, 1995; Zarnoth and Sniezek, 1997). The question can therefore be asked, what is the influence of confidence in these different decision making environments? Do we follow confidently expressed advice more, or less, when we have made an initial, albeit tentative decision, before receiving advice than we would do when we receive advice before making any decisions?

Taking decision-making environment into account, Sniezek and Buckley (1995) considered the effects of advisor confidence, cueing and cognitive conflict on choice accuracy and confidence within a Judge-Advisor System (JAS). They hypothesised that when advisors recommend answers to a judge (cueing), the judge will be influenced by those recommendations, choosing the consensus recommendation when the advisors are in agreement, but basing their choices on the advice of the most confident advisor when advisors do not agree (cognitive conflict).

Confirming previous research findings Sniezek and Buckley (1995) found that giving advice did influence the judges' choices, with the most confident source exerting the greatest influence. Under the no conflict condition, where the advisors' confidence was not necessarily a factor in the decision process, there was a strong tendency to choose the consensus recommendation across all three decision-making conditions (86.5% - 94.9%). Under advisor conflict, however, a 'confidence utilisation' strategy was employed, with the most confident recommendation being followed. Specifically, making a tentative choice prior to receiving advice, led to the most confident advisors' recommendation being followed on 63.1% of the final decisions (independent condition). Receiving advice prior to making any form of decision resulted in the most

confident advisor's recommendation being followed on 70.6% of occasions (cued condition). This difference in confidence utilisation between the two conditions neared significance ($p = .06$). Their most dominant finding relating to the influence of confidence was in the dependent condition, although this condition was the most artificial since choices were made on the answers alone because the actual accompanying questions were not provided. When the judge had to rely solely on another person's advice they followed the most confident advisor's recommendation 90.2% of the time. All three experimental conditions showed significant differences in choice behaviour from the control condition, where the same answers were chosen at the chance level (49%). However, the decision-making environment had no influence people's confidence in their choices, and advisor confidence had no bearing on judges' accuracy, with decisions based on advisor confidence being less accurate than decisions based on advisor consensus (58.4% vs. 66.6%)

The results indicate that when there is consensus amongst advisors, this will be the determining factor in the judges decision, whereas when conflicting advice is given, an advisor's confidence will be used as a way to distinguish between the alternatives. This is regardless of the decision-making condition, although when in time the advice is received does mediate the extent of this reliance on another's confidence. However, Sniezek and Buckley (1995) point out that the low validity of these judgements inhibits their value because the most confident advisor had only a modest chance of being more correct than less confident advisors.

So, is it worth seeking advice? Receiving advice, or being cued, can be detrimental to performance. While Sniezek and Buckley (1995) expected that conflicting recommendations would lead to greater consideration of the alternatives in an attempt to resolve conflict, this was not the case. They suggest that this may be because people see conflict as indicative of task difficulty, leading to a reliance on heuristics, specifically in this case the confidence heuristic. As the amount of information one can bring to a task decreases, the power of another person to influence and manipulate our choices via their confidence level increases.

Rationale for Experiment

Evidently, it appears that confidently expressed advice does exert a great deal of influence when we are uncertain. However, the extent of this influence can depend on the sources of information we access to help us make a decision, at what point we

receive advice, and whether we totally rely on the advice we receive, or still try and solve problems ourselves. Furthermore, whether advisors are in agreement or disagreement over their recommendations can determine the influence of confidence. As Snizek and Buckley (1995) found, when there is advisor consensus their level of confidence has little influence on judges' decisions, whereas when there is advisor conflict, an advisor's confidence will be used as a way to distinguish between the alternatives.

However, Snizek and Buckley's findings relate to advice received from multiple sources. When there is only one advice giver, do we still rely on their confidence to assess that information, and what is the implication for more uncertain speakers? This issue is investigated in this chapter. The previous experiments reported in this thesis have shown that the medium and low confidence speakers lose out when a highly confident speaker is present. But we do not always consult multiple sources for their advice, nor indeed do we do so simultaneously. Therefore, in addition to decision-making condition, this experiment also considers how we utilise the advice of people expressing different levels of confidence in the absence of such a comparison. In such a situation one would expect the available advice to be followed, regardless of the level of confidence with which that advice is expressed. Indeed, Snizek and Buckley found that the tendency to accept advice, when it was from agreeing advisors at least, was so strong that it was followed even when the advisors gave confidence assessments of .5, which indicated that their answer was just a guess. The question is, to what extent is advice expressed with different levels of confidence followed, and is this influenced by when in time we receive that advice?

The hypothesis of the experiment reported in this chapter is that the availability of advice, and more specifically a speakers' expression of confidence in that advice, will influence the choices people make. It is expected that any advice, regardless of how confidently it is expressed, will lead to an increase in the amount of times an answer is chosen, compared to when no advice is given. However, the higher a speaker's confidence level is, the more frequently their recommendations will be chosen. The extent to which people follow a speaker's advice is expected to depend upon the decision-making condition, and on the basis of previous research, it is expected that advice will be followed more in the cued than in the independent condition.

Method

Participants

86 undergraduate psychology students, recruited from the University of Wolverhampton's participant pool, took part in the study. Participants' ages ranged from 18 to 40 years ($M = 21.03$, $S.D. = 3.91$). Participants were randomly assigned to one of two experimental conditions, Independent ($n = 42$) or Cued ($n = 44$). Participants assigned to the independent condition also formed the control condition ($n = 42$).

Task Materials

The task consisted of a set of 60 two-alternative general knowledge questions, of which one was correct (A or B). The questions had not been used in any of the previous experiments reported in this thesis. Difficult questions were selected to encourage the need to utilise the advice offered. A pilot study conducted on 20 participants confirmed that the questions were of a sufficient difficulty level, with mean accuracy across the 60 two-alternative questions being no better than would be expected by chance ($M = 51.22\%$, $S.D. = 6.30$). Participants also perceived the questions to be difficult, with mean confidence in answers being only 35.74% ($S.D. = 22.76$).

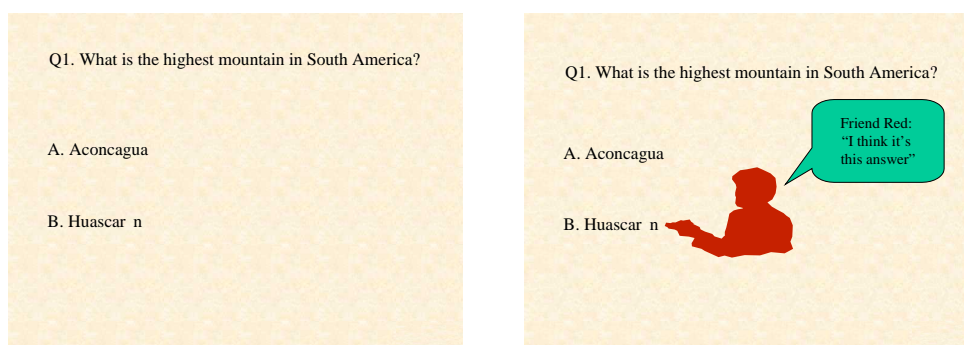


Figure 10.1. Example slides from the control and experimental conditions

In the main study there were two experimental conditions (Independent and Cued), which both used the same task materials, and one control condition. All task materials were presented on PowerPoint. Figure 10.1 shows an example slide from the experimental and control conditions. In the experimental conditions one of the two-alternative answers had a speaker's advice attached to it. The advice was in the form of a speaker's recommendation as to which answer was correct, and was accompanied by a

verbal confidence cue. Three speaker's offered advice, with one always expressing high confidence in their choice (Friend Blue), one medium confidence (Friend Red) and one low confidence (Friend Green), using cues developed in an earlier pilot study. Only one advisor gave advice on each question (as opposed to all three advisors/speakers giving an answer to each question in previous experiments), with all three advisors providing answers to an equal number of questions (20 each). Accuracy was kept constant across advisors, with each speaker recommending the correct answer on 50% of occasions. All three advisors also recommended answer A or B an equal amount of times. In the control condition, the answers to each question were not accompanied by any advice.

Design and Procedure

Two experimental conditions were used: Independent and Cued. In the Independent condition, participants first answered the questions without receiving any advice recommending answers, and then answered the same set of questions again, where the answers were this time accompanied by a speaker's advice. This means that the participant must first access their own knowledge (an internal source of information) before seeing information from an external source, which they can decide to use or ignore. The first administration of the questions in this condition also acts as a control condition that any shifts in choice in the two decision-making environments can be compared with. Snizek and Buckley (1995) point out that while this is not technically a control group, it does serve as a useful baseline measurement for subsequent choice behaviour in the experimental conditions. In the Cued condition, participants answered the questions once only, viewing the answers with advice attached. This means that participants have access to external information first, but again they can decide to use this or ignore it in favour of their own, internal information.

A 3 (Condition: Control; Cued; Independent) × 3 (Speaker Confidence: High; Medium; Low) mixed design was used, with repeated measures on speaker confidence. The dependent variables were; percentage of time each speaker's answers were chosen, participant's mean confidence in their answers, and their perceptions of each speaker.

All participants were tested in small groups, without interaction, with each participant facing a separate computer monitor. Upon arrival, participants were issued with a set of general instructions outlining the nature of the experiment and a booklet in which to record their answers. Once participants had consented to take part in the experiment they were directed to read specific instructions relating to the experimental

condition they were in, which were presented on the computer monitor. In the Independent condition, participants completed the task twice – before and after receiving ‘advice’. Participants in this condition were informed that there were two parts to the task. They were first asked to imagine that they were entering a quiz, which consisted of 60 general knowledge questions. They were told that their task was to decide which was the correct answer out of the two alternatives provided, only one of which was correct. Participants were asked to make their selection by circling the letter corresponding to their chosen answer (A or B) on their answer sheet provided, and indicate their confidence in that answer, on a 0 – 100 scale, where a score of 0 meant that they had no confidence at all in that answer being correct and 100 meant that they knew beyond doubt that the answer they had chosen was correct. Participants were instructed to answer each question in turn, and told not to return to any previous questions. Upon completion of the 60 questions, participants were asked to notify the experimenter that they had finished that section of the experiment.

The participants in the Independent condition were then given instructions regarding the second part of the task, which consisted of the same set of questions, this time with advice accompanying the answers. Participants assigned to the Cued condition only completed the task once, viewing the questions with advice attached, and so received the same set of instructions, as follows.

Imagine that you have entered a quiz with some friends: Friend Blue, Friend Green and Friend Red. The quiz consists of 60 general knowledge questions. You need to decide which is the correct answer out of the two alternatives provided, one of which is correct. On each question, one of your friends say which answer they think is correct - you can choose to take or ignore your friend’s advice. Pay attention to how each friend answers.

All remaining instructions regarding how indicate their choice of answer, and confidence in that answer, were as before. Upon completion of the second part of the task, participants were asked to answer a few further questions relating to their perceptions of the three speakers who had offered them advice. This post-experimental questionnaire asked for participants to estimate what percentage of questions they thought they had answered correctly, what percentage of questions they thought each speaker had answered correctly, as well as ratings, on a 11-point scale, of each speakers’ perceived confidence, knowledgeability, friendliness, competency and trustworthiness. Finally, participants were asked which of the three speakers they would choose as their team-mate if they were to enter another round of the competition.

Results

Influence of Speaker Confidence and Decision-Making Condition on Choice

A Speaker Confidence x Condition ANOVA was conducted to establish whether there were any differences in the influence of confidence as a result of when the speaker's advice was given. Table 10.1 shows the mean percentage of agreement with each speaker.

Table 10.1

Mean percentage agreement with each speaker

Condition	Speaker Confidence			Total
	High	Medium	Low	
Control	47.98 (10.36)	48.45 (9.14)	46.67 (9.08)	47.70 (4.87)
Independent	82.74 (14.36)	72.86 (16.75)	60.00 (19.29)	71.86 (14.29)
Cued	75.23 (20.94)	65.11 (18.47)	52.61 (17.78)	64.32 (16.18)

Note. Standard deviations in parentheses

There was a significant main effect of Condition on participants' choice of answer, $F(2, 125) = 38.99, p < .001$, indicating that participants relied on another person's advice to differing degrees depending on when they received that advice. In the Control condition, which acted a baseline for the experimental conditions, the answers, that in the experimental conditions had advice attached to them, were chosen 47.70% of the time (in the absence of advice). This result is as would be expected by chance alone, given that there were two alternative answers for each question, and hence a 50% selection rate for the answers would be expected. Planned comparisons, using independent measures t-tests, indicated that when 'advice' was offered, in terms of a speaker expressing some level of confidence in one of the two alternatives, significant increases were seen from the Control condition, indicating that participants took some of the advice offered to them. In the Independent condition, where participants had made an initial choice before receiving a speaker's 'advice', the speakers' recommendations were chosen on 71.86% of occasions, a significant 24.17% increase from the Control condition, $t(82) = 10.37, p < .001$. In the Cued condition, where participants had not made an initial choice before receiving the speakers' advice, speakers' recommendations were chosen on 64.32% of occasions, a significant 16.62%

increase from the Control condition, $t(84) = 6.38, p < .001$. The extent to which a speaker's advice was taken also differed significantly between the two experimental conditions, with the speakers' recommendations being chosen 7.55% more frequently in the Independent than the Cued conditions, $t(84) = 2.29, p = .003$.

A significant main effect of Speaker Confidence, $F(4, 250) = 61.60, p < .001$, and a Speaker Confidence \times Condition interaction indicated that the extent to which speakers' recommendations were taken depended on how confident they were in that advice and whether or not 'advice' was attached to the answers, $F(4, 250) = 12.71, p < .001$. Table 10.1 shows the mean percentage of agreement with each speaker in each condition.

In the Control condition no advice and confidence cues were given, but the questions were grouped together for analysis so that they corresponded to the questions given by the high, medium and low confidence speakers in the experimental conditions, and could act as a comparison level. In the Control condition each of the three speakers' answers were chosen equally often, all being around the chance level of 50% because the task was difficult, $F(2, 82) = .35, p = .70, \eta^2 = .009$, whereas in the Independent and Cued conditions differences were seen in the frequency with which the three speakers' advice was taken, $F(2, 82) = 44.41, p < .001, \eta^2 = .52$, and $F(2, 86) = 36.49, p < .001, \eta^2 = .46$, respectively. The manner in which participants took each speaker's advice followed a linear trend in both the Independent and Cued conditions, $F(1, 41) = 55.44, p < .001$ and $F(1, 43) = 48.93, p < .001$, with answers being chosen more often as a speaker's confidence increased.

Figure 10.2 shows the differences in the frequency with which each speaker's answers were chosen when they expressed their answers with confidence cues attached (Independent and Cued conditions) compared to when they did not use confidence cues (Control condition). All the scores are positive, indicating higher agreement with the answer when advice points to that answer than in the control condition. Answers expressed with high confidence were chosen 34.76% more frequently in the Independent condition, $t(82) = 12.72, p < .001$, and 27.25% more frequently in the Cued condition, $t(84) = 8.39, p < .001$, whereas answers expressed with medium confidence were chosen 24.40% more often in the Independent condition, $t(82) = 8.29, p < .001$, and 16.66% more often in the Cued condition, $t(84) = 5.26, p < .001$. Finally, answers expressed with low confidence were chosen 13.33% more frequently in the Independent condition, $t(82) = 4.05, p < .001$, and 5.95% more often in the Cued condition, although this difference was not significant, $t(84) = 1.74, p = .09$.

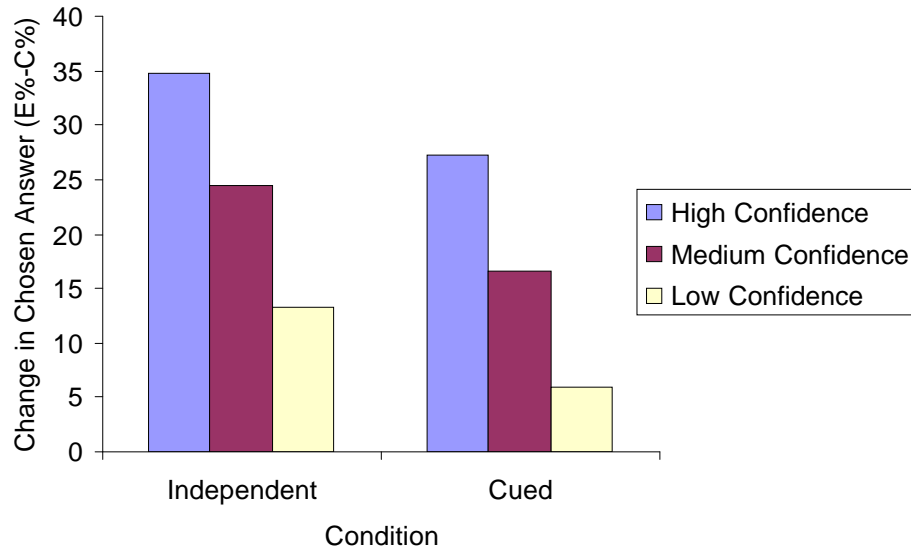


Figure 10.2. Changes in using different speaker's advice according to condition.

These results clearly indicate that the speaker's recommendations were used to differing extents depending on which experimental condition participants were in. Indeed, participants in the Independent condition followed the high confidence speakers advice 7.51% more frequently than those in the Cued condition, $t(84) = 2.10, p = .04$, and the medium confidence speakers advice 7.74% more frequently, $t(84) = 2.03, p = .04$. Although participants in the Independent condition followed the advice given by the low confidence speaker 7.39% more frequently than those in the Cued condition, this difference did not reach significance, $t(84) = 1.73, p = .09$.

Choice according to Speaker Accuracy

Each speaker gave the correct answer on 50% of occasions. Table 10.2 shows the percentage of times each speaker's recommendations were taken on the correct and incorrect answers. A Speaker Confidence \times Accuracy \times Condition ANOVA was conducted to see if there were any differences in the way in which advice was used on correct and incorrect answers. This revealed main effects of Speaker Confidence, $F(2, 250) = 61.60, p < .001$, Accuracy, $F(1, 125) = 5.12, p = .03$, and Condition, $F(1, 125) = 38.99, p < .001$, and a Speaker Confidence \times Condition interaction, $F(4, 250) = 12.71, p < .001$. However, there were no significant two-way interactions between Accuracy \times Condition, $F(2, 125) = .28, p = .76$, Speaker Confidence \times Accuracy, $F(2, 250) = 1.84, p = .16$, or a significant Speaker Confidence \times Accuracy \times Condition interaction, $F(4,$

250) = .20, $p = .94$. Therefore it appears that participants followed the speakers' recommendations regardless of the accuracy of their answers, with inaccuracies not being detected.

Table 10.2

Mean percentage of agreement with each speaker according to speaker accuracy

Condition	Speaker Confidence		
	High	Medium	Low
Control			
<i>Correct Answers</i>	50.00 (15.62)	49.52 (16.22)	48.57 (12.41)
<i>Incorrect Answers</i>	45.95 (17.12)	47.38 (12.26)	44.76 (16.11)
Independent			
<i>Correct Answers</i>	84.29 (16.25)	71.90 (19.66)	62.14 (21.59)
<i>Incorrect Answers</i>	81.19 (15.96)	73.81 (18.86)	57.86 (21.13)
Cued			
<i>Correct Answers</i>	77.27 (19.93)	64.32 (21.28)	53.86 (21.26)
<i>Incorrect Answers</i>	73.18 (21.22)	65.91 (19.92)	51.36 (22.27)

Note. Standard deviations in parentheses. In the control condition no advice, and thus no level of confidence, was given for either answer.

Accuracy

Following a speaker's advice, by choosing their recommended answers, did not lead to an improvement in participants' accuracy, with participants in neither the Control ($M = 51.75$, $S.D. = 7.21$), Independent ($M = 50.89$, $S.D. = 4.80$) or Cued ($M = 50.81$, $S.D. = 4.83$) condition showing accuracy levels any higher than would be expected by chance, $F(2, 125) = .35$, $p = .70$. This was to be expected since the higher confidence speakers were not in fact more accurate in this experiment.

Participants were however more accurate than they thought they were. In the experimental conditions, participants were asked to estimate the percentage of questions they thought they had answered correctly. Those in the Independent condition thought they had answered approximately one third of questions correctly ($M = 33.05\%$, $S.D. = 19.71\%$), whereas participants in the cued condition gave even more conservative estimates of their own accuracy ($M = 29.67\%$, $S.D. = 18.70\%$), although the difference between the two conditions was not significant, $t(82) = .81$, $p = .42$. In neither the

independent nor cued condition did the participants' estimates of their own accuracy bear any relationship with their actual accuracy, $r(40) = .22, p = .17$ and $r(44) = -.07, p = .65$.

Influence of Speaker Confidence and Condition on Confidence in Choice

A Speaker Confidence \times Condition ANOVA on participants' confidence in answers found no significant main effect of Condition, $F(2, 125) = 2.45, p = .09$, indicating that as a whole, participants' confidence in their chosen answers did not increase when advice was given. A main effect of Speaker Confidence, $F(2, 250) = 30.73, p < .001$, and a significant Speaker Confidence \times Condition interaction, indicates that participants' confidence in their chosen answers did vary depending on whether the answers had advice attached to them, and the level of confidence expressed in this advice, $F(4, 250) = 7.17, p < .001$. Separate ANOVAs on each condition were conducted to investigate this further.

2 Table 10.3

Mean confidence in chosen answers

Condition	Speaker Confidence			Total
	High	Medium	Low	
Control	38.91 (22.40)	37.73 (22.06)	38.65 (24.43)	38.43 (20.96)
Independent	54.69 (23.94)	45.53 (22.52)	39.58 (20.62)	46.60 (21.04)
Cued	55.18 (20.43)	45.57 (17.41)	38.62 (18.14)	46.46 (16.06)

Note. Standard deviations in parentheses

From the Control condition data in Table 10.3 it can be seen that answers chosen in the absence of advice, and hence confidence cues, resulted in equal levels of confidence in participants' chosen answers, $F(2, 82) = .12, p = .89, \eta^2 = .003$. Significant differences in participants' confidence in answers were seen in the Independent and Cued conditions, depending on which speaker's recommendation they were choosing, $F(2, 82) = 27.45, p < .001, \eta^2 = .40$ and $F(2, 86) = 22.05, p < .001, \eta^2 = .34$. In both the Independent and Cued conditions, participants' confidence in answers followed significant linear trends, $F(1, 41) = 35.44, p < .001$ and $F(1, 43) = 26.94, p < .001$. Planned comparison t-tests showed that in both the Independent and Cued conditions confidence was higher when following a high confidence rather than a medium

confidence speaker's advice, $t(41) = 4.70, p < .001$ and $t(43) = 4.09, p < .001$, a high confidence rather than a low confidence speaker's advice, $t(41) = 5.95, p < .001$ and $t(43) = 5.19, p < .001$, and a medium confidence rather than a low confidence speaker's advice, $t(41) = 3.82, p < .001$ and $t(43) = 3.93, p < .001$. Hence, the higher a speaker's confidence in their recommendation was, the more confident the participants were when choosing that answer.

Despite participants' confidence following a linear trend, significant increases in confidence between the two experimental conditions and the control group were only seen for high confidence answers, $F(2, 125) = 7.31, p = .001$. Here, the addition of high confidence cues increased participants' confidence in their answers by 15.78% in the Independent condition, $t(82) = 3.12, p = .003$, and by 16.25% in the Cued condition, $t(84) = 3.52, p = .001$. However, although participants were more confident in the Independent and Cued conditions than in the Control condition when choosing the medium confidence speaker's answers, this difference was not significant, $F(2, 125) = 2.01, p = .14$. Participants' confidence when choosing to agree with the low confidence speaker's answers was no different to their confidence in the same answers when no confidence cues were used, $F(2, 125) = .03, p = .97$. Figure 10.3 illustrates the changes in participants' confidence in answers from control to experimental conditions.

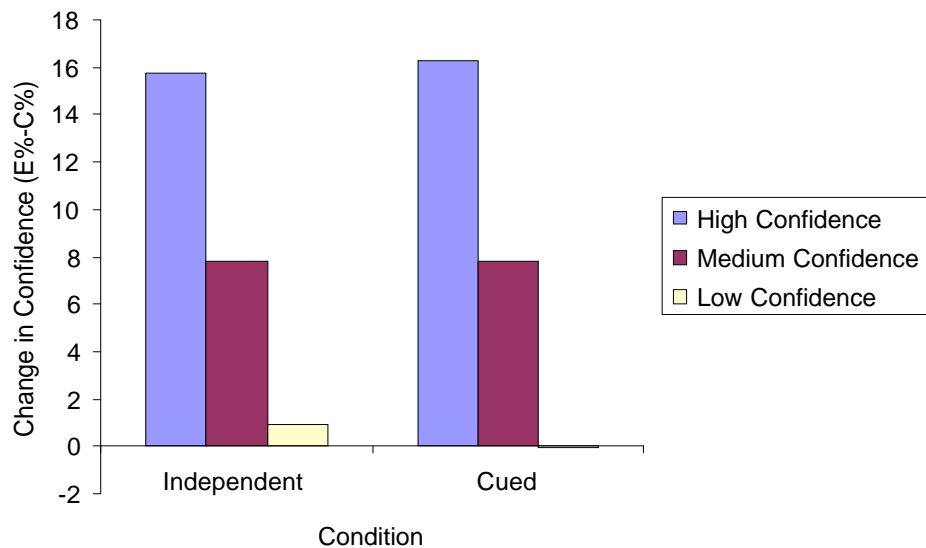


Figure 10.3. Change in confidence in answers according to speaker confidence and condition.

Influence of Confidence and Condition on Perceptions of Speakers

In the two experimental conditions, participants were asked a series of further questions relating to their perceptions of the speakers who had offered them advice on the general knowledge questions.

3

4 *Speaker Accuracy*

Participants had estimated what percentage of questions they thought each speaker (red, green and blue) had answered correctly. This was not done by the control group since there were no speakers in that condition. Table 10.4 shows that all estimates were lower than actual speaker accuracy (50%).

A Speaker Confidence \times Condition ANOVA revealed main effects of Speaker Confidence, $F(2, 164) = 19.69, p < .001$, and Condition, $F(1, 82) = 4.69, p = .03$, but no interaction between these two factors, $F(2, 164) = .48, p = .62$. Table 10.4 indicates that in both of the experimental conditions, participants perceived higher confidence to be associated with higher levels of accuracy, with the high confidence speaker being seen as the most accurate speaker and the low confidence speaker being seen as the least accurate speaker, even though all three speakers were actually equally accurate. The main effect of Condition shows that participants in the Independent condition estimated the speakers to be 7.66% more accurate overall than those in the Cued condition did ($M = 41.82\%$ vs. $M = 34.17\%$).

5 Table 10.4

Estimates of speaker accuracy

Condition	Speaker Confidence		
	High	Medium	Low
Independent	49.27 (26.65)	40.00 (19.47)	36.20 (16.48)
Cued	44.14 (26.48)	32.25 (17.83)	26.11 (16.44)
Total	46.58 (26.52)	35.94 (18.92)	30.92 (17.13)

Note. Standard deviations in parentheses

6 *Speaker Confidence, Knowledge, Friendliness, Competence and Trustworthiness*

To determine whether when participants received advice affected how they perceived the speakers, Speaker Confidence \times Condition ANOVAs were conducted on the interpersonal perception ratings given in the two experimental conditions (Table 10.5).

Table 10.5

Perceptions of Speakers split by Levels of Speaker Confidence

	Speaker Confidence		
	High	Medium	Low
Confidence			
<i>Independent</i>	6.85	5.02	4.43
<i>Cued</i>	6.88	5.14	4.09
<i>Total</i>	6.87	5.08	4.25
Knowledgeability			
<i>Independent</i>	6.48	4.80	4.93
<i>Cued</i>	6.09	5.02	4.25
<i>Total</i>	6.27	4.92	4.57
Friendliness			
<i>Independent</i>	5.62	5.69	5.62
<i>Cued</i>	6.39	6.16	6.09
<i>Total</i>	6.02	5.94	5.87
Competence			
<i>Independent</i>	6.18	5.26	4.89
<i>Cued</i>	6.18	5.16	4.70
<i>Total</i>	6.18	5.21	4.79
Trustworthiness			
<i>Independent</i>	5.25	5.13	4.97
<i>Cued</i>	5.48	4.34	4.80
<i>Total</i>	5.37	4.71	4.88

7

8 Main effects of Speaker Confidence were seen on participants' perceptions of each speaker's confidence, knowledgeability, and competency, $F(2, 162) = 25.28, p < .001$, $F(2, 164) = 14.71, p < .001$, and $F(2, 160) = 9.49, p < .001$. As can be seen from Table 9.5, in each case, a linear relationship was seen, so the higher a speaker's expressed confidence was, the more confident, knowledgeable and competent participants perceived the speaker as being, $F(1, 81) = 55.76, p < .001$, $F(1, 82) = 22.45, p < .001$, and $F(1, 80) = 17.18, p < .001$. The lack of any main effects of Condition, $F(1, 81) = .06, p = .80$, $F(1, 82) = .99, p = .32$, and $F(1, 80) = .11, p = .74$, or any Speaker

Confidence \times Condition interactions, $F(2, 162) = .20, p = .82, F(2, 164) = .95, p = .39,$ and $F(2, 160) = .04, p = .96,$ indicates that these patterns were consistent in both the Independent and Cued conditions. No significant main effects of Speaker Confidence or Condition were seen for ratings of speaker friendliness, $F(2, 162) = .21, p = .81$ and $F(1, 81) = 3.36, p = .07,$ and trustworthiness, $F(2, 164) = 2.52, p = .08$ and $F(1, 82) = .40, p = .53,$ and subsequently no interactions with Condition were observed, $F(2, 162) = .29, p = .75$ and $F(2, 164) = 1.51, p = .22 .$

9

10 *Team-Mate*

The extent to which participants chose each speaker as their team-mate was the same in both experimental conditions, $\chi^2 = .53, df = 2, p = .77.$ In both the independent and the cued conditions the high confidence speaker was the most popular choice of team-mate, being chosen by 51.3% of participants in the independent condition and 59.1% in the cued condition, followed by the medium (28.2% and 22.7%) and then low confidence speakers (20.5% and 18.2%), $\chi^2 = 6.00, df = 2, p = .50$ and $\chi^2 = 13.27, df = 2, p = .001.$

Summary of Results

Significant main effects of Condition and Speaker Confidence, and a Speaker Confidence \times Condition interaction indicated that the extent to which speakers' recommendations were taken depended on how confident they were in that advice and whether or not 'advice' was attached to the answers. Further analysis found no significant interactions with Accuracy, indicating that a speaker's accuracy had no bearing on whether or not their advice was taken.

In relation to the influence of confidence on confidence in answer, there was no significant main effect of Condition, but a main effect of Speaker Confidence, and a Speaker Confidence \times Condition interaction, indicated that participants' confidence in their chosen answers did vary depending on whether the answers had advice attached to them, and the level of confidence expressed in this advice.

The addition of confidence cues also had significant effects on participants' choice of team-mate and their perceptions of the speakers, in terms of how accurate, confident, knowledgeable, and competent they were viewed as being, but not on how friendly or trustworthy they were.

Discussion

The results of this experiment show that being in receipt of advice from a speaker significantly influences the choices people make in difficult MCQ general knowledge tests. In support of the hypotheses stated in the introduction of this chapter, the extent to which advice is followed depends on when that advice is received, and how confidently it is expressed. However, receiving advice, and subsequently following the given recommendations, does not improve the quality of the decisions made, when a speaker's confidence and accuracy are not related, in that decision accuracy constantly remains low whereas decision confidence can increase. In real life, however, confidence and accuracy may have some degree of correlation and thus following a more confident speaker may have some positive impact on accuracy. Future research could investigate the degree of relationship between speaker confidence and their accuracy and how this influences a listener's choices in different situations of varying difficulty.

As expected, making advice available led to shifts in participants' choice of answers, compared to when no advice was given, with the extent to which this advice was followed increasing as the speakers' confidence in their advice also increased. Advice expressed with high confidence was followed more than that expressed with a medium level of confidence, which in turn was followed more than that expressed with low confidence. However, unlike in previous experiments reported in this thesis, all levels of speaker confidence led to an increase in the extent to which that recommendation was followed, compared to when no advice was given. Reasons for this will be discussed more fully in the general discussion.

These results can be interpreted in relation to Sniezek and Buckley's (1995) findings. They found that when advice came from multiple sources, the tendency was to match the consensus opinion when all advisors agreed, but to use a 'confidence utilisation' strategy when the advisors did not agree. In the present experiment advice on each question came from one speaker only, and hence a comparison was not present, whereas in earlier chapters advice came from multiple sources and hence a comparison was necessary. Having a single advisor meant that there was not a situation where there was cognitive conflict or advisor consensus. However, advice coming from a lone speaker can be interpreted as a consensus opinion up to a point, in that it is the only opinion – especially when the decision-maker is uncertain or has no firm favourite amongst alternatives meaning that they are not in conflict with the speakers' recommendations.

This was certainly the case here. At best the participants' initial accuracy rates indicated that their choices were no more than guesses, and correspondingly their reported confidence in those initial (control) choices also showed high uncertainty. Owing to this uncertainty, a speaker's advice was followed even when that advice was expressed with lower levels of confidence. As mentioned previously, Sniezek and Buckley did find that advice was followed even when the advisor's confidence indicated they were relatively uncertain.

However, there is evidence to suggest that a confidence utilisation, or confidence heuristic strategy was used. Although advice expressed with all three levels of confidence was followed to a certain degree, the extent to which it was followed increased as the confidence in that advice increased. As a speaker's confidence increased, incremental increases in participants' confidence in their chosen answers was also seen, with choice confidence being higher when following a high confidence speaker's recommendation than it is when following a medium, and in turn low confidence speaker's answers, although taking advice from the latter two speakers did not significantly raise choice confidence from control levels. Furthermore, increasing levels of confidence led to a speaker being seen as more accurate, confident, knowledgeable and competent than a speaker expressing less confidence in their advice, indicating that the underlying assumptions of the confidence heuristic were being applied. Hence, although a comparison between speakers, and their confidence level, was not needed on individual questions, such a comparison evidently occurred overall.

Although it was hypothesised that advice, and a speakers' confidence in that advice, would have more of an influence on choice in the cued decision-making environment, where advice was received before any tentative choice had been made, than in the independent decision-making environment, where a tentative choice could have been made, the opposite pattern of results was found. A speakers' recommendation was chosen more often in the independent condition than in the cued condition, overall and for each of the three levels of speaker confidence.

It is suggested that the difference between the present findings and those of Sniezek and Buckley (1995) reported earlier may be due to task difficulty. The experiment reported in this chapter used difficult questions (with an initial mean accuracy rate of 51.75%), to maximise confidence heuristic use, whereas the questions used by Sniezek and Buckley may have been easier (average item difficulty was .6, ranging from .5 to .8, which indicates a fairly moderate difficulty question set). If this is the case, then

participants in Sniezek and Buckley's experiment may have found it easier to generate initial answers that they were confident, or at least fairly confident, in. This could have made them less susceptible, but not totally resistant, to the influence of another person, thus accounting for why a speaker's answer was followed less often in the independent than the cued condition. The opposite may have been true in the present experiment. Owing to the difficulty of the task, the participants in the independent condition could have had higher uncertainty. Indeed, in the present experiment initial confidence was just 38.43% compared to 70.4% in Sniezek and Buckley's experiment. This higher initial uncertainty may have made the participants more susceptible to the influence of another's advice and their expressed confidence in that advice. Since the participants in the independent condition had tried to come up with an answer in the absence of advice but found the task difficult, the difficulty of the task may have been more salient, hence increasing their uncertainty, and in turn increasing their need of advice to aid their decision. In other words, they abandoned their own knowledge for that of another, even though the quality of the two was no different, with it just being the expression of confidence that gave the advice the illusion of being of higher quality. This suggestion is lent weight by Sniezek and Van Swol's (2001) observation that pre-testing can lower a decision-makers' self-confidence. Low self-confidence can make people more likely to trust information from another source over their own knowledge (Lee and Moray, 1994; Sniezek and Van Swol, (2001). Participants in the cued task, while also finding the task difficult would not have encountered this initial uncertainty, perhaps because the task difficulty was less salient, making them slightly less susceptible to the influence of confidence. Thus, this may explain why in this case advice, in particular confidently expressed advice, was followed more in the independent than the cued condition. This explanation would fit in with the theories of Sniezek and Buckley (1995) and also Vissers et al. (2003), who suggest that social influence is mediated by subjective uncertainty, the more uncertain we are the more susceptible we are to being influenced.

Support for this explanation comes from the results relating to aspects of speaker and participant accuracy. It seems that speaker inaccuracies were not detected, highlighting the difficulty of the task. Advice that pointed towards wrong answers was chosen equally as often as that pointing towards correct answers. Given this finding it is not surprising that following a speaker's advice did not lead to an improvement in decision accuracy. Although actual accuracy was low, being no better than would be expected by chance, participants still underestimated their own accuracy, perhaps because of the

difficulty of the questions. Indeed, no relationship was found between actual accuracy and estimates of accuracy.

This discrepancy between actual accuracy and estimated accuracy may be because, as Snizek et al. (1990) suggest, confidence in a single item is determined differently to confidence in a set of items (where confidence is viewed in relation to performance, or accuracy). For a single item, confidence may be related to the relative amount of information one can generate in support of the chosen answer, whereas for a set of items, confidence in the proportion correct may depend on a judgment of the difficulty of the task, one's ability, effort, and so on. Hence, one can be very confident about a particular item, but not be confidence about the task as a whole.

Limitations

The present experiment did not include a true control condition for the independent or cued conditions, which would have involved advice being given without any confidence cues attached. On the basis of previous research (e.g. Harvey and Fischer, 1997), one would expect advice to be followed when it is present, even without any explicit expression of confidence being made in that advice. While it may have been interesting to take this into account, the purpose of the present experiment was to determine differences between how advice expressed with different levels of confidence is utilised, and the differences in how this confidence was utilised in the two decision-making environments. Therefore, the decision not to include a true control condition for each environment was considered justified.

In the present experiment the advice giver's confidence was not necessarily indicative of their accuracy, particularly so for the more confident speakers. Although in real-life this may not always be the case, this method was used so that people would not necessarily be agreeing with the most accurate speaker. Keeping accuracy constant across the three speakers means that a speaker's social influence is attributable to their level of expressed confidence rather than their accuracy level. This does however reflect many real-life situations, as a speaker's accuracy is only useful to a listener if they know an answer - in which case they would be less likely to seek advice – or have some way of verifying it. But, as Snizek and Van Swol (2001) point out, the answers to most real-world tasks cannot be instantly verified at the time, if at all. Nevertheless, future research could investigate the influence of different levels of confidence and accuracy.

Furthermore, as stated at the start of this discussion section, the results of this experiment relate to choice in relation to difficult questions. The ecological validity of this is discussed in the next chapter, the General Discussion, in relation to the experimental limitations of the thesis.

Conclusions

So when is the best time to seek, and give, advice? Our use of another person's advice can vary according to when we receive that advice. However, this may be due to the higher level of uncertainty that some decision-making environments induce rather than when we are actually given advice. Therefore, if seeking advice we should not let our own uncertainty prevail, as this causes us to doubt the knowledge that we do actually possess. As such we should avoid, or indeed not dwell, on situations that will increase uncertainty, and make us more susceptible to another's influence.

If we are giving advice on the other hand, and are motivated to have our advice accepted, perhaps because the desired outcome would be beneficial for ourselves, we should do so after we have encouraged the advice seeker to attempt a solution themselves. In this way we maximise their uncertainty and increase the chances of our advice being followed. When we do finally give the advice that is being sought, we should do so as confidently as we can. The extent to which we follow a speaker's advice is determined by our use of the confidence heuristic, in that we follow advice expressed with high confidence more than advice that is expressed with less confidence, and are in turn more confident in these choices. We also place a higher value on advice expressed with high confidence, viewing such a speaker as being more accurate, confident, knowledgeable and competent than less confident speakers. In using the confidence heuristic therefore we assume that a speaker's level of expressed confidence is indicative of the quality of their information, even when this is not the case.

CHAPTER 11

General Discussion

Discussion of findings

The aim of this thesis was to find out if confidence serves as an effective form of influence. It has shown that people do rely on a speaker's level of confidence as a way of making judgements and decisions – they use confidence heuristically. The extent to which the confidence heuristic is utilised by listeners has been investigated and some factors that mediate its use have been identified, along with some of the assumptions that listeners make about speakers on the basis of their expressed confidence. Such assumptions provide clues as to why people may feel that using the confidence heuristic is an effective strategy. A summary of the findings from the experiments that have been conducted as part of this thesis will follow, before turning to a discussion of these findings in relation to the confidence heuristic.

Throughout this thesis, although not necessarily simultaneously in each chapter, the influence of confidence has been considered in relation to three variables: its influence on choice, on confidence in those choices and upon interpersonal perceptions of the speakers. Furthermore, in terms of choice, the influence of confidence has been considered from two perspectives for much of this thesis: from changes in choice behaviour in the absence and presence of confidence cues, to the pattern of influence of different levels of confidence when confidence cues are available. In each case these variables have been investigated in relation to the influence of a speaker expressing high, medium, or low confidence. Previous research has tended to focus on the influence of confidence when it is communicated numerically (e.g. Price and Stone, 2004; Zarnoth and Sniezek, 1997). The research presented in this thesis instead gave consideration to the influence of verbal expressions of confidence, identified earlier (Chapters 1 and 2) as a more natural and common way of expressing our confidence/uncertainty. Additionally this was considered within an interactive decision-making environment, identified in the literature review as a way in which we make many decisions, and one that does not bring with it the complications of group decision-making. The results will be discussed firstly in relation to the influence of confidence on choice, encompassing its effects on confidence in choice (Chapters 3, 4, 7, 8, 9 and 10), followed by the results relating to the influence of confidence on interpersonal perceptions (Chapters 5 and 6, as well as relevant findings from all chapters).

Influence of confidence on choice

In terms of choice behaviour in the absence and presence of confidence cues, the general finding has shown shifts in listeners' answers from those given by a low confidence speaker towards those given by a high confidence speaker. Such choice shifts were found in Chapters 3, 4, 5, 8, 9, and 10, showing a linear relationship between a speaker's confidence level and the extent of influence that speaker has, where influence is a speaker's ability to get listeners to choose their answers, regardless of the accuracy of those answers (Sniezek and Buckley, 1995). So when a speaker has expressed confidence in their answers, listeners have been influenced most by a high confidence speaker, followed by a medium confidence speaker and hence, influenced least by a low confidence speaker. This pattern was found in Chapters 3, 4, 5, 7, 8, 9, and 10. Concurring with Zarnoth and Sniezek (1997) then, the social influence of confidence was found to be constant, in that high confidence exerts the most influence, yet it is not constant in the extent to which the same level of confidence exerts an influence on the different tasks. The magnitude of the choice shifts, and the differences in the extent to which speaker's expressing different levels of confidence influence listeners in their choice of answers has been found to depend on a number of different factors.

Chapter 3 looked at task type and the influence of confidence, following on from the suggestion that the extent of a speaker's influence is dependent upon the type of task being undertaken, in the extent to which a task is intellectual or judgmental (Laughlin and Ellis, 1986; Zarnoth and Sniezek, 1997). The results support this suggestion within a more ecological setting – verbal expressions in an interactive decision-making environment - than the influence of quantitative expressions in a group decision-making environment as used by Zarnoth and Sniezek (1997). In Chapter 3 three different tasks were used – one representing an intellectual task, one a judgmental task, and also an extremely judgmental task. A speaker's (high) confidence had the strongest effect on listener's choices on the external judgement task, a marginally less strong effect on the intellectual task, with the weakest effect of this speaker's confidence being seen on the judgmental task.

Chapter 4 indicated that there could be individual differences in the influence of confidence, specifically, a listener's Need for Closure – the general tendency to prefer certain to uncertain knowledge. People high in Need for Closure showed a far greater reliance on the high confidence speaker's answers, up to 94% on the external judgement

task, than people low in Need for Closure, who as a comparison chose the same speakers answers just 69% of the time on the same task. People who were low in Need for Closure on the other hand, whilst still influenced by the high confidence speaker the most, were not averse to choosing the answers given by the other two, less confident, speakers. For instance on the external judgement task, low Need for Closure individuals picked the medium confidence speaker's answers on 21% of occasions, compared to just 3% of high Need for Closure individuals.

The extreme judgmental task that was used in Chapters 3 and 4 was admittedly fairly abstract, particularly when compared to the other tasks used. Yet it achieved its purpose and sufficiently mimicked a situation where a listener could bring no prior knowledge, as with the intellectual task, or opinions, as with the judgmental task, and was totally reliant on the speaker's confidence level. Hence the task allowed for the influence of confidence to be considered in the absence of listener knowledge. Sniezek and Buckley (1995) created a similar situation, where listener knowledge was eliminated, by allowing listeners to view responses given by speakers but not allowing them to see the questions that had been asked in the first place, a situation the researchers admitted themselves was artificial, but achieved its purpose. It was felt that the task used in Chapters 3 and 4 did not appear quite so artificial, since it allowed listeners to seemingly have control over their choices given that they had more information available to them, i.e. being able to view the questions that generated the speakers' answers.

In Chapters 3 and 4 the listeners had no way of determining the accuracy of the answers they were given by the speakers. Difficult general knowledge questions were used in the intellectual task, and for many of the experiments reported in this thesis, as a way of maximising reliance on the answers given by the speakers and thus allowing for the influence of confidence to be considered. The difficulty of the tasks was confirmed via the listener's accuracy, which for the most part were no better than would be expected by chance, and so indicated that listener's answers (in the absence of confidence cues at least) were sheer guesswork (see Chapters 3, 4, 7, 9, and 10). At no point did the accuracy of a speaker have any bearing on the influence that speaker exerted upon the listener's choices or the accuracy of those choices. Hence it is safe to conclude that the level of influence seen was due to the speakers' confidence.

Chapter 7 asked what would happen to the influence of confidence when a listener was provided with feedback relating to a speaker's accuracy, given that we often

interact with people prior to seeking their advice and hence may become aware of any judgmental biases they have during this interaction. Price and Stone (2004) found that such information had little bearing on how speakers were perceived, and so it was asked if the same would be true when making choices on the basis of a speaker's recommendation. Chapter 7 showed that when feedback was available, giving listeners an indication of a speaker's accuracy, and in turn the appropriateness of their confidence, the influence of a speaker's confidence, particularly a high confidence speaker's influence, was greatly reduced to the extent that a high confidence speaker was no more influential than one expressing a medium level of confidence. Indeed, feedback had the most detrimental effect on the influence a high confidence speaker had, whereas it actually increased the level of influence exerted by the medium and low confidence speakers.

With the exception of Chapter 7, the results summarised so far relating to the influence of a speaker's confidence upon listeners' choices have shown that adding confidence cues to answers leads to choice shifts from the low to high confidence speaker's answers. However, this highlighted a number of methodological limitations and generated further issues that needed clarification. Firstly, whilst the choice shifts have been robust they obscure true shifts arising from the influence of confidence, in that Chapters 3, 4 and 5 considered choice shifts between a control group, who saw speakers' responses in the absence of confidence cues, and an experimental group, who saw speakers' responses with confidence cues attached. While there are a number of arguments for using such a methodology, in that it does not allow for task repetition to, a) lead to familiarity with the answers/task, and b) obscured the true intention of the experiment, it was nevertheless thought to be worthwhile giving this issue some further consideration, and so Chapter 8 adopted a within-subjects rather than a between-subjects design.

Chapter 8 again showed choice shifts from the low confidence speaker towards the high confidence speaker, resulting in a linear relationship between confidence and influence upon choice. However, the extent of these shifts was less pronounced than generally found in earlier experiments. This is potentially due to one of two reasons, or indeed both may contribute to this. Firstly, as opposed to just using difficult general knowledge questions, as in other chapters, a range of question difficulties were used. On the questions that participants found easier, as indicated by their initial level of confidence, there were only small choice shifts around the 3% – 4% margin, whereas

for more difficult questions this rose to 15% - 16%. This shift is much smaller than found in previous chapters where difficult general knowledge questions were used. Indeed, for the equivalent questions in Chapter 3 (the intellectual task) the shift towards the high confidence speaker's answers was almost 34%, shifting 16% and 18% from the medium and low confidence speakers. Given this difference on essentially the same task, it is unlikely that question difficulty is the only factor here that is mediating the influence of confidence. A second possibility relates to the choice processes engaged in, or that have been engaged in, when receiving a speaker's answers. In Chapter 8 participants were required to make an independent choice for all the questions before they saw the speaker's answers, and so participants were required to (possibly) change their answers from their initial choices after viewing a speaker's answer. This was not so in Chapters 3 and 4. Here participants had not chosen any initial answers, and their choices were made simultaneously with seeing a speaker's answers. This issue will be returned to shortly when discussing the results from Chapter 10.

A further issue that arose from the earlier experimental chapters was that of the pattern of choice shifts. It became apparent that one speaker's gain, the high confidence speaker's, was another speaker's loss, most notably the low confidence speaker's. This meant that the influence of a speaker's confidence seen until now could have been artificially inflated. Chapters 9 and 10 used methodologies to counteract this.

In Chapter 9 participants were required to rate each speaker's answer to each question indicating the likelihood of that answer being correct, prior to making a final choice. In terms of choice, the same pattern as previously reported emerged. However, in terms of how each speaker's answers were rated there was a different pattern. While still showing a linear relationship, from high to medium to low confidence in being rated as most likely to be correct, the changes in ratings when confidence cues were added showed gains for the high *and* medium confidence speakers, and a marginal, but non-significant decrease for the low confidence speaker. In retrospect perhaps the forced-choice method should not have been used in conjunction with the rating scales, as this may have led participants to give more weight to the overall choice process rather than weighing each response. Hence this may have obscured true responses. However, it can be asked whether it can automatically be assumed that ratings and final choices would be associated, and this notion provided the rationale for the said methodology used.

Snizek and Buckley (1995) have suggested that confidence is influence when there is conflict between advisors. In other words, when more than one person is offering advice, and these people all offer conflicting advice, it is the most confidently expressed advice that will be most influential. This has been found in the experiments reported in this thesis, yet they have brought with them the problem of one speaker's gain being another's loss. In Chapter 10 the issue of loss/gain was eliminated. In previous chapters participants had to choose their answer after comparing those suggested by three competing sources – the high, medium, and low confidence speakers. In Chapter 10, only one speaker recommended an answer to each question, with some being suggested by a high confidence speaker, some by a medium confidence speaker, and some by a low confidence speaker. Would confidence still exert influence here, where there is not conflicting advice? It seems so.

As in the previous experiments reported in this thesis, there was a linear relationship between confidence and influence in Chapter 10. However, unlike the previous experiments, where having to choose one answer after receiving different suggestions from three speakers resulted in gains for the high confidence speaker and losses for the low confidence speaker in terms of their answers being chosen, expressing confidence in answers, be it high, medium, or low, led to increases in the amount of time those speaker's answers were chosen, compared to when no level of confidence was stated.

The main focus of Chapter 10 however was to consider differences in the influence of confidence resulting from when a speaker's advice was received. As mentioned earlier, this is a further possibility that may contribute to differences in the extent of influence a speaker's confidence. Recall that in Chapter 8, participants made initial choices prior to seeing a speaker's answers, whereas in Chapters 3, 4, and 9, choices were made after seeing a speaker's answers. Snizek and Buckley (1995) suggest that *when* advice is received can affect the influence of confidence, finding that people who made initial choices were less susceptible to the influence of confidence than those who had not. The opposite pattern was found in Chapter 10, with people who had made their own initial choices independently of a speaker's advice being more influenced by the advice subsequently received from that speaker than those who did not make prior choices. Potential reasons for this difference will be discussed in the next section.

The results have clearly shown that confidence is an effective form of influence. Concurring with previous research, the higher a speaker's confidence is the greater their level of influence will be upon the decisions a listener opts in and/or out of, and hence a

decision-maker is more likely to accept or follow the recommendation of an advisor as that advisor's confidence increases (Gill, Swann, and Silvera, 1998; Lee, 2005; Leippe, Manion, and Romanczyk, 1992; Paese and Kinnaly, 1993; Pulford and Colman, 2005; Sniezek and Buckley, 1995; Sniezek and Van Swol, 2001). However the extent of this influence is not constant (Zarnoth and Sniezek, 1997). As we have seen, there appear to be individual differences, with some people being more susceptible to the influence of confidence than others (Chapter 4). Not surprisingly too, receiving feedback about a speaker's performance, and hence having clues to their judgmental biases also diminishes, if not quite eliminates, the influence of confidence (Chapter 7). However, there is also a more constant factor that emerged throughout the course the experiments - that of a speaker's own confidence level. Indeed it would appear that the influence of confidence is a two-way process.

Uncertainty and the influence of confidence

Why were people influenced by a speaker's confidence to different extremes? Chapters 3 and 8 indicated that the listener's own confidence is just as important in the influence process as a speaker's confidence is. In Chapter 3 it was suggested that differences in the influence of confidence between the three tasks were due to listeners' confidence on those tasks. With reference to the control groups, where no confidence cues were used, confidence was low on the intellective and external judgmental tasks, around 27% - 36%, whereas it was far higher on the judgmental task, being over 60%. In the case of the first two tasks this indicates that listeners were simply guessing, as these confidence levels are no more than would be expected by chance when having three options to choose from. Listeners' confidence on the judgmental task indicated that they felt far more confident here in being able to choose the best answer themselves. Not surprisingly, speaker confidence had the least influence on choice on this task. In fact, it became clear that the influence of a speaker's confidence increased as a listener's confidence decreased. Chapter 3 concluded that these differences in confidence reflect differences in the amount of information a listener can bring to a task. Participants could bring most information to the judgmental task, using their own opinions to help them in their decisions. On the intellective task far less information was brought by the listener - they could potentially use their own knowledge, but given the low accuracy rate, at the chance level, this is unlikely, although they may have thought they brought some knowledge to the task. On the external judgement task, where the

greatest influence of (high) confidence was demonstrated, listeners could not, or did not feel that they could, bring any useful information to help them in their choices, and hence their confidence was lowest here. This supports Sniezek and Buckley's (1995) suggestion that as the amount of information one can bring to a task decreases, the influence that other people have, via their expression of confidence, increases.

As it was clear that the listener's own uncertainty was important, this was investigated further. As previously pointed out, true shifts in choice and initial confidence could not be investigated in Chapter 3 owing to the use of a between-subjects design. Using a within-subjects design in Chapter 8 allowed for an investigation of how a listener's confidence mediated the influence of a speaker's confidence. This confirmed that the higher a listener's initial confidence was, i.e. their confidence in answers before seeing a speaker's answers, the less influence a speaker's subsequent confidence had, and in turn the lower the listener's initial confidence was the greater the speaker's influence was. This can be taken as support of Visser, Krosnick, and Simmons' (2003) observation that the more confident someone is in their information the less need they have to seek or attend to other information on that issue.

Sniezek and Buckley (1995) hypothesised that there may be differences in the extent to which we are influenced by a speaker's confidence resulting from the sources of information we utilise when making a choice - we can use our own information or that offered by someone else. Which source of information we use is said to depend on when we receive advice. If we make an initial choice before receiving advice (independent decision-making), we should be less influenced by that advice and how confidently expressed it is than when we have not made an initial decision (cued decision-making). This was not supported in Chapter 10, finding instead that a speaker's confidence exerted a (slightly) greater influence in situations where an initial decision had been made. Again this result may be due to the listener's own confidence. It was concluded in Chapter 10 that, given the nature of the task used - difficult general knowledge questions - higher uncertainty may have been induced in the independent decision-making situation as a result of attempting to tackle a difficult task alone, consequently leading to a greater need to rely on someone else's advice. This explanation for the differing extent of influence that a speaker's confidence exerted in Chapters 3, 4, 8 and 10 clearly supports previous suggestions that the greater one's initial uncertainty is, the more we are susceptible to the influence of another's confidence (Lee, 2005; Sniezek and Buckley, 1995, Visser et al., 2003).

Influence of confidence on confidence

The listener's own initial uncertainty clearly played a major part in the extent to which they were influenced by a speaker's confidence in their choices. Chapters 3, 4, 8, 9, and 10 also showed that the addition of confidence cues to a speaker's answer led to listeners having more confidence in their subsequent choices. As with the results for choice, the listener's own initial confidence had a bearing on the extent to which their confidence increased. In Chapters 3 and 8 confidence increased more after viewing a speaker's confidence when initial confidence was low, either owing to task type (Chapter 3), or question difficulty (Chapter 8). However, despite the larger increases in confidence when initially uncertain, these increases were not to such an extent that the subsequent increases led to final confidence being higher for the questions where there had been initial low confidence than those where initial confidence was higher. Quite possibly smaller increases in confidence, when there was high initial confidence, resulted from a ceiling effect occurring, and confidence could not increase to the same extent simply because it was so high anyway leaving little room for increase.

In Chapters 3, 4, 8, and 9 the increases in confidence were seen regardless of the level of confidence the speaker expressed – just expressing any confidence was sufficient to influence listeners in this way, whether the speaker had high, medium, or even low confidence in their answers. Regardless of the speaker's confidence, listener's confidence rose to similar amounts across all three speakers. However this was not the case in Chapter 10. Here confidence in answers only rose significantly from control group confidence when choosing the high or medium confidence speakers' answers. Furthermore, the increases in listener confidence were incremental reflecting the speakers' confidence level. Confidence was higher when agreeing with the high confidence speaker than when agreeing with the medium confidence speaker, and in turn the low confidence speaker (even though there was no increase from control confidence, independently there was a significant linear trend). What caused these differences? Recall that in Chapters 3, 4, 8, and 9, choices were made between answers expressed with high, medium, or low confidence, with high confidence having a considerable influence on choice, particularly in comparison with the influence of the other two speakers. In Chapter 10 such a comparison was not required, and listeners either chose the speaker's recommendations or they did not. It would seem that in the case of the latter, listener's own confidence was directly influenced by the speaker's level of confidence. Two potential reasons could explain why the earlier results showed

equivalent levels of speaker confidence regardless of who they were agreeing with. Firstly, confidence when choosing the answers of the lower confidence speaker could have been equivalent to that when choosing the high confidence speaker's answers because when listeners chose these more doubtfully recommended answers they did so believing they knew the correct answer anyway, independently of the speaker's recommendation. Hence they would have felt more confident on these questions anyway. Alternatively, it may be that incremental increases in confidence are not seen when there is a comparison because the act of comparing makes listeners more confident when choosing a medium or low confidence answer. Choosing a more uncertainly expressed answer means eliminating a confidently expressed one, and so if the confident option is considered incorrect a listener may feel entitled to be more confident in less certain answers.

Interpersonal perceptions of confidence

As noted in the review of the literature, research tends to either consider how confidence influences decisions/choices, or how it influences the way in which we perceive a speaker, generally in relation to speech style research. However, it is important to consider both of these issues, as the latter may give an indication as to why the former occurs. Chapters 5 and 6 focused on how speaker's expressing levels of confidence are perceived in an attempt to uncover people's reasons for relying on a speaker's confidence when making decisions. Consideration was also given to this issue in other chapters but was not the main aim of those chapters. However relevant/important results from these chapters will also be discussed here.

Given that researchers (e.g. Apple, Streeter, and Krauss, 1979; Erickson, Lind, Johnson, and O'Barr, 1978; Lind and O'Barr, 1978; Scherer, 1979) have identified two major dimensions of speech cues – relating to competence and likeability – the influence of a speaker's confidence in relation to these was considered. These variables were investigated via two methodologies, either a forced-choice for most/least (Chapters 3, 4, 6) or through the use of ratings scales (Chapters 3, 9 and 10). With the exception of Chapter 6, the results have been the same regardless of the methodology used. For most factors relating to speaker competence (e.g. competence, intelligence, knowledgeable, and professionalism), the higher a speaker's confidence was, the more positively they were viewed. In other words a confident speaker is seen as being competent and knowledgeable, whereas an uncertain speaker is not. The exception to

this has been where feedback about a speaker's performance has been made available (Chapter 6). Here both the high and medium confidence speakers are seen as competent and intelligent, but the low confidence speaker still remains the most negatively perceived speaker in these terms.

A speaker's confidence was also taken as being indicative of their accuracy level, with a high confidence speaker being seen as the most accurate, and a low confidence speaker as the least (Chapters 6, 9, and 10). However, listeners' perceptions of speaker accuracy did not correspond with the speakers' actual accuracy. In Chapter 6 listeners overestimated speaker accuracy, by 13% for the high confidence speaker, 8% for the medium confidence speaker and 3% for the low confidence speaker. Given that the actual accuracy rate for each speaker was the same, 33.33%, the estimate of 36% for the low confidence speaker's accuracy was actually the most realistic. What is surprising about these results is that listeners actually saw whether the speakers answered the questions correctly, and even though they were in principal aware that each speaker answered the same number of questions correctly, did not take this information into account when judging speaker accuracy. In Chapter 9 the high confidence speaker's accuracy was again overestimated, and the low confidence speaker's underestimated, with there being just a slight overestimate for the medium confidence speaker. Here listeners did not have any information regarding any of the speakers' true accuracy levels. In Chapter 10 the accuracy of all speakers was more or less underestimated, although higher confidence was still perceived to be associated with higher accuracy.

For factors relating to speaker likeability on the other hand (e.g. likeability and friendliness) the most confident speaker was viewed the most negatively, whether feedback was available (Chapter 6) or not (Chapters 3, 5 and 9). Overall, the high confidence speaker was considered to be the least likeable speaker. This was on a par with the low confidence speaker in Chapter 3, where the medium confidence speaker was the most liked, with the high confidence speaker being by far the least liked speaker when performance feedback was given in Chapter 6, where a non-significant result was gained for the most liked speaker. In Chapters 5 and 9 the high confidence speaker was seen as being the least friendly of the three speakers. However, other chapters found non-significant results for speaker likeability (Chapters 5 and 9) and speaker friendliness (Chapter 10).

Reasons for the mixed results may be due to the different methodologies used. Chapters 3 and 6 used forced-choice scales to investigate how the speakers were

perceived whereas Chapters 5 and 9 asked participants to rate the speakers. However, it is likely that the mixed results are due to the strength of this factor, as for the most part the significant results relating to people's perceptions of speaker likeability have only shown small effect sizes.

The competency results concur with those found in previous research relating to speaker confidence (Leippe, Manion, and Romanczyk, 1992; Price and Stone, 2004) and speech style (Carli, 1990; Carli, LaFleur, and Loeber, 1995; Erickson et al., 1978; Parton, Siltanen, Hosman, and Langrdnerfer, 2002), in that confidence is perceived more positively than uncertainty. The likeability results, although less consistent and not as pervasive as those relating to the competency dimension do provide support for previous research that has found too much confidence to be detrimental to how a speaker is viewed (London, McSeveney, and Tropper, 1971; Pulford, 2002; Zarnoth and Sniezek, 2002). Indeed, in Chapter 7 many listeners (44% when feedback was given and 18% when it was not) said they did not choose the high confidence speaker as a teammate because they (correctly) thought that speaker was overconfident.

The confidence heuristic

The summary of the results has shown that there is a general tendency for people to base the majority of their choices on the advice/recommendation of the most confident speaker. The higher a speaker's confidence, the more frequently their recommendation was chosen. It was hypothesised at the end of the literature review that this was because people utilise a confidence heuristic, taking a speaker's confidence as a cue to their accuracy, competence, and knowledge (Price and Stone, 2004; Thomas and McFadyen, 1995). This notion was supported with the finding that the more confidence a speaker expressed the more accurate (Chapters 6, 9, and 10), competent, and knowledgeable (Chapters 3, 4, 5, 9, and 10) they were perceived as being, as well as being rated highly on other factors relating to competency. The results also indicate that this is considered a valid basis on which to base one's choices, supporting Thomas and McFadyen's (1995) model which suggests that the confidence heuristic is used in situations where a 'best' choice cannot be directly communicated, but is instead signalled via a speaker's confidence. Hence decisions are made following a simple comparison of the confidence with which information relevant to that decision is presented. Given that participants' perceptions of speakers and their choice of answers all generally followed a linear relationship, increasing from low to medium to high confidence, it certainly seems that

people do compare the speakers' confidence levels before making their judgements and decisions. We take a speaker's confidence as a way of validating the information they are supplying us with, and so it would seem, as suggested by Thomas and McFadyen, that confidence is a means by which informational influence is transmitted.

Models of persuasion, such as the Heuristic-Systematic Model (e.g. Chaiken, 1980; Chaiken, Liberman, and Eagly, 1989) and the Heuristic-Systematic Model (Petty and Cacioppo, 1986) state that people engage in either systematic/central processing, whereby a message's arguments are evaluated, or in heuristic/peripheral processing, whereby the surface qualities of a message are attended to. Given that people place more weight on the confidence with which an answer is expressed than the accuracy of that answer, even when feedback is made available (e.g. Chapter 7), this would suggest that people assume confidence to be an indicator of accuracy, and hence use confidence heuristically. If people do use confidence to equate accuracy, then this indicates that they are using a speaker's confidence to provide them with information, as suggested by Thomas and McFayden. Therefore, if confidence is a means by which informational influence is transmitted then suggests that confidence acts as a peripheral cue.

Thomas and McFadyen (1995) asked whether we can assume that the confidence heuristic is a general cognitive heuristic, or whether there are gender or other information-irrelevant differences in how speakers are perceived. Similar to the results of Price and Stone (2004), no evidence was found in this thesis to support the notion of gender differences in confidence heuristic use (Chapter 5; but see Pulford, 2002). Individual differences in peoples' use of the confidence heuristic were found in relation to Need for Closure (Chapter 4), but this was still in keeping with the notion that the confidence heuristic is a general cognitive heuristic. Need for Closure mediated the extent to which the confidence heuristic was relied upon, but not the way in which it was used, with high confidence exerting the most influence regardless of a listener's Need for Closure.

As suggested in the review of the literature, it is important to take into account such contextual factors as a listener's awareness of a speaker's tendency to judgmental biases (Fox and Irwin, 1998). The confidence heuristic is prone to error, as with other heuristics, which can result in an inefficient exchange of information (Thomas and McFadyen, 1995; Tversky and Kahneman, 1974). This was the case here. With the possible exception of the low confidence speaker, the speakers expressed inappropriate levels of confidence relevant to their information. Nevertheless, listeners still based

their choices on the speaker's confidence, even when there was evidence to the contrary. For instance, when accuracy information was provided in the form of feedback in Chapters 6 and 7, some evidence of confidence heuristic utilisation was seen, and a speaker's confidence was still taken as indicative of a speaker's accuracy. This would support the notion that the social influence of confidence is greater than the social influence of accuracy (Zarnoth and Sniezek, 1997). Although there was an inefficient exchange of information, a speaker's confidence remained an effective form of influence, giving speakers the ability to influence listeners in their choice of answer, irrespective of their actual accuracy (Sniezek and Buckley, 1995).

However, this is not to say that we are indiscriminate consumers of a speaker's confidence (Paese and Kinnaly, 1993). There is evidence to suggest that repeatedly expressing too much confidence could be detrimental in the long run, as predicted by Thomas and McFadyen's model of the confidence heuristic, given that the high confidence speaker, although seen as competent, was not liked particularly. This was seen in both the presence and absence of accuracy feedback (Chapters 3, 5, 6 and 9) and would indicate that people may have had suspected the high confidence speaker's tendency to judgmental biases at least. Nevertheless, as noted in Chapter 5, while this latter finding could be detrimental in the long run to a speaker who wishes to have their advice taken/recommendations followed in future interactions, in the short-term it does not undermine their effectiveness. Not liking a speaker may not particularly deter us from taking their advice, especially comparing it to other sources of advice, but it may stop us from opting to co-operate with them, or choosing them to help us in a task that requires co-operation.

It may not be that everyone picks up on the speaker's biases though, and contrary to Price and Stone's (2004) suggestion that the confidence heuristic is used in the same way by all people when it comes to discriminating between speakers, this may not be strictly the case. Perhaps some people do try and attend to all the information that is available, whereas others simply identify the most confident speaker and stick with this option regardless of the information that may be disregarded in doing so. Evidence for this suggestion comes from looking at how people's choice of team-mate relates to their perceptions of the speakers (Chapter 6) and to the choices they make (Chapter 7) when information relating to a speaker's accuracy was given.

Some people appear to be highly reliant on the confidence heuristic in its most basic sense. These people prefer the most confident speaker, at least in terms of their team-

mate, follow this speaker's recommendations a majority of the time, and give little consideration to other differentiating information that is available. In other words, they identified the most confident speaker and gave little regard to the other speakers. But for others, specifically those opting for the medium confidence speaker, more effort appears to be given to discriminating between speakers in an attempt to make better quality decisions. These people do not see the other two speakers equally – they simply dislike and mistrust the high confidence speaker. Perhaps these people realise that this speaker's confidence is frequently unjustified. Yet despite this they are not totally resistant to the influence of this speaker's confidence. Admittedly they are not as reliant on it as those who choose the high confidence speaker as their team-mate, but they do not totally discount it either, even though they have picked up on the judgmental biases of the speaker. Furthermore, they still do not consider the low confidence speaker as an option. This would indicate that, despite their best efforts, confidence is still a powerful form of influence over these people, for although the low confidence speaker is generally the most well-calibrated, this is ignored purely it seems on the basis of their confidence. But this would make sense. After all, why would we opt for the alternative that is no more confident, or even less so, than we are ourselves?

Thomas and McFadyen (1995) presented a game-theoretical model of the confidence heuristic whereby two people co-operate to reach a mutually beneficial outcome. In such situations it pays to appropriately express one's confidence relative to one's knowledge. However, we are not always working towards a common goal. Price and Stone (2004) considered the confidence heuristic within a more interactive decision-making environment, whereby an individual assesses information provided by advisors. In this situation advisors are essentially competing to have their stance accepted by the decision-maker and may be motivated to misrepresent their confidence to achieve this. The common thread between these two models is that information provided by two speakers is being weighed up and assessed. But as Thomas and McFadyen note, it would be interesting to consider how the confidence heuristic works when there are more people involved who have conflicting interests. From their perspective this would involve group decision-making where the aim is still to reach a consensus. However, as stated previously, group decision-making brings with it other factors that may hide true choice preferences, and it is more common in daily life to make decisions interactively.

This thesis considered if and how the confidence heuristic was used when we have more than two speakers expressing different levels of confidence offering advice to a

single decision-maker. It was found that the confidence heuristic is still utilised even when the task involves more than a simple comparison of a confident speaker against a more tentative speaker. But are we still just searching to identify the most confident speaker, as the confidence heuristic would predict (Thomas and McFadyen, 1995)?

The more sources of information we have available to us, the more cognitively demanding the task becomes. To simply apply a confidence heuristic to identify the most confident speaker and follow this person's advice means we are discounting more potentially useful information. It is possible that we use the confidence heuristic in reverse too, as suggested in Chapter 9, whereby we identify the *least* confident speaker to simplify our decisions, eliminating information we deem to be useless, based on how we perceive the speaker. Although this speaker was actually the most well-calibrated speaker in the experiments, they were viewed overall the most negatively (Chapters 3, 5, 6, 9, and 10). Hence, we believe that this speaker has very little useful information to offer us and so discount them. Heuristics are about simplifying our cognitive processes, and already we have simplified matters and are now left with a choice between two speakers. We can now apply the confidence heuristic in a positive way, searching for the information we feel is most useful to us based on a comparison of a speaker's confidence and identify the *most* confident speaker (Price and Stone, 2004; Thomas and McFadyen, 1995). Whether this would occur when there are multiple speakers, more than the three used here in an interactive decision-making environment, would be worth considering in future. This would also allow an investigation of the confidence heuristic when faced with a broader range of confidence expressions, rather than just the two levels used in previous research or the three levels used throughout this thesis.

Using an interactive decision-making environment to test the confidence heuristic brings with it another factor, that of the individual decision-maker's own confidence. This was not an issue in Price and Stone's (2004) experiments, which took place within a similar environment to those used in this thesis, as their task involved an individual's assessment of the advisors, in terms of how they perceived them on the basis of their confidence level, rather than having to make choices on the same basis. In the latter context an individual's own confidence is certainly a factor and raises two possibilities. Firstly, confidence heuristic use is mediated by one's own confidence. Here, the greater our own uncertainty is the more we are susceptible to the social influence of others, making us in turn more reliant on the confidence heuristic (Chapters 3, 8, and 10). In some situations uncertainty is greater than in others, specifically as the amount of

information we can bring to a task decreases. Indeed, some situations foster greater reliance on the confidence heuristic because they induce greater uncertainty in the listener. This may be due to the type of the task (Chapter 3), the difficulty of the task (Chapter 8), or the situation in which we are making our decisions (Chapter 10).

However, there is a second possibility. The explanation above would suggest that we only use the confidence heuristic when we are uncertain, but this may not be strictly true. This is not to say that we use the confidence heuristic when totally certain. In such (rare) situations, we are unlikely to seek the advice of others. But there is frequently that element of doubt, and we may seek advice to eliminate this. Here we may use the confidence heuristic, weighing up our own confidence against that of another. Just because we seek advice, this does not mean that we have to take it. When a speaker's confidence outweighs our own we may take their advice, but when our confidence is equal to or greater than a speaker's is, we trust our own opinions. It is far easier to verify exactly how confident you feel yourself than how confident someone else feels. Hence we are still using the confidence heuristic, comparing the confidence with which information is held – in this case ours against theirs.

So is the confidence heuristic a general cognitive heuristic? Evidence has been found for people using a confidence heuristic, not only in their choices but also in the way in which they perceive speakers. A speaker's confidence is used as a way of discriminating between the sources of information we are receiving, and determining the quality of that information, rightly or not. Hence, it would seem that to a certain extent, it is a general cognitive heuristic. In different situations and by different people it may be relied upon more or less, but the basic principle is still the same – confidence is power, and so the most confident option prevails. Yet the extent to which it is used is mediated by contextual factors, such as individual differences, task type, and an awareness of a speaker's judgmental biases.

Nonverbal communication of confidence

It was noted in the literature review that confidence can be communicated nonverbally as well as verbally. Although beyond the scope of this thesis, it is certainly an area worthy of further investigation, particularly given that nonverbally expressed confidence has previously been shown to enhance persuasion (London, 1973). Indeed, Kimble and Seidel (1991) suggest that listeners are more likely to be convinced by

nonverbal signs of confidence than by verbal expressions of confidence, as overt indications of confidence are sometimes mistrusted.

What then are the nonverbal signs of confidence? Kimble and Seidel (1991) suggest that they may be defined as those that indicate composure or a lack of nervousness or anxiety. Research has shown that confidence, in comparison to uncertainty, may manifest itself in nonverbal behaviours such as direct eye contact, longer glances and more decisive gestures, such as pointing or head nodding (Brinol and Petty, 2003; Manusov and Trees, 2002; Timney and London, 1973; Walker, 1977). Confidence may also be expressed via nonverbal aspects of speech, with a confident speaker speaking quicker, with great energy (i.e. strong, loud voice), greater pitch variation (i.e. expressive intonation) and shorter pauses, than an uncertain speaker (Apple, Streeter, and Krauss, 1979; Brennan and Williams, 1995; Erickson, Lind, Johnson, and O'Barr, 1978; Kimble and Seidel, 1991; London, Meldman, and Lanckton, 1970; Mehrabian and Williams, 1969; Miller, Maruyama, Beaber, and Valone, 1976; Moore, Harris, and Patriquin, 1993; Scherer, London, and Wolf, 1973; Smith and Clark, 1993; Walker, 1977). Future research should take the nonverbal communication of confidence into account, investigating the influence of confidence using different modes of communication, in addition to the written mode used in this thesis. It would be interesting to see how the confidence heuristic is used when this additional information is made available as different communication modalities bring with them additional cues to which a listener can attend, cues that may diminish or enhance other cues thus making a speaker's verbal expression of confidence more, or less, salient to a listener (Chaiken and Eagly, 1976; Sniezek and Van Swol, 2001).

Age differences

Another related area worthy of further research would be an investigation of age differences in the influence of confidence/use of the confidence heuristic. Children's understanding of belief terms, such as know and think, as modulators of certainty develops around the ages of four to six years old (Moore, Pure, and Furrow, 1990; Moore, Harris, and Patriquin, 1993; Olson and Astington, 1993). Moore, Harris, and Patriquin (1993) found that young children use cues to evaluate the reliability of the information that they are receiving. Specifically, prosodic cues to a speaker's confidence were used, with children as young as five being able to interpret falling intonation as indicating greater certainty than rising intonation. It is suggested that

children of this age judge a speaker's confidence according to verbal cues when these are clear, with prosody serving to modulate the interpretation of these cues. However when there is ambiguity, the prosodic cues may be used in place of the verbal cues as indicators of a speaker's certainty.

Age differences in the influence of confidence have also been found later on in life. For example, Feezel (1974) found that college students were more willing to accept internal expressions of confidence (e.g. *I know, I believe*) than high school students. However, Whittaker and Meade (1967) found that the extent to which someone was persuaded decreased as their age increased. Future research could focus on identifying at what age people develop the rule of the confidence heuristic, and if people's use of it changes as they get older.

Further Research

In addition to the areas identified above that may benefit from additional investigation, a number of suggestions for further research have been made throughout this thesis. Whilst some of these have been addressed in subsequent chapters of this thesis, the main points of remaining suggestions are summarised below.

Throughout the experiments reported in this thesis, speaker accuracy has been kept constant across all three speakers. As discussed later on, in relation to experimental limitations, in the context of the research presented within this thesis this method was considered necessary and justified. In real-life a speaker's confidence may be more corresponding to their accuracy than was presented here (however, see section on applications of research for potential exceptions to this in relation to eyewitness confidence). For this reason further research should consider the influence of confidence across a range of accuracy levels. It would be beneficial to compare the influence of confidence in situations where confidence equals accuracy against those in which it does not, allowing the relative influence of these two factors (confidence and accuracy) to be considered.

Within this discussion chapter it has clearly been identified that one's own confidence is an important determinant of the influence that another person's confidence will have upon our judgements and decisions. Further research should explore this issue in more detail to identify exactly what the nature of the own/other's confidence interaction is, and what factors may affect this. The context in which a speaker is seeking advice or being given information may be important here.

It has been acknowledged that the context in which a speaker is communicating their confidence, and for what purpose, needs to be taken into account. Different decision-making environments may highlight a greater, or a lesser, need to rely on a speaker's confidence by which to evaluate their information. The importance of the task being completed, or the decision that is required to be made, may have a significant influence upon the influence of speaker's confidence. One would hope that a listener engages in more systematic processing of information, thus relying less on speaker confidence, when making an important decision, such as whether the person on trial is guilty, than when answering general knowledge questions. However, more systematic processing may also be seen in the case of general knowledge questions, such as when motivation is high. For example, if entering a pub quiz where the prize is £100 for the winning team, the team members are going to be far more motivated to generate correct answers, and so should engage in more systematic, and less heuristic processing of information, than if no rewards for being correct are offered. Thus, when motivation for being correct is increased more effort should be given in such a situation to identifying the correct answer than to identifying the most confidently expressed answer.

Further research should also investigate issues surrounding the source of information. Preliminary consideration was given to this in Chapter 5, where the influence of a speaker's and listener's gender was considered. It would be worthwhile extending this line of research to also further consider who the speaker/listener is in terms of their status, age, experience and profession. A brief discussion of this, in relation to Doctor-Patient communication can be found in the section on applications of research.

Experimental limitations

The situations in which the influence of confidence has been investigated in this thesis, and hence those in which the confidence heuristic have been found to be applied, have been limited to multiple-choice tests. Previous research has found that individual's confidence may be sensitive to the question format used, with confidence on open-ended questions being more predictive of accuracy than on multiple-choice questions (Koehler, 1994; Pallier, Wilkinsons, Danthier, Kleitman, Knezevic, Stankov, and Roberts, 2002). This may be because MCQs evoke a bias that causes individuals to neglect the alternatives to the focal hypothesis, in that they may be less likely to consider why a chosen response is incorrect, whereas open-ended questions provide more opportunity to consider alternatives. However, this was the intention of the

research reported in this thesis – to see if a speaker’s confidence biased listeners in their choice of answers, and hence the use of MCQs was necessary in the current context. As Koriat, Lichtenstein, and Fischhoff (1980) suggest, when making a choice our information search is directed toward evidence supporting a preferred alternative. The aim of this thesis was to discover if people used a speaker’s confidence as such evidence. Clearly they did.

For a majority of this thesis the MCQs have been limited to difficult general knowledge questions, used to maximise confidence heuristic use (but see Chapters 3, 4, 5 and 8 for exceptions to this). It has already been shown that the influence of confidence is mediated by the type of task used (Chapter 3; Zarnoth and Sniezek, 1997). However, while general knowledge questions are theoretically intellectual tasks, Zarnoth and Sniezek (1997) point out that a task outside one’s knowledge domain may involve a judgement, as noted in Chapter 3. Furthermore as Sniezek and Van Swol (2001) note, most real-life tasks do not have a demonstrably correct answer that can be proven at the time of interaction, and so many tasks are not straightforward intellectual ones, as those used in this thesis. Hence, the findings can be extrapolated to other types of task to a certain extent. Additionally, the intention of this thesis was to see if confidence was an effective form of influence, regardless of the speakers’ accuracy, following Sniezek and Buckley (1995). A speaker’s accuracy is only useful as a way of determining the quality of a speaker’s information if we can prove that accuracy. Hence the tasks used in this thesis were designed to maximise reliance on a speaker’s confidence as way of differentiating between alternative sources of information, and sufficiently fulfilled this role. Given that an empirical investigation of confidence heuristic has not been done before, as Thomas and McFadyen did not test their theoretical model, the use of difficult MCQs allowed for specific questions to be asked to test the assumptions of the confidence heuristic. Nevertheless future research should consider the influence of confidence in a wider context, as this research can be applied to many real-life situations.

Applications of research

Besides the communication of general knowledge and opinions, confidence is taken as indicative of accuracy in other realms, such as eyewitness testimony (see Wells and Murray, 1984 for a review). As was noted in the literature review, decisions based on a speaker’s confidence can have far more serious consequences here, and many

miscarriages of justice have resulted from the testimonies of extremely confident, but mistaken, eyewitnesses (Wells et al., 1998).

Leippe, Manion, and Romanczyk (1992) considered the role of confidence in relation to eyewitness persuasion. Their general finding was that people over-used expressions of confidence on which to base their judgements, supporting the notion that in the absence of any other differentiating information, the more confident one is the more influence they exert. The fact that jurors often rely on the confidence of a witness as being a predictor of accuracy has been found by others too (e.g. Bothwell and Jalil, 1992; Penrod and Cutler, 1995). It would therefore be useful to train juries to be cautious of a witness's confidence. On the other hand, witnesses are taught to use effective testimony delivery skills, both verbal and nonverbal, prior to the trial so that they appear both credible and persuasive (Boccaccini, 2002). Hence a person taking the witness stand could be given coaching in how to appear more confident and thus increase their chances of a jury believing them. Hopefully this would be applied to those people who may not come across as appropriately confident for reasons such as their predisposition to a lack of self-confidence, rather than because they are not being truthful. However, as Marshall (1995) warns, while a witness in a trial must convey a certain sense of confidence in their abilities and actions to the jury, an arrogant witness is the one most likely to be quickly discounted by the jurors.

There is also a need for a better understanding of the communication and influence of confidence in the training of new doctors. Formalised medical training rewards students for being confident and getting answers "correct" (Godolphin, 2003). Ogden, Fuks, Gardner, Johnson, McLean, Martin, and Shah (2002) note that doctors will often ignore their uncertainty, instead presenting a confident face to patients as a means of maintaining patient confidence, although they are beginning to be encouraged to express their uncertainty to patients where necessary.

However ignoring uncertainty and just being extremely confident is unlikely to foster a situation in which choices are offered to the patient and a shared decision-making is engaged in. Patients have difficulty asking doctors questions, which they attribute mostly to the doctors' traits (Towle, Godolphin, Manklow, and Wiesinger, 2003). For instance, a doctor's confidence may cause the patient to feel intimidated and unable to express their concerns. As Chapter 7 showed, people are wary of a speaker expressing too much, and conversely too little confidence, perceiving a more moderately confident speaker to be more open to discussion. Therefore if a doctor was not so extremely

confident all the time, without being too uncertain, a patient may feel that they have more input into the decision-making process. Indeed, doctors should be aware of how they are perceived by patients. “If doctors want to communicate risk effectively to their patients and the public they need to be aware that they are just one source of information and may no longer be most trusted” (Alaszewski and Horlick-Jones, 2003, p. 730). Being accurate and clear may not be enough, making how one is perceived in relation to values relating to competency and likeability also important (Edwards, 2003). Finding the right balance when expressing one’s confidence between accuracy, competency and how positively one is received can be beneficial to both the speaker and the listener.

Conclusions

The aim of this thesis was to take a more ecological approach to research relating to the influence of confidence, focusing on confidence as it is commonly expressed in our day-to-day lives. The literature review highlighted the fact that in previous research the importance of how confidence is communicated has been relatively ignored in relation to the influence of confidence, with the focus being on how subjective probabilities and confidence ratings influence people’s judgements and decisions. In real-life people more commonly communicate their confidence via verbal expressions, such as I know and I think, rather than via numerical expressions such as 90%, or a .6 chance, and so it is important to address this issue. To rectify this the experiments reported in this thesis used confidence cues to investigate the influence of verbal expressions of confidence found commonly in natural language as opposed to numerical expressions of than a subjective probability. In doing so the findings from this research can be applied more directly to the communication and influence of confidence in real-life situations.

This thesis has provided evidence that confidence is an effective form of influence and people do seem to apply a confidence heuristic, using a speaker’s confidence as a way of evaluating the quality of the information. We assume that a speaker’s confidence is a valid cue to their accuracy, competency and knowledge level. Hence the more confidently expressed that information is, the more likely it is that it will be followed. Our use of the confidence heuristic when receiving advice from others, and deciding whether or not to take that advice is mediated by our own uncertainty, and the greater this is the more reliant we become on a speaker’s confidence. Some situations foster

greater uncertainty, and hence greater confidence heuristic use, whether due to the type of the task, its difficulty, or the situation in which we are making the decisions.

It was noted in the introduction to this thesis that although we may base our decisions on how confidently someone expresses their information, the question can be asked as to whether we are right to use confidence in such a way? This thesis has presented evidence to suggest that this is not always an effective strategy, as decisions based on a speaker's confidence can lead to erroneous decisions being made. However, in everyday life there may be much less miscommunication of confidence than was presented in this thesis, and it would be a sorry state of affairs if we went through life mistrusting everyone we met, and everything they said, no matter how confident they were in saying it. Indeed, if this were the case, having to verify each piece of information we received before using it, life would be far more cognitively taxing – hence the need for a confidence heuristic. Using the confidence heuristic is acceptable, as long as we are aware of the dangers of being too reliant on another person's confidence and are prepared to take all of the available information into account.

Unfortunately, this is where the problem lies - confidence is, at times, relied upon far too heavily - and so perhaps this thesis should be seen as a cautionary tale. On an everyday level, using the confidence heuristic can make life that little bit simpler, but the context in which a speaker's statement of confidence is embedded, along with the importance of a decision based upon that confidence must also be considered. Miscommunication of confidence does occur, although this is often unintentional, as a speaker may truly believe they have a right to be confident in what they are saying. However, the consequences of this can be devastating. Take the story of Jennifer Thompson, who was the victim of rape in 1984. Recounting her ordeal and the events leading up to the conviction of the accused in *The New York Times* in 2000 she said, "I identified my attacker. I **knew** this was the man. I was **completely confident**. I was **sure**....I picked the same man in a lineup. Again, I was **sure**. I **knew** it". Based on Jennifer's testimony, Ronald Cotton was sentenced to life imprisonment. Eleven years later, DNA evidence proved conclusively that Cotton was not the man who had raped Jennifer. To quote the title of Jennifer's article, "*I was certain, but I was wrong*".

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APPENDIX A
Pilot study questionnaire

Please read each of the following statements carefully and then decide how confident you think a speaker using these expressions would be in their answer. Indicate how confident you think each speaker is that their answer is correct by ticking one of the seven boxes to the right of each statement.

<i>Statement</i>	<i>I think the speaker is:</i>						
	Not at all Confident	Moderately Confident			Highly Confident		
1. It must be...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
2. Is it...?	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
3. I could be wrong but I think it's...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
4. I should say it's...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
5. Err, I think it's...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
6. Perhaps it's...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
7. It could be...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
8. I'm certain it's...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
9. I'm not sure but it may be...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
10. There's a good chance it's...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
11. I'm positive it's...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
12. I think it's.... but I can't be sure.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
13. I'm sure it's...	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>	5 <input type="radio"/>	6 <input type="radio"/>	7 <input type="radio"/>
14. I'm not completely confident,	1	2	3	4	5	6	7

- but I think it's...
15. I suppose it could be... 1 2 3 4 5 6 7
16. Well, it's.... I guess. 1 2 3 4 5 6 7
17. I'm not sure, it's kind of... 1 2 3 4 5 6 7
18. If I remember correctly, it's... 1 2 3 4 5 6 7
19. I'm fairly confident it's... 1 2 3 4 5 6 7
20. I know it's... 1 2 3 4 5 6 7
21. It may be... 1 2 3 4 5 6 7
22. It's obviously... 1 2 3 4 5 6 7
23. I suspect it's... 1 2 3 4 5 6 7
24. It's... 1 2 3 4 5 6 7
25. I'm not certain, but it could be... 1 2 3 4 5 6 7
26. It might be... 1 2 3 4 5 6 7
27. There are, I believe... 1 2 3 4 5 6 7
28. I'm guessing, but I would say it's... 1 2 3 4 5 6 7
29. Erm, I think it's... 1 2 3 4 5 6 7
30. I would say it's... 1 2 3 4 5 6 7
31. I think it's.... isn't it? 1 2 3 4 5 6 7

- | | | | | | | | | |
|-----|--|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 32. | It's.... I think. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 33. | I could be mistaken but I'm sure it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 34. | It's possibly... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 35. | I'm not sure but it could be... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 36. | As far as I can recall it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 37. | I have no doubt, I mean I'm sure it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 38. | I guess it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 39. | It's definitely... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 40. | Yes, it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 41. | I'm confident that it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 42. | I seem to recall it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 43. | It's around about... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 44. | I think, I think it's.... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 45. | Oh yes, it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 46. | Chances are it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 47. | It's probably... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 48. | I know for a fact that it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

- | | | | | | | | | |
|-----|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 49. | I think it's | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 50. | Oh, I don't know, I suppose it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 51. | I believe it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 52. | I remember, it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 53. | It could be.... but I don't know. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 54. | Isn't it...? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 55. | I have no doubt it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 56. | Oh, I think it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 57. | Could it be...? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 58. | It's...without a doubt. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 59. | I'm absolutely certain it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 60. | I can't say for sure, but I think it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 61. | It's certainly... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| 62. | Surely it's... | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Thank you for your time and effort in completing this questionnaire, it is greatly appreciated.

APPENDIX B
Descriptive Statistics and t-tests comparing ratings for confidence cues in
past/present tense

Q No.	TENSE	N	Mean	S.D.	Q No.	TENSE	N	Mean	S.D.
Q1	past	13	4.62	1.39	Q32	past	13	3.08	1.38
	present	13	4.92	1.50		present	13	3.15	1.34
Q2	past	13	2.85	1.46	Q33	past	13	3.92	.86
	present	13	3.08	1.38		present	13	3.85	1.28
Q3	past	13	3.15	1.21	Q34	past	13	3.46	.97
	present	13	3.15	1.46		present	13	3.62	1.04
Q4	past	13	4.00	1.15	Q35	past	13	3.15	1.21
	present	13	3.77	1.01		present	13	3.46	.78
Q5	past	13	2.46	1.20	Q36	past	13	3.69	.95
	present	13	1.85	.55		present	13	4.08	.95
Q6	past	13	3.08	.86	Q37	past	13	4.85	1.57
	present	13	3.00	.71		present	13	4.54	1.76
Q7	past	13	3.00	.82	Q38	past	13	3.15	1.28
	present	13	3.54	.88		present	13	3.15	.90
Q8	past	13	5.54	1.66	Q39	past	13	6.38	.87
	present	13	6.38	.87		present	13	6.38	.96
Q9	past	13	2.92	1.12	Q40	past	13	6.31	.85
	present	13	3.31	1.18		present	13	6.08	1.04
Q10	past	13	4.08	.95	Q41	past	13	6.46	.66
	present	13	4.62	.96		present	13	6.23	1.01
Q11	past	13	6.00	1.53	Q42	past	13	4.62	1.19
	present	13	6.54	.88		present	13	4.46	.78
Q12	past	13	3.46	.97	Q43	past	13	3.92	1.04
	present	13	3.69	1.03		present	13	3.92	1.04
Q13	past	13	5.54	1.05	Q44	past	13	3.23	1.01
	present	13	5.62	1.19		present	13	3.08	1.19
Q14	past	13	3.85	.90	Q45	past	13	5.46	1.13
	present	13	3.69	.63		present	13	5.31	1.44
Q15	past	13	2.69	1.03	Q46	past	13	4.00	.91
	present	13	2.77	.93		present	13	3.46	.97
Q16	past	13	3.00	1.29	Q47	past	13	4.15	1.07
	present	13	2.62	.87		present	13	4.00	1.15
Q17	past	13	2.62	1.26	Q48	past	13	6.23	1.09
	present	13	2.46	1.05		present	13	6.31	1.11
Q18	past	13	4.31	1.03	Q49	past	13	4.00	1.15
	present	13	4.38	.96		present	13	3.85	.80
Q19	past	13	5.23	.93	Q50	past	13	2.85	1.21
	present	13	5.00	1.35		present	13	2.77	1.01
Q20	past	13	6.00	1.58	Q51	past	13	4.23	.83
	present	13	6.23	1.24		present	13	4.08	1.32
Q21	past	13	3.77	.93	Q52	past	13	5.00	.91
	present	13	3.38	1.04		present	13	4.38	.96
Q22	past	13	6.08	.76	Q53	past	13	2.92	1.32
	present	13	6.00	1.22		present	13	3.08	.86
Q23	past	13	4.08	1.04	Q54	past	13	2.92	1.44
	present	13	3.92	1.12		present	13	3.15	1.14
Q24	past	13	5.92	1.55	Q55	past	13	6.08	1.26
	present	13	5.23	1.54		present	13	5.62	1.26
Q25	past	13	3.69	1.32	Q56	past	13	4.23	1.48
	present	13	3.46	1.20		present	13	3.62	1.04
Q26	past	13	3.54	1.27	Q57	past	13	3.46	.88
	present	13	3.54	.97		present	13	3.62	.65
Q27	past	13	4.62	1.04	Q58	past	13	6.15	1.14
	present	13	4.54	1.13		present	13	5.54	1.61
Q28	past	13	2.54	.88	Q59	past	13	6.54	.78
	present	13	3.08	.86		present	13	6.23	1.36
Q29	past	13	2.85	1.41	Q60	past	13	4.00	.82
	present	13	2.85	1.34		present	13	3.85	1.14
Q30	past	13	3.77	1.09	Q61	past	13	6.00	1.00
	present	13	4.00	.82		present	13	6.15	1.14
Q31	past	13	2.54	1.20	Q62	past	13	4.54	1.27
	present	13	2.92	1.50		present	13	4.85	1.14

Independent Samples Test

	t-test for Equality of Means						
	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						Lower	Upper
Q1	-.543	24	.592	-.31	.57	-1.48	.86
Q2	-.413	24	.683	-.23	.56	-1.38	.92
Q3	.000	24	1.000	.00	.53	-1.09	1.09
Q4	.542	24	.593	.23	.43	-.65	1.11
Q5	1.680	24	.106	.62	.37	-.14	1.37
Q6	.249	24	.806	7.69E-02	.31	-.56	.72
Q7	-1.620	24	.118	-.54	.33	-1.22	.15
Q8	-1.625	24	.117	-.85	.52	-1.92	.23
Q9	-.853	24	.402	-.38	.45	-1.31	.55
Q10	-1.434	24	.165	-.54	.38	-1.31	.24
Q11	-1.102	24	.281	-.54	.49	-1.55	.47
Q12	-.588	24	.562	-.23	.39	-1.04	.58
Q13	-.175	24	.863	-7.69E-02	.44	-.99	.83
Q14	.505	24	.618	.15	.30	-.47	.78
Q15	-.200	24	.843	-7.69E-02	.38	-.87	.72
Q16	.891	24	.382	.38	.43	-.51	1.28
Q17	.338	24	.738	.15	.46	-.79	1.09
Q18	-.197	24	.846	-7.69E-02	.39	-.88	.73
Q19	.507	24	.617	.23	.46	-.71	1.17
Q20	-.415	24	.682	-.23	.56	-1.38	.92
Q21	.993	24	.330	.38	.39	-.41	1.18
Q22	.192	24	.849	7.69E-02	.40	-.75	.90
Q23	.364	24	.719	.15	.42	-.72	1.03
Q24	1.143	24	.264	.69	.61	-.56	1.94
Q25	.468	24	.644	.23	.49	-.79	1.25
Q26	.000	24	1.000	.00	.44	-.91	.91
Q27	.181	24	.858	7.69E-02	.43	-.80	.96
Q28	-1.578	24	.128	-.54	.34	-1.24	.17
Q29	.000	24	1.000	.00	.54	-1.11	1.11
Q30	-.610	24	.547	-.23	.38	-1.01	.55
Q31	-.723	24	.477	-.38	.53	-1.48	.71
Q32	-.144	24	.887	-7.69E-02	.53	-1.18	1.03
Q33	.180	24	.859	7.69E-02	.43	-.81	.96
Q34	-.390	24	.700	-.15	.39	-.97	.66
Q35	-.770	24	.449	-.31	.40	-1.13	.52
Q36	-1.031	24	.313	-.38	.37	-1.15	.39
Q37	.470	24	.643	.31	.65	-1.04	1.66
Q38	.000	24	1.000	.00	.43	-.90	.90
Q39	.000	24	1.000	.00	.36	-.74	.74
Q40	.619	24	.542	.23	.37	-.54	1.00
Q41	.688	24	.498	.23	.34	-.46	.92
Q42	.390	24	.700	.15	.39	-.66	.97
Q43	.000	24	1.000	.00	.41	-.84	.84
Q44	.355	24	.725	.15	.43	-.74	1.05
Q45	.304	24	.764	.15	.51	-.89	1.20
Q46	1.460	24	.157	.54	.37	-.22	1.30
Q47	.353	24	.727	.15	.44	-.75	1.05
Q48	-.178	24	.860	-7.69E-02	.43	-.97	.81
Q49	.395	24	.696	.15	.39	-.65	.96
Q50	.175	24	.862	7.69E-02	.44	-.83	.98
Q51	.355	24	.725	.15	.43	-.74	1.05
Q52	1.674	24	.107	.62	.37	-.14	1.37
Q53	-.352	24	.728	-.15	.44	-1.06	.75
Q54	-.452	24	.655	-.23	.51	-1.28	.82
Q55	.935	24	.359	.46	.49	-.56	1.48
Q56	1.225	24	.233	.62	.50	-.42	1.65
Q57	-.508	24	.616	-.15	.30	-.78	.47
Q58	1.122	24	.273	.62	.55	-.52	1.75
Q59	.707	24	.486	.31	.44	-.59	1.21
Q60	.395	24	.696	.15	.39	-.65	.96
Q61	-.365	24	.718	-.15	.42	-1.02	.72
Q62	-.650	24	.522	-.31	.47	-1.28	.67

APPENDIX C

Instructions issued to participants and example questions for tasks used in Chapters 3 and 4

Male/Female Age:

Imagine that you are entering the first round of a competition, *The Millionaire Fortunes Game*, with three friends. There are three parts to this round:

- **One part of the game involves answering difficult general knowledge questions – such as on the game show “Who wants to be a Millionaire?”**
- **One part of the game involves picking the ‘top answers’ given in a public opinion poll – such as on the game show “Family Fortunes”**
- **One part of the game is a memory game where you must make decisions based on your friend’s memory for objects.**

Further instructions will be given at the start of each part of the game.

Each part of the game contains 12 questions. As you are allowed to confer on the questions each friend will give you their answer to each question in turn. However, as you have paid the competition entrance money the final decision on each question is yours.

Can you and your friends get enough questions right to go through to the next round of the competition? If you were to get through to the next round, you would take *one* of your friends with you.

Instructions:

You ask each of your three friends the twelve questions in each part of the game. After every question you will read each friend’s response to that question. You must then decide which of your friends has given the correct or most likely answer.

You do not need to choose the same friend every time, just choose who you think has given the most accurate or likely response for each question. Only choose **one** answer.

Please read the responses carefully, paying attention to **who** said it, as you will be asked questions relating to each friend later on.

Please indicate your selection to each question by circling the name of the appropriate friend (A, B or C).

Then please indicate how confident you are that the answer you have chosen is correct by choosing any number between 0 and 100, where a score of 0 means that you have no confidence at all in that answer being correct and 100 means that you know beyond doubt that the answer you have chosen is correct.

Please answer each question in turn. Once you have answered a question, go on to the next one. Do not return to any previous questions. Please pay attention to how each friend answers, as you will be asked question relating to this later on. Once you have completed all three parts of the game, you will receive instructions as to what to do for the remainder of the experiment.

General Knowledge Game

Note. Underlined words show changes in responses given by the speakers between the control and experimental conditions.

In this part of the game you be asked twelve difficult general knowledge questions.

You ask each of your three friends the questions. After every question read each friend's response carefully and then decide which friend has given the correct answer.

- Indicate your selection by circling the appropriate letter (A, B or C).
- Please also indicate your confidence in that answer, as previously instructed.

1. What is the highest mountain in South America?

Friend A said I'm certain the highest mountain is Ojos del Saládo

Friend B said I believe Aconcagua is the highest mountain

Friend C said Well, the highest mountain is Huascarán, I guess

<i>Which friend is correct?</i>	A	B	C	<i>How confident are you that this answer is correct?</i>	_____
---------------------------------	---	---	---	---	-------

2. What is the longest river in Asia?

Friend C said I think the Indus is the longest river, isn't it?

Friend B said I suspect longest river is the Yenisei

Friend A said I know the longest river is the Yangtze

<i>Which friend is correct?</i>	A	B	C	<i>How confident are you that this answer is correct?</i>	_____
---------------------------------	---	---	---	---	-------

3. On which island was Napoleon was born?

Friend C said Oh, I don't know, I suppose it was on Corsica

Friend A said I'm positive it was on Sardinia

Friend B said I can't say for sure, but I think it was on Sicily

<i>Which friend is correct?</i>	A	B	C	<i>How confident are you that this answer is correct?</i>	_____
---------------------------------	---	---	---	---	-------

4. Who was the first woman to swim the English Channel?

Friend B said I think Durrell was the first woman

Friend A said I have no doubt that the first woman was Ederle

Friend C said I suppose the first woman [was] could have been Hammett

<i>Which friend is correct?</i>	A	B	C	<i>How confident are you that this answer is correct?</i>	_____
---------------------------------	---	---	---	---	-------

5. What was the last name of Billy the Kid?

Friend C said Billy the Kid's last name [was] could be Bonney but I don't know

Friend B said I would say Billy the Kid's last name was Burnley

Friend A said I'm confident that Billy the Kid's last name was Browne

<i>Which friend is correct?</i>	A	B	C	How confident are you that this answer is correct?	_____
---------------------------------	---	---	---	---	-------

Opinion Poll Game

In this part of the game you will be asked to pick the 'top' answers given in an opinion poll, in which people were asked to answer questions such as "Name a fruit beginning with A".

You ask each of your three friends in turn what they think the 'top' answer is for each question. After every question read each friend's response carefully and then decide which friend has given the most likely 'top answer'.

- Indicate your selection by circling the appropriate letter (A, B or C).
 - *Please also indicate your confidence in that answer, as previously instructed.*
-

What's the top answer? In the opinion poll, we asked people to...

1. Name a famous Saint.

Friend A said I know that the top answer is Saint Patrick

Friend B said I believe that the top answer is Saint Paul

Friend C said I'm guessing but I would say that the top answer is Saint Christopher

Who has chosen the
'top' answer?

A B C

**How confident are you that
this is the 'top' answer?** _____

2. Name a flavour of crisps.

Friend C said Oh, I don't know, I suppose the top answer is Cheese & Onion flavour

Friend B said I would say that the top answer is Salt & Vinegar flavour

Friend A said I have no doubt that the top answer is Smokey Bacon flavour

Who has chosen the
'top' answer?

A B C

**How confident are you that
this is the 'top' answer?** _____

3. Name a planet in the Solar System.

Friend B said I suspect that Jupiter is the top answer

Friend C said Well Venus is the top answer, I guess

Friend A said I'm confident that Mars is the top answer

Who has chosen the
'top' answer?

A B C

**How confident are you that
this is the 'top' answer?** _____

4. Name an animal you might see in the zoo.

Friend A said I'm absolutely certain that the top answer was lion

Friend B said I can't say for sure but I think the top answer was elephant

Friend C said I suppose the top answer [was] could have been monkey

Who has chosen the
'top' answer?

A B C

**How confident are you that
this is the 'top' answer?** _____

5. Name a TV chef.

Friend C said The top answer [is] could be Delia Smith, but I don't know

Friend A said I'm certain Ainsley Harriott's going to be the top answer

Friend B said I think the top answer is going to be Jamie Oliver

Who has chosen the
'top' answer?

A B C

**How confident are you that
this is the 'top' answer?** _____

Memory Game

This part of the game is a memory game. Your friends were shown 12 pictures of objects. You are not shown these pictures. Your task is to correctly identify which object was shown in which position, e.g. 1st, 9th, 5th and so on. As you have not seen the pictures of the objects you need to rely on your friends' answers to make your decisions.

Your friends are asked which object was in which position in a random order. After every question read each friend's response to that question and then decide which of your friends has given identified the correct object in the correct position.

- Indicate your selection by circling the appropriate letter (A, B or C).
 - Please also indicate your confidence in that answer, as previously instructed.
-

1. What was the fourth object you were shown?

Friend B said I would say that the fourth object was the book

Friend A said I have no doubt that the fourth object was the wine bottle

Friend C said I suppose the fourth object [was] could have been the clock

Which friend is
correct?

A B C

How confident are you that
this answer is correct? _____

2. What was the seventh object you were shown?

Friend C said I think the seventh object was the hammer, wasn't it?

Friend A said I'm certain the seventh object was the vase

Friend B said Oh, I think the seventh object was the dart board

Which friend is
correct?

A B C

How confident are you that
this answer is correct? _____

3. What was the second object you were shown?

Friend A said I know the second object was the scales

Friend B said I think the second object was the clock

Friend C said I'm guessing but I'd say the second object was the boomerang

Which friend is
correct?

A B C

How confident are you that
this answer is correct? _____

4. What was the tenth object you were shown?

Friend A said I'm positive the tenth object was the magnifying glass

Friend C said Well the tenth object was the book, I guess

Friend B said I can't say for sure but I think the tenth object was the wine bottle

Which friend is
correct?

A B C

How confident are you that
this answer is correct? _____

5. What was the first object you were shown?

Friend C said Oh I don't know, I suppose it was the top hat

Friend B said I suspect this was the guitar

Friend A said I'm confident that this was the light bulb

Which friend is
correct?

A B C

How confident are you that
this answer is correct? _____

Could you now please answer the following questions regarding your impressions of each friend.

1. Based on their performance over the last three games which friend would you take with you to the next round of the competition if you were to get through? (please circle your answer)

A B C

2. Based on how they answered the questions, what sex do you think each friend was? (delete as appropriate)

Friend A: Male/Female

Friend B: Male/Female

Friend C: Male/Female

3. Which friend do you think is the most competent? *A* *B* *C*

4. Which friend do you think is the least competent? *A* *B* *C*

5. Which friend do you like the most? *A* *B* *C*

6. Which friend do you like the least? *A* *B* *C*

7. Which friend do you think is the most confident? *A* *B* *C*

8. Which friend do you think is the least confident? *A* *B* *C*

APPENDIX D
Chapter 3 data

Debriefing

This research project is looking at how other people's confidence influences the decisions we make and our perceptions of other people. This may depend on what type of task is involved and who is communicating that confidence. There may also be individual differences in this, which is also being considered.

If you have any questions then please ask the investigator. Individual participants results will not be released, but if you would like further information regarding the aims and results of the experiment, then these can be obtained from the experimenter (contact details below) at a later date, to be confirmed.

Thank you for your participation.

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APPENDIX E
Personality Questionnaires used in Chapter 4

Need for Cognition

Instructions: For each of the statements below, please indicate to what extent the statement is characteristic of you. If the statement is extremely uncharacteristic of you (not at all like you) please circle the “1” to the left of the question; if the statement is extremely characteristic of you (very much like you) please circle the “5” next to the question. Of course, a statement may be neither extremely uncharacteristic nor extremely characteristic of you; if so, please use the number in the middle of the scale that describes the best fit.

Please keep the following scale in mind as you rate each of the statements below:

**1 = extremely uncharacteristic; 2 = somewhat uncharacteristic; 3 = uncertain;
4 = somewhat characteristic; 5 = extremely characteristic.**

-
- | | | | | | |
|---|---|---|---|---|---|
| 1. I would prefer complex to simple problems. | 1 | 2 | 3 | 4 | 5 |
| 2. I like to have the responsibility of handling a situation that requires a lot of thinking. | 1 | 2 | 3 | 4 | 5 |
| 3. Thinking is not my idea of fun. | 1 | 2 | 3 | 4 | 5 |
| 4. I would rather do something that requires little thought than something that is sure to challenge my thinking abilities. | 1 | 2 | 3 | 4 | 5 |
| 5. I try to anticipate and avoid situations where there is likely a chance I will have to think in depth about something. | 1 | 2 | 3 | 4 | 5 |
| 6. I find satisfaction in deliberating hard and for long hours. | 1 | 2 | 3 | 4 | 5 |
| 7. I only think as hard as I have to. | 1 | 2 | 3 | 4 | 5 |
| 8. I prefer to think about small, daily projects to long-term ones. | 1 | 2 | 3 | 4 | 5 |
| 9. I like tasks that require little thought once I've learned them. | 1 | 2 | 3 | 4 | 5 |
| 10. The idea of relying on thought to make my way to the top appeals to me. | 1 | 2 | 3 | 4 | 5 |
| 11. I really enjoy a task that involves coming up with new solutions to problems. | 1 | 2 | 3 | 4 | 5 |
| 12. Learning new ways to think doesn't excite me very much. | 1 | 2 | 3 | 4 | 5 |
| 13. I prefer my life to be filled with puzzles that I must solve. | 1 | 2 | 3 | 4 | 5 |
| 14. The notion of thinking abstractly is appealing to me. | 1 | 2 | 3 | 4 | 5 |
| 15. I would prefer a task that is intellectual, difficult, and important to one that is somewhat important but does not require much thought. | 1 | 2 | 3 | 4 | 5 |
| 16. I feel relief rather than satisfaction after completing a task that required a lot of mental effort. | 1 | 2 | 3 | 4 | 5 |
| 17. It's enough for me that something gets the job done; I don't care how or why it works. | 1 | 2 | 3 | 4 | 5 |
| 18. I usually end up deliberating about issues even when they do not affect me personally. | 1 | 2 | 3 | 4 | 5 |

Need for Closure

Please rate the extent to which you agree with the following statements.

Circle any number from 1 to 6, choosing the one that best reflects the extent to which each statement applies to you. Where; **1 = Strongly Disagree to 6 = Strongly Agree**

		Strongly Disagree			Strongly Agree		
		1	2	3	4	5	6
1	I think that having clear rules and order at work is essential for success.	1	2	3	4	5	6
2	Even after I've made up my mind about something, I am always eager to consider a different opinion.	1	2	3	4	5	6
3	I don't like situations that are uncertain.	1	2	3	4	5	6
4	I dislike questions which could be answered in many different ways.	1	2	3	4	5	6
5	I like to have friends who are unpredictable.	1	2	3	4	5	6
6	I find that a well ordered life with regular hours suits my temperament.	1	2	3	4	5	6
7	When dining out, I like to go to places where I have been before so that I know what to expect.	1	2	3	4	5	6
8	I feel uncomfortable when I don't understand the reason why an event occurred in my life.	1	2	3	4	5	6
9	I feel irritated when one person disagrees with what everyone else in a group believes.	1	2	3	4	5	6
10	I hate to change my plans at the last minute.	1	2	3	4	5	6
11	I don't like to go into a situation without knowing what I can expect from it.	1	2	3	4	5	6
12	When I go shopping, I have difficulty deciding exactly what it is that I want.	1	2	3	4	5	6
13	When faced with a problem I usually see the one best solution very quickly.	1	2	3	4	5	6
14	When I am confused about an important issue, I feel very upset.	1	2	3	4	5	6
15	I tend to put off making important decisions until the last possible moment.	1	2	3	4	5	6
16	I usually make important decisions quickly and confidently.	1	2	3	4	5	6
17	I would describe myself as indecisive.	1	2	3	4	5	6
18	I think it is fun to change my plans at the last moment.	1	2	3	4	5	6
19	I enjoy the uncertainty of going into a new situation without knowing what might happen.	1	2	3	4	5	6
20	My personal space is usually messy and disorganized.	1	2	3	4	5	6
21	In most social conflicts, I can easily see which side is right and which is wrong.	1	2	3	4	5	6
22	I tend to struggle with most decisions.	1	2	3	4	5	6
23	I believe that orderliness and organization are among the most important characteristics of a good student.	1	2	3	4	5	6
24	When considering most conflict situations, I can usually see how both sides could be right.	1	2	3	4	5	6
25	I don't like to be with people who are capable of unexpected actions.	1	2	3	4	5	6
26	I prefer to socialize with familiar friends because I know what to expect from them	1	2	3	4	5	6
27	I think that I would learn best in a class that lacks clearly stated objectives and requirements.	1	2	3	4	5	6
28	When thinking about a problem, I consider as many different opinions on the issue as possible.	1	2	3	4	5	6
29	I like to know what people are thinking all the time.	1	2	3	4	5	6
30	I dislike it when a person's statement could mean many different things	1	2	3	4	5	6
31	It's annoying to listen to someone who cannot seem to make up his or her mind.	1	2	3	4	5	6
32	I find that establishing a consistent routine enables me to enjoy life more.	1	2	3	4	5	6
33	I enjoy having a clear and structured mode of life.	1	2	3	4	5	6
34	I prefer interacting with people whose opinions are very different from my own.	1	2	3	4	5	6
35	I like to have a place for everything and everything in its place.	1	2	3	4	5	6
36	I feel uncomfortable when someone's meaning or intention is unclear to me.	1	2	3	4	5	6
37	When trying to solve a problem I often see so many possible options that it's confusing.	1	2	3	4	5	6
38	I always see many possible solutions to problems I face.	1	2	3	4	5	6
39	I'd rather know bad news than stay in a state of uncertainty.	1	2	3	4	5	6
40	I do not usually consult many different opinions before forming my own view.	1	2	3	4	5	6
41	I dislike unpredictable situations.	1	2	3	4	5	6
42	I dislike the routine aspects of my work (studies).	1	2	3	4	5	6

IPIP

On the following pages there are phrases describing people's behaviours. Please use the rating scale below to describe how accurately each statement describes you. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and then circle the number that corresponds with your response.

Response options: 1 = Very inaccurate; 2 = Moderately inaccurate; 3 = Neither inaccurate or accurate; 4 = Moderately accurate; 5 = Very accurate

I...

1	Am the life of the party.	1	2	3	4	5
2	Feel little concern for others.	1	2	3	4	5
3	Am always prepared.	1	2	3	4	5
4	Get stressed out easily.	1	2	3	4	5
5	Have a rich vocabulary.	1	2	3	4	5
6	Don't talk a lot.	1	2	3	4	5
7	Am interested in people	1	2	3	4	5
8	Leave my belongings around.	1	2	3	4	5
9	Am relaxed most of the time.	1	2	3	4	5
10	Have difficulty understanding abstract ideas.	1	2	3	4	5
11	Feel comfortable around people.	1	2	3	4	5
12	Insult people.	1	2	3	4	5
13	Pay attention to details.	1	2	3	4	5
14	Worry about things.	1	2	3	4	5
15	Have a vivid imagination.	1	2	3	4	5
16	Keep in the background.	1	2	3	4	5
17	Sympathize with others' feelings.	1	2	3	4	5
18	Make a mess of things.	1	2	3	4	5
19	Seldom feel blue.	1	2	3	4	5
20	Am not interested in abstract ideas.	1	2	3	4	5
21	Start conversations.	1	2	3	4	5
22	Am not interested in other people's problems	1	2	3	4	5
23	Get chores done right away.	1	2	3	4	5
24	Am easily disturbed.	1	2	3	4	5
25	Have excellent ideas.	1	2	3	4	5
26	Have little to say	1	2	3	4	5
27	Have a soft heart	1	2	3	4	5
28	Often forget to put things back in their proper place.	1	2	3	4	5
29	Get upset easily.	1	2	3	4	5
30	Do not have a good imagination.	1	2	3	4	5
31	Talk to a lot of different people at parties.	1	2	3	4	5
32	Am not really interested in others.	1	2	3	4	5
33	Like order.	1	2	3	4	5
34	Change my mood a lot.	1	2	3	4	5
35	Am quick to understand things.	1	2	3	4	5
36	Don't like to draw attention to myself.	1	2	3	4	5
37	Take time out for others	1	2	3	4	5
38	Shirk my duties.	1	2	3	4	5
39	Have frequent mood swings.	1	2	3	4	5
40	Use difficult words.	1	2	3	4	5
41	Don't mind being the centre of attention.	1	2	3	4	5
42	Feel others' emotions.	1	2	3	4	5
43	Follow a schedule	1	2	3	4	5
44	Get irritated easily.	1	2	3	4	5
45	Spend time reflecting on things.	1	2	3	4	5
46	Am quiet around strangers.	1	2	3	4	5
47	Make people feel at ease.	1	2	3	4	5
48	Am exacting in my work.	1	2	3	4	5
49	Often feel blue.	1	2	3	4	5
50	Am full of ideas.	1	2	3	4	5

APPENDIX G

Task materials used in Chapter 5

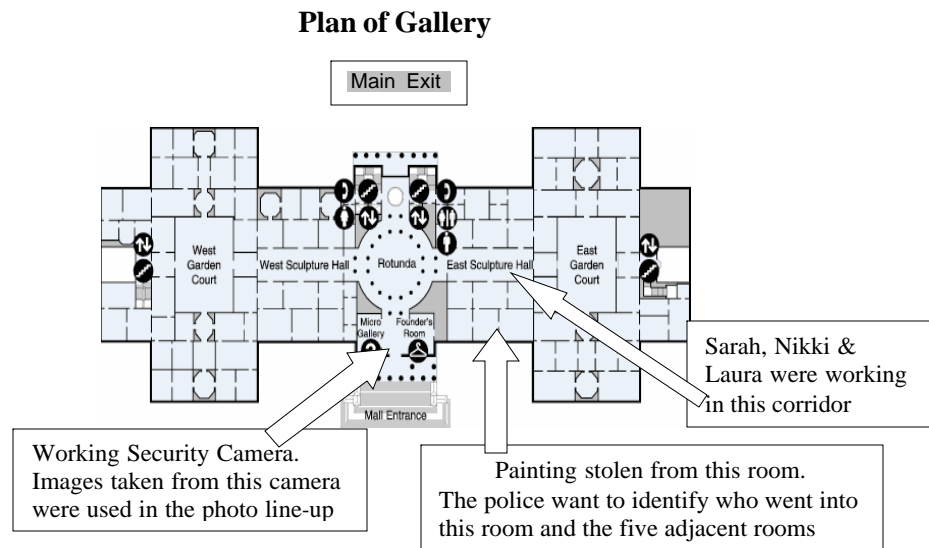
Background

A small but valuable painting has been stolen from a side room at an art gallery. Unfortunately at the time the painting was stolen the security cameras in that part of the gallery were out of order following a technical fault – whether this is coincidence or was planned as part of the theft is, as yet, unknown. This does however mean that the culprit remains unidentified.

The time of the theft has been narrowed down to half an hour - the room had been checked by a security guard at 10.30 a.m. and again at 11.00 a.m. at which time the painting, which had been cut out of its frame, was reported missing.

The police want to identify all of the visitors to the gallery who went into the rooms near where the painting was located during that time and at what time they went in there. They are not necessarily suspects but they do all need to be identified in case they saw anything suspicious. Any one of these people may have some important information, no matter how minor it may seem to them, that could help the police in their investigation.

Three people, Sarah, Nikki and Laura, who were working near that area of the gallery are giving statements to the police of what they saw that day.



After giving their descriptions of each of the people they saw the witnesses are asked if they can pick out the person they've described from a photo line-up made up of images taken from the one working security camera in the gallery at the time. This was positioned in the entrance of the gallery. Before 11 a.m. 18 people were filmed entering the gallery, all of which are included in the photo line-ups. As all 18 people were in the gallery that morning all 3 witnesses could have seen each visitor at some time. Not all of the visitors however went into the rooms near where the painting was stolen from between 10.30 and 11.00 a.m. What the police want to know is which of the visitors did.

From the descriptions given and the identifications made can you work out which of the 18 visitors to the gallery went towards the room during that half an hour period and at what time?

Please read each of the three witness's statements carefully. After you have read all three you will be asked some questions relating to the events of the day and the three witnesses.

This photo line-up is made up of images taken from a security camera in the entrance of the building. The following 18 people entered the art gallery before 11.00 a.m. on the day in question.

Number 1



Number 2



Number 3



Number 4



Number 5



Number 6



Number 7



Number 8



Number 9



Number 10



Number 11



Number 12



Number 13



Number 14



Number 15



Number 16



Number 17



Number 18



Testimonies

Sarah gave the following testimony:

On the day that the painting was stolen I was on duty in the east sculpture hall. I'd been there since the gallery had opened at 10 a.m. I'm certain that 8 people had entered the rooms in question since the gallery had opened, although obviously not all of them went into them between 10.30 and 11 a.m. During that time I'm positive that I did see three people go in there.

It was 10.40 when I saw the first person go in. I know for a fact that it was a woman who was about fifty. I'm absolutely certain that her hair was brown and chin-length. Out of the photo line-up from the visitors to the gallery that day I'd say it was certainly number 1.

I'm sure it was 10 minutes later the next person came in, which was a man. He was definitely with another man when I saw him but I don't recall what the other man looked like. I'm positive though that the man I did see was in his twenties and I know he had long, messy hair. He was white and I'm certain he was about 5ft 10" and thin. I'm confident that it was number 2.

Nikki gave the following testimony:

I had been working in the east sculpture hall on the day that the painting was stolen and had been ever since I'd started work at 10 that morning. I seem to recall that 6 people had so far gone into those rooms you're asking about since the gallery opening that day and some of these had probably gone in there between 10.30 and 11 a.m. I remember two people going in there between those times.

It was around about 10.45 when I first saw someone go towards the room. If I remember correctly the first person was a woman of about thirty years old. I could be mistaken but I'm sure she had bobbed dark hair. Judging by the photo line-up, I'd say it was probably number 9.

I believe it was 15 minutes later when the next person went in. It was a man and he was probably alone when I saw him. I remember that he was of average build, about 6ft 2" in height, and I believe his hair was short and ruffled looking. I think he was in his early thirties. I suspect it was number 6.

Laura gave the following testimony:

I started my shift in the east sculpture hall at 10 a.m. that day. I'm guessing but I would say that 7 visitors went into the rooms near the painting since I'd started that day, although some of these had perhaps gone in before 10.30. Between 10.30 and 11 a.m. I'm not sure, but there could have been four visitors in there at some point.

It could have been 10.35 when the first person went in, I suppose a woman who, I could be wrong, but I think was in her forties. I'm guessing but I'd say she had dark curly hair. Looking at the photos, I'd say it was number 7, wasn't it?

Well, it was 5 minutes later, I guess, when the next man came in. He wasn't alone, he could have been with another man and a woman when I saw him, but I don't know what they looked like. I suppose that the man I saw was in his fifties, I guess he was about 6ft in height and of medium build. I could be wrong but I think he had short greying hair. I'm not sure but it could have been number 15.

IPIP

On the basis of the above testimonies given by the witnesses to the police could you now please answer the following questions regarding the day's events (you may refer back to the testimonies if necessary).

Please tick the box corresponding to your answer.

1. How many visitors to the gallery had entered the rooms near the painting before 11 a.m.?

6 7 8

2. How many visitors to the gallery had entered the rooms between 10.30 and 11 a.m.?

2 3 4

3. What time did the first person enter the rooms?

10.35 10.40 10.45

4. Who was the first person to enter the rooms?

Number 1 Number 7 Number 9

5. When did the second person enter the room?

5 minutes later 10 minutes later 15 minutes later

6. Were they alone?

Alone With another man With a man and a woman

7. Who was the second person to enter the room?

Number 2 Number 6 Number 15

8. For each of the following questions please indicate your answer on the seven-point scale provided, by circling the relevant number. Please rate each friend independently

on the basis of their statements – you can give then same rating to more than one friend if you need to. You may refer back to their statements if necessary.

How intelligent was:	Highly Intelligent			Average			Not very Intelligent	
Sarah	1	2	3	4	5	6	7	
Nikki	1	2	3	4	5	6	7	
Laura	1	2	3	4	5	6	7	

How honest was:	Very Honest			Average			Very Dishonest	
Sarah	1	2	3	4	5	6	7	
Nikki	1	2	3	4	5	6	7	
Laura	1	2	3	4	5	6	7	

How competent was:	Extremely Incompetent			Average			Extremely Competent	
Sarah	1	2	3	4	5	6	7	
Nikki	1	2	3	4	5	6	7	
Laura	1	2	3	4	5	6	7	

How nervous was:	Very Nervous			Average			Very Calm	
Sarah	1	2	3	4	5	6	7	
Nikki	1	2	3	4	5	6	7	
Laura	1	2	3	4	5	6	7	

How optimistic was:	Completely Optimistic			Average			Completely Pessimistic	
Sarah	1	2	3	4	5	6	7	
Nikki	1	2	3	4	5	6	7	
Laura	1	2	3	4	5	6	7	

How knowledgeable was:	Not very Knowledgeable			Average			Very Knowledgeable	
Sarah	1	2	3	4	5	6	7	
Nikki	1	2	3	4	5	6	7	
Laura	1	2	3	4	5	6	7	

How polite was:	Extremely Polite			Average			Extremely Impolite	
Sarah	1	2	3	4	5	6	7	
Nikki	1	2	3	4	5	6	7	
Laura	1	2	3	4	5	6	7	

How friendly was:	Not very Friendly			Average			Very Friendly	
Sarah	1	2	3	4	5	6	7	
Nikki	1	2	3	4	5	6	7	
Laura	1	2	3	4	5	6	7	

How self-confident was:	Highly Self-confident		Average			Lacking Self-confidence	
Sarah	1	2	3	4	5	6	7
Nikki	1	2	3	4	5	6	7
Laura	1	2	3	4	5	6	7

How trustworthy was:	Completely Untrustworthy		Average			Completely Trustworthy	
Sarah	1	2	3	4	5	6	7
Nikki	1	2	3	4	5	6	7
Laura	1	2	3	4	5	6	7

How professional was:	Very Professional		Average			Very Unprofessional	
Sarah	1	2	3	4	5	6	7
Nikki	1	2	3	4	5	6	7
Laura	1	2	3	4	5	6	7

How likeable was:	Extremely Likeable		Average			Extremely Unlikeable	
Sarah	1	2	3	4	5	6	7
Nikki	1	2	3	4	5	6	7
Laura	1	2	3	4	5	6	7

How credible was:	Not very Credible		Average			Very Credible	
Sarah	1	2	3	4	5	6	7
Nikki	1	2	3	4	5	6	7
Laura	1	2	3	4	5	6	7

Thank you for taking the time to participate in this experiment.

APPENDIX I

Examples of difficult general knowledge questions used in Chapters 6, 7, 9, and 10. (Correct answers in bold)

1. What is the highest mountain in South America?
 - a) **Aconcagua**
 - b) Huascar n
 - c) Ojos del Sal do
2. What is the name of the island on which Napoleon was born?
 - a) **Corsica**
 - b) Sardinia
 - c) Sicily
3. What is the last name of the first woman to swim the English channel?
 - a) **Ederle**
 - b) Hammett
 - c) Durrell
4. The ELO system is used to rate leading players of which board game?
 - a) **Chess**
 - b) Scrabble
 - c) Monopoly
5. Benthos are plants and animals living where?
 - a) **Water**
 - b) Soil
 - c) Snow
6. Worn in Ancient Greece, what was a 'petasus'?
 - a) **Hat**
 - b) Belt
 - c) Robe
7. What is the capital city of Lithuania?
 - a) **Vilnius**
 - b) Riga
 - c) Tallinn
8. Who was the first ever winner of the Booker prize for Fiction?
 - a) **P H Newby**
 - b) A S Byatt
 - c) J M Coetzee
9. Port Louis is the capital of which island state in the Indian Ocean?
 - a) **Mauritius**
 - b) Maldives
 - c) Madagascar
10. What was the name of the English riots of 1780?
 - a) **Gordon Riots**
 - b) Gilbert Riots
 - c) Graham Riots

11. A 'dybbuk' is an evil spirit in which folklore?
- a) **Jewish**
 - b) West African
 - c) Irish
12. Douglas Bader was a hero of which world war?
- a) First World War
 - b) Boer War
 - c) **Second World War**
13. 'The Scarlet Letter' is a novel by which American writer?
- a) Jack London
 - b) **Nathaniel Hawthorne**
 - c) Herman Melville
14. Which sporting events first took place in 1903?
- a) **Tour de France**
 - b) US Masters Golf
 - c) Monte Carlo Rally
15. Madame Tussaud, the waxworks founder, was born in which city?
- a) Paris
 - b) **Strasbourg**
 - c) Geneva
16. Lake Eyre, Australia's lowest point, is in which state?
- a) New South Wales
 - b) **South Australia**
 - c) Western Australia
17. Which religious order was founded by Saint Bruno?
- a) Franciscan
 - b) Dominican
 - c) **Carthusian**
18. In which language was the poem 'Beowulf' written?
- a) Welsh
 - b) **Old English**
 - c) Latin
19. Ray Manzerek was the keyboard player with which band of the 1960s?
- a) The Beach Boys
 - b) Jefferson Airplane
 - c) **The Doors**
20. Who was Prime Minister in the year Queen Victoria married?
- a) **Viscount Melbourne**
 - b) Earl Grey
 - c) Lord Grenville

APPENDIX I
Overconfidence questionnaire used in Chapter 6

Below are some general knowledge questions. You need to choose the correct answer from the 3 alternatives provided.

- 1) Please circle only ONE of the three answers given. One of them is correct.
- 2) Next: indicate how confident you feel that your chosen answer is correct (for each question) by choosing any number at all between 0 (no confidence that your answer is correct) to 100 (total confidence that your answer is correct). Write this number in the gap in the sentence after the question:

I feel ____% sure that I've chosen the correct answer (0 – 100 scale)

- 3) After that we would like you to estimate the probability/odds that the answer you've chosen is correct – since there are three answers and one of them is correct you have a .33 chance of being correct (1 in 3), so this is the lowest number you should put, and it reflects that you are just guessing at random and have no idea which is the right answer. If you do know the right answer then the probability of it being correct is obviously nearer to 1.0 (which is the maximum number you can put).

If, for example, you said the probability of being correct was .8 on ten different questions this would mean that you would expect to be correct 8 times out of 10. If you say 1.0 on all ten questions then you would expect to be right 10/10 times. If you say .5 on all ten questions then you would expect to be right half of the time and get 5/10 correct. Etc.

You can use any number then between .33 and 1.0 to indicate the probability that your chosen answer is correct.

Write this number in the gap in the sentence after the question:

The probability that this is the right answer is _____. (.33 to 1.0 scale).

Please answer all of the questions, even if you have to guess on all of them you could get 33% correct by chance.

NOTE: Please answer all the questions one by one in the order that they are presented in the booklet. Guess at any answers you don't know. Please do not jump around the questionnaire or go back to questions to change your answers after you have filled them in; we are interested in your first answer.

Please ask if you have any questions.

GENERAL KNOWLEDGE QUESTIONNAIRE 1

C3 **What zodiac sign is the crab?**
Sagittarius Aquarius **Cancer**

I feel ____% sure that I've chosen the correct answer.

The probability that this is the right answer is ____.

C11 **What nationality is racing driver Jean Alesi?**
Canadian **French** Italian

I feel ____% sure that I've chosen the correct answer.

The probability that this is the right answer is ____.

C17 **What is the name of Michael Schumacker's brother, who also drives in Formula 1 racing?**
Rolf Ranulf **Ralf**

I feel ____% sure that I've chosen the correct answer.

The probability that this is the right answer is ____.

C24 **Ghee is a clarified butter popular in the cuisine of which country?**
Italy **India** Israel

I feel ____% sure that I've chosen the correct answer.

The probability that this is the right answer is ____.

C27 **Who played the lead role in the sitcom Shelley?**
Ronnie Barker Leonard Rossiter **Hywel Bennett**

I feel ____% sure that I've chosen the correct answer.

The probability that this is the right answer is ____.

C36 **What is the star sign of someone born on Leap Year day?**
Taurus Capricorn **Pisces**

I feel ____% sure that I've chosen the correct answer.

The probability that this is the right answer is ____.

C38 'Digger' was a nickname given to World War II Allied soldiers of which country?
Australia Belgium USA

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C42 Who wrote the TV sitcom 'Butterflies'?
Carla Lane John Sullivan Johnny Speight

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C51 Julie Andrews married which film director in 1969?
Sydney Pollack Blake Edwards Mike Nichols

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C57 What kind of fruit is a Ribstone pippin?
a pear an apple a cherry

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C69 Which cake is a marzipan-covered sponge that cuts into pink & yellow chequered squares?
a Battenberg a Strasbourg.....a Nuremburg

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C80 Which football team won the FA Cup, Worthington Cup and UEFA Cup in 2001?

Sunderland Liverpool Chelsea
I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C92 Robbie Fowler captained which football team in 2001?
Liverpool Tottenham Hotspur Arsenal

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C59 Which of these is a cricket term for a delivery by a left-handed spin bowler to a right handed batsman?
Chinaman Prussian Laplander

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C65 Alf Ramsey was manager of which football team from 1955 to 1963?
Southampton Ipswich Town Aston Villa

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C66 Which of these spices comes from the Myristica Fragrans tree?
cloves nutmeg paprika

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C68 During World War II, Anderson and Morrison were types of what?
an air-raid shelter a bomb a gas mask

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C98 Where does a military person wear an epaulette?
on the shoulder on the cuff on the cap

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C101 Who trained the 2001 Derby winner Galileo?
Michael Stoute Aidan O'Brien Tony Balding

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

C108 A Parmentier dish is garnished with which vegetable?
carrot potato onion

I feel ____% sure that I've chosen the correct answer.
The probability that this is the right answer is ____.

APPENDIX L
Pilot study accuracy results for easy, medium, and hard difficulty questions
used in Chapter 8
 (Correct answers in bold)

Q.	Question	Answers	Mean	S.D.
11	Thor is the God of Thunder in which mythology?	Roman Norse Greek	5.00	22.36
24	Prue Leith is a famous what?	Cookery writer Tennis player Photographer	10.00	30.78
35	Who composed the opera ‘Boris Godunov’?	Mussorgsky Rimsky-Korsakov Borodin	10.00	30.78
36	Of which country was Salvador Allende president?	Peru Chile Venezuela	15.00	36.63
25	Castle Howard is in which county?	Gloucestershire Suffolk North Yorkshire	20.00	41.04
31	Who would use an ‘embouchure’ in their work?	Pilot Seamstress Musician	20.00	41.04
26	Who was the wife of Henry VI of England?	Catherine of Aquitaine Margaret of Anjou Eleanor of Aachen	20.00	41.04
33	‘Night of the Hunter’ was the only film directed by which actor?	Charles Laughton Boris Karloff James Mason	25.00	44.43
34	In Greek mythology, the nymph Callisto was turned into which creature?	Spider Peacock Bear	25.00	44.43
27	What is a linnet?	Bird Poem Musical instrument	30.00	47.02
8	What is the name of the national anthem of America?	America the Beautiful Stars and Bars Star-Spangled Banner	30.00	47.02
19	What type of creature is a pollack?	Beetle Fish Deer	30.00	47.02
12	How many are there in a baker’s dozen?	11 13 12	35.00	48.94

32	Which Russian word means ‘openness’?	Perestroika Glasnost Pravda	35.00	48.94
2	Which English king was known as ‘The Great’?	Harold John Alfred	40.00	50.26
21	Which planet in our solar system was discovered most recently?	Neptune Jupiter Pluto	40.00	50.26
29	The chemical ethylene glycol is most commonly used as what?	Nail varnish remover Starch Antifreeze	40.00	50.26
22	Charcoal is made by heating what?	Coal Wood Chalk	45.00	51.04
7	In which London building are the Crown Jewels kept?	Tower of London Buckingham Palace Houses of Parliament	50.00	51.30
17	What nationality was Louis Braille, who devised the reading system for the blind?	German French Dutch	50.00	51.30
13	A dime is equal to how many cents?	25 10 50	55.00	51.04
14	What kind of bird is a poussin?	Chicken Quail Pheasant	55.00	51.04
20	What is dermatophobia the fear of?	Skin Dentists Crowds	55.00	51.04
30	Who replaced Charles Dickens on the Bank of England £10 note?	Charles Darwin Rudyard Kipling Francis Drake	55.00	51.04
4	Which Soho street was a centre of London fashion in the 1960s?	Wardour Street Berwick Street Carnaby Street	60.00	50.26
28	The Rosetta Stone was discovered in which country?	Israel Egypt Yemen	60.00	50.26
6	What is the capital of Northern Ireland?	Dublin Belfast Derry	65.00	48.94

9	How many fish represent the zodiac sign of Pisces?	Three Two One	65.00	48.936 0
10	What flavour is the drink Pernod?	Aniseed Hazelnut Peach	65.00	48.94
18	In which city is the Royal Mile?	Cardiff Bristol Edinburgh	65.00	48.94
15	What is the colour of the maple leaf on the Canadian national flag?	Green Gold Red	75.00	44.43
23	In German towns, what is the S-Bahn?	Motorway University Railway	75.00	44.43
1	What is the male equivalent of a mermaid called?	Merman Merlord Merboy	80.00	41.04
3	Which race is run annually at Aintree?	London Marathon Grand National Boat Race	80.00	41.04
5	Damon Hill is a past world champion in which sport?	Motor racing Rowing Sailing	95.00	22.36
16	In which country are 'fajitas' a traditional dish?	Mexico Thailand Lebanon	100.00	0.00

APPENDIX P
Conference Abstracts

Wesson, C. (2004) Factors mediating the influence of another's confidence: The role of task type on choice and confidence in choice. *Paper presented at the PsyPAG Annual Confidence, July 2004.*

Abstract

When we are uncertain we may turn to other people for their advice or opinions. The level of confidence with which they express themselves can influence the choices we opt in or out of and the subsequent confidence we have in those choices. However the extent to which another's confidence influences us may be mediated by a number of factors. This research investigates the role of task type upon the influence of confidence. In a mixed factorial design 116 participants completed three different tasks, each consisting of 12 questions with three alternative responses from which participants selected their answer. Each response was given by a different 'speaker'. In the experimental condition speaker's answers were preceded by confidence cues; one speaker answered each question with high confidence, one with medium confidence and one with low confidence. In the control condition speaker's answers were given in the absence of confidence cues. A significant interaction between speaker confidence (high/medium/low) and condition (confidence cues/no confidence cues) showed that the addition of high confidence cues had the most positive influence upon choice, and low confidence cues had the most negative influence, on all three tasks. A significant speaker confidence, condition and task type interaction indicated that the extent of this influence depended upon task type. Speaker confidence of any level also served to increase participant's confidence in their answers with the extent of this influence again depending on task type. The results indicate that when we are uncertain we use another person's confidence level as a way of distinguishing between information we are receiving, taking high confidence as representative of the 'best' answer. However the extent to which we rely upon another's confidence to help us in our choices depends upon our own level of confidence or uncertainty.

Wesson, C. & Pulford, B. (2005). Individual differences in the influence of confidence: The effects of Need for Closure and Need for Cognition [Abstract]. *Proceedings of the British Psychological Society*, 13(2), 163.

Abstract

Objectives: The influence of expressed confidence was investigated in relation to the choices people make and the confidence they have in those choices, to ascertain whether individuals use the confidence with which a person expresses their answers as a heuristic. To determine whether the confidence heuristic is a general cognitive heuristic or is mediated by individual differences, the influence of Need for Closure and Need for Cognition was also considered.

Design: The experiment used a 3 ('speaker' confidence: high, medium, and low) x 2 (Need for Closure: High vs. Low) x 2 (Need for Cognition: High vs. Low) x 2 (condition: confidence cues vs. no confidence cues) mixed design, with repeated measures on the first variable.

Methods: 110 undergraduates took part in the experiment in which they were required to choose the correct/most likely answer to a series of questions belonging to three different task types, and to indicate their confidence in their chosen answer. Participants were given three alternative answers to each question to choose from. In the experimental group these were accompanied by high, medium or low confidence cues developed in a previous pilot study, whereas in the control group there were no cues as to the speaker's confidence. Participants also completed two personality questionnaires measuring Need for Closure and Need for Cognition.

Results: The addition of confidence cues to a speaker's answer resulted in a shift towards choosing answers expressed with high confidence and away from those expressed with low confidence. Regardless of a speaker's confidence level, the addition of confidence cues led to an increase in participants' confidence in their answers. However, the extent of these effects was dependent on task type. In relation to the personality measures used, Need for Closure had an effect on participants' choice of answer whereas Need for Cognition affected participants confidence in their chosen answers. High (vs. low) Need for Closure participants showed a greater shift towards answers expressed with high confidence and away from those expressed with medium confidence. High (vs. low) Need for Cognition participants were more confident in their chosen answers.

Conclusions: People do appear to use a heuristic that uses the confidence of a person as an indicator of the validity of their information. People use the heuristic when they are uncertain as a means of making choices and having confidence in those choices. However, the extent to which the confidence heuristic is used, and the way in which it is used, is influenced by individual differences.