J. EDUCATIONAL COMPUTING RESEARCH, Vol. 14(2) 171-183, 1996

GENDER AND SOCIAL FACILITATION EFFECTS ON COMPUTER COMPETENCE AND ATTITUDES TOWARD COMPUTERS

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ABSTRACT

Subjects (36 male, 36 female), aged from fifteen to fifty-two years, performed a computer-based tracking task under one of six audience conditions in an experiment designed to investigate the effects of gender and social facilitation on performance. In addition to the computer task, each subject completed a fifteen-item questionnaire designed to identify levels of computer usage, computer-related anxiety, confidence and competence when using computers, and attitudes toward computers and computer users. Males performed significantly better than females, and a significant social facilitation effect was found. A significant Gender × Audience interaction was found, with females performing very much better in the presence of a female audience than alone or with a male audience. The implications for educational policy and practice are briefly discussed.

There is little doubt that the growth of computer usage, coupled with an increased preoccupation of the mass media with information technology and computer competence, has created anxiety in the minds of many people. Research by Weinberg and Fuerst suggested that between one-third and one-quarter of all people are to some degree "computerphobic" and as a result tend to avoid contact with keyboard-based technologies [1].

Zubrow [2] and Elkjaer [3] have reviewed a number of empirical studies showing that men tend to perform better and hold more positive attitudes toward computers than women. Brosnan and Davidson reviewed the evidence related to "computerphobia" and posed the question as to whether or not it is also a gender issue [4]. Anecdotal evidence suggests that computers appear to be perceived primarily as a masculine technology, and this tends to be confirmed by the sex distributions in school and college computer classes and amusement arcades. This male predominance is perhaps surprising in the light of the fact that many of the pioneers in the field of computing were female. In the 1800s Augusta Ada Lovelace wrote the first set of computer instructions, in the 1940s Adele Goldstone wrote the first programs for ENIAC, and in the 1960s Grace Hopper was largely responsible for the development of the first widely used programming language, Cobol. Women were also well represented in the early days of the industry when 65 percent of computer operators were female [5].

The problem of explaining the gender imbalance in computer usage and attitudes toward computers has attracted a certain amount of attention from researchers. The findings appear to suggest that females are no less aware of the importance of the newer technologies [3, 6] and that they are just as able to learn programming and other requisite skills [7]. Evidence has also shown that females on computer courses perform as well as their male counterparts and also figure equally among those with high grades [8]. However, women tend to approach computers with less confidence and more anxiety than men [9]. Furthermore, masculinity correlates with positive attitudes toward computers and femininity with computer anxiety [10]. Research into biological differences has suggested that males and females may tend to use differing cognitive strategies while using computers [11], but there is no evidence that either sex is innately superior at this type of task [3]. Additionally, the notion that males may have deep-seated spatial abilities that fit them better for computer use has not been confirmed by research, which has shown that such differences can be trained out within half an hour [12]. On the basis of observations and interviews with Danish teenagers, Elkjaer suggested an explanation of this gender difference in terms of socially constructed gender identities of girls as "guests" in a sphere where boys are perceived as "hosts" [3].

There is evidence for an imbalance between males and females in levels of involvement with computers and the effects of involvement on competence and attitudes. Research by Arch and Cummins on the impact of previous experience in structured learning environments suggests that prior usage is a more accurate predictor than gender of competence, level of usage, and attitudes toward computers [13]. Thus we may expect those with most prior experience of computers to view them in a more positive light and to be better at using them. In line with this, Levin and Gordon reported evidence that those who owned computers at home showed more positive attitudes toward them, felt a greater need for computers in their lives, and were more motivated to become familiar with them [14].

Because women tend to have less experience of computer usage and to approach computers with more anxiety than men, women and men are likely to respond differently to the presence of other people in a computing situation. According to Zajonc's drive theory of social facilitation, the mere presence of an audience or coactors leads to an elevated level of physiological arousal, which in turn enhances the emission of dominant responses [15]. Tasks that are simple or well learned are most likely to benefit from the presence of an audience or coactors, because in these cases correct or appropriate responses predominate in the person's task-relevant response hierarchy, whereas tasks that are complex or less well learned are likely to deteriorate, because in those cases incorrect responses predominate (see [16-19] for reviews of more than 240 studies). These effects may be due to evaluation apprehension [18], attention-distraction effects associated with embarrassment and self-presentational anxieties [16], or a number of other factors, but according to all of these theories performance of a simple or well-learned task is facilitated by the presence of others and performance of a difficult or poorly learned task is impaired. It is therefore possible that, in a computing situation, the presence of audience or coactors may tend to have differential effects on the performance of men and women.

Robinson-Staveley and Cooper investigated the effects of gender and social facilitation on subjects' performance on a commercially produced computer game and on their attitudes toward computers [20]. They confirmed earlier findings of Wilder, Mackie, and Cooper [9] and Zubrow [2] that relatively experienced computer users perform better and view computers more favorably than relatively inexperienced computer users. More intriguingly, they found a three-way interaction which showed that whereas gender and social context yielded no significant effects with highly experienced computer users, and among relatively inexperienced subjects working alone there was no significant gender difference, among relatively inexperienced computer users working in the presence of another person male subjects scored significantly higher and expressed more favorable attitudes toward computers than female subjects. In other words, gender and social facilitation effects combined interactively to affect performance only for low-experience subjects. When working in the presence of another person, low-experience male subjects performed better and reacted more positively to computers, but low-experience female subjects performed worse and expressed more negative attitudes toward computers. This suggests dramatically different effects of social context on male and female computer users.

In Robinson-Staveley and Cooper's experiment, the person present with the subject in the social facilitation condition was always of the same sex as the subject [20]. It is entirely possible, however, that a person of opposite sex may have quite different effects on subjects' performance. There is evidence from other areas of research to show that the presence of a person of opposite sex can have a powerful influence, especially on sex-role stereotyped forms of behavior [21-23]. Furthermore, research has shown that subjects sometimes alter their self-presentation strategies in a manner that transforms others' gender-related expectations into self-fulfilling prophecies [24, 25].

The experiment reported in this article therefore extends that of Robinson-Staveley and Cooper [20] by investigating performance on a computer-based task of male and female subjects in the presence of both male and female audiences.

As in Robinson-Staveley and Cooper's experiment, social facilitation was induced by the presence of an audience consisting of a single individual, but in the experiment reported in this article both same-sex and opposite-sex audiences were used. A relatively austere computer tracking task was used instead of a commercial computer game of the type used by Robinson-Staveley and Cooper, because it was felt that commercial computer games might be viewed as more user-friendly and less stereotypically masculine. Additionally, relationships between subjects' gender, their previous experience of computers, and their attitudes toward computers and computer users were examined.

METHOD

Design

A randomized group design with six treatment conditions was used: 1) females alone, 2) males alone, 3) females with a female audience, 4) females with a male audience, 5) males with a female audience, 6) males with a male audience. Subjects first took part in two short practice sessions using a computer and mouse to enable them to familiarize themselves with the system. They then performed five trials on a computer-based tracking task under one of the six conditions, and additional information about previous experience of computers and attitudes toward computers and computer users was gleaned from the questionnaire. The dependent variable was the score achieved on the computer task, which indicated the percentage of time on target while the subject tracked the moving icon. All trials were carried out in the same room, using the same equipment, and any subjects who wore spectacles were asked to wear them while performing the tracking task.

Subjects

The subjects (36 males and 36 females) were all undergraduate students. All were volunteers, selected from a wide range of study areas with ages ranging from sixteen to fifty-two years. Subjects were naive as to the aims of the research, although all realized that there was a computer-based task and a questionnaire involved.

Materials

The system used in this experiment was an Opus 20486-based PC, with Microsoft mouse and Opus VGA color monitor. The on-screen tracking task was specially programmed for the experiment. Subjects were required to use a computer mouse to maintain a small white cross with 7mm arms in the center of a moving white 7mm^2 square. The target moved in a random fashion, both in terms of speed and direction, against a blue background throughout, and each subject completed five trials. At the end of each sixty-second trial, the subject's score, shown as a percentage of the trial during which the target was successfully tracked, was displayed. This value was recorded as the subject's score for that trial. The program also allowed for two thirty-second pre-session practice trials, one with horizontal tracking only, the other with vertical tracking only.

The pre-experimental questionnaire was also prepared specially for the experiment. It included information about the subject's sex, age, self-rated level of computer usage ("How would you rate your current level of computer usage?"), self-rated level of computer competence ("How competent do you feel when using computers?"), and self-rated level of computer-related anxiety ("How anxious do you feel about computers?"). Additionally, the last seven questions were intended to measure subjects' attitudes toward computers and to identify the type of people whom they perceived to be computer users. These latter questions were adapted from a questionnaire by Collis [26].

Procedure

All sessions were carried out in the same room. Subjects were initially asked to complete the pre-experimental questionnaire while awaiting their turn outside the room. Once this was completed, they were invited into the room and were presented with the following standardized written instructions:

> For this exercise, you will be required to carry out a simple computer task. On the display screen, you will see two symbols, a cross and a square. The square will begin to move around the screen and it is your task to track it (using the computer mouse) trying to keep the cross within the moving square. If you move the mouse FORWARD (away from you) then the cross will move UP the screen. If you move the mouse BACK (toward you) the cross will move DOWN the screen. If you move the mouse from LEFT to RIGHT, the cross will travel across the screen, LEFT, or RIGHT. Before commencing your experimental session, you may practise with the mouse, using two trials. In the first, the square will move only UP and DOWN, in the second it will move only from LEFT to RIGHT. The main exercise will require you to track the square as it moves in a random fashion, in all directions around the screen. You must do this FIVE times, and after each attempt the computer will display your score. IF YOU HAVE ANY QUESTIONS, PLEASE ASK.

Once any questions had been answered, the subject performed the two thirty-second practice sessions, followed by the five trials under one of the following six treatment conditions.

(FA) Females alone
(MA) Males alone
(FFA) Females with a female audience
(FMA) Females with male audience

(MFA) Males with female audience
(MMA) Males with male audience

In conditions FA and MA, each subject carried out the five trials alone and recorded his or her own scores. In the audience conditions, a research assistant (male or female) sat next to the subject throughout all five trials and recorded the subject's scores.

At the end of the five trials, the subject was thanked for his or her participation, the purpose of the study was fully explained, and any questions were answered.

RESULTS

The dependent variable score for each subject was the subject's mean percentage time on target across the five trials. The results are summarized in Table 1. An analysis of variance was performed to determine the significance of differences due to gender and audience condition. The mean score of the male subjects (M = 42.24) was significantly higher than the mean score of the female subjects (M = 28.07), and this difference was significant: $F(1,66) = 23.78$, $p < .001$, effect size $\eta^2 = .26$. The main effect of social facilitation was also significant. The mean score of subjects under audience conditions (M = 37.97) was higher than the mean score of subjects working alone (M = 29.52), and this difference was also significant: $F(2,66) = 10.81$, $p < .001$, effect size $\eta^2 = .47$. Finally there was a significant interaction of Gender × Audience: $F(2,66) = 3.37$, $p < .05$, effect size $\eta^2 = .09$. The interaction is displayed in Figure 1.

It is clear from Figure 1 that whereas the scores of both male and female subjects were slightly higher in the presence of the male audience than alone, the effect of a female audience was much stronger, especially for female subjects. The only treatment condition in which a very large social facilitation effect

Table 1. Tracking Time on Target (%) by Males and Females Under Three Audience Conditions

Condition	*N*	*M*	*SD*	Min.	Max.
FA	12	19.77	9.01	2.80	34.80
MA	12	39.27	15.08	19.40	72.20
FFA	12	42.90	8.45	25.80	54.00
FMA	12	21.55	10.21	2.80	40.80
MFA	12	46.40	10.50	24.60	66.20
MMA	12	41.05	17.81	7.40	64.00

Note: FA = females alone, MA = males alone, FFA = females with a female audience, FMA = females with a male audience, MFA = males with a female audience, and FMA = females with a male audience.

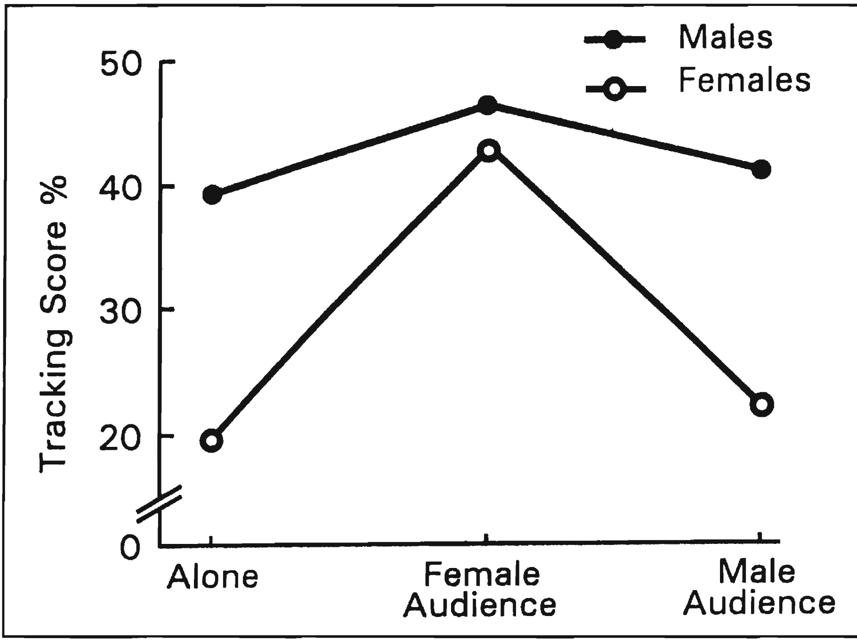

Figure 1. Tracking scores (mean percentage time on target) of male ($N = 36$) and female ($N = 36$) subjects under three audience conditions: alone, in the presence of a female audience, and in the presence of a male audience. The interaction between subjects' gender and audience condition is statistically significant.

occurred was among female subjects working in the presence of a female audience. With a female audience, female subjects' scores were similar to those of male subjects, but when working alone or in the presence of a male audience, female subjects' scores were vastly worse than those of male subjects.

The results were also analyzed in the light of Robinson-Staveley and Cooper's [20] finding that whereas gender and social context yielded no significant effects with experienced computer users, and that even among inexperienced computer users working alone there was no significant gender difference, among relatively inexperienced computer users working in the presence of another person male subjects scored significantly higher than female subjects. First, the pool of subjects was divided into relatively experienced and relatively inexperienced computer users according to their responses to the question, "How would you rate your current level of computer usage?" Subjects who scores above 3 on a 5-point Likert scale (1 = inexperienced, 5 = experienced) were classified as experienced, and those who scored 3 or less were classified as inexperienced. Comparing male and female subjects' tracking scores separately for experienced and inexperienced computer users, the only significant differences were between experienced males in the presence of an audience ($M = 47.15$) and experienced females in the presence of an audience ($M = 30.11$), $t(20) = 3.36$, $p < .005$, and between inexperienced males alone ($M = 40.60$) and inexperienced females alone ($M = 18.54$), $t(6) = 3.74$, $p < .01$. All other gender differences within experienced and inexperienced groups were non-significant ($p > .05$).

Questionnaire Responses

Self-rated levels of computer usage, computer competence, and computer-related anxiety were all scored on 5-point rating scales from 1 ("very low" competence or usage or "no anxiety") to 5 ("very high" competence or usage or "high anxiety"). The intercorrelations of these scores and performance scores on the tracking task are shown in Table 2.

All intercorrelations are statistically significant. Significant positive correlations were found between computer usage and tracking score, computer usage and computer competence, and computer competence and tracking score. Significant negative correlations were found between computer anxiety and tracking score, computer anxiety and computer usage, and computer anxiety and computer competence.

Some significant gender differences were found in responses to the questionnaire items based on Collis designed to investigate attitudes toward computers and computer users [26]. A higher proportion of males (26/36) than females (13/36) responded "Yes" to the item, "I think that computers are easy to use," $\chi^2(1) = 9.45$, $p < .01$; a higher proportion of males (8/36) than females (2/36) responded "Yes" to the item, "I think that people who like computers are often not very sociable," $\chi^2(1) = 4.18$, $p < .05$; and a higher proportion of females (33/36) than males (23/36) responded "Yes" to the item, "It's difficult to get on now if you don't understand computers," $\chi^2(1) = 8.04$, $p < .01$. No other significant differences were found in the subjects' responses to the questionnaire.

Table 2. Correlations between Tracking Score, Self-Rated Level of Computer Use, Computer Anxiety, and Computing Competence

	Score	Level of Use	Anxiety	Competence
Score	—			
Level of use	.349*	—		
Anxiety	–.336*	–.548**	—	
Competence	.429**	.758**	–.567**	—

*$p < .01$
**$p < .001$

DISCUSSION

The results of this experiment confirm the expected gender effect, with male subjects performing significantly better than female subjects on a computer-based tracking task. The size of this gender effect was large: men outperformed women by 50 percent of the average amount of time on target. In line with this finding, proportion of male subjects who answered "Yes" to the questionnaire item, "I think that computers are easy to use" (72%) was also significantly higher than the proportion of female subjects who answered "Yes" (36%). Although the reasons why men tend to outperform women in tasks involving computers are not fully understood, there is ample evidence to show that this phenomenon is quite general [2, 3, 9]. Our data also revealed an even larger main effect due to social facilitation, with subjects performing significantly better in the presence of an audience than alone. This, too, is a well-known phenomenon that has been reported many times in the past (see [15-19]).

This experiment failed to confirm the findings of Robinson-Staveley and Cooper that only among inexperienced computer users working in the presence of another person male subjects scored significantly better than female subjects [20]. When our data were analyzed separately within groups of experienced and inexperienced computer users, the only significant gender differences were between experienced males and experienced females in the presence of an audience and between inexperienced males and inexperienced females working alone. Neither of these differences was significant in Robinson-Staveley and Cooper's experiment, in which only same-sex audiences were used. In our experiment, both male and female subjects performed better when working in the presence of a person of the same sex as themselves, and the effect was much larger for female than for male subjects. Robinson-Staveley and Cooper's finding was part of a triple interaction that applied only to subjects with relatively little experience with computers. Using both male and female audiences, we found a significant Gender × Audience interaction of a slightly different though closely related kind. As Figure 1 shows clearly, this interaction was due to the powerful effect of the female audience on the tracking scores of the female subjects, who performed badly when working alone or in the presence of a male audience. The male audience had virtually no effect on the tracking scores of either male or female subjects.

The significant interaction between gender and audience condition may be due to the well-attested fact that women tend to approach computers with less confidence and more anxiety than men [9]. The presence of a female audience may have helped to restore the female subjects' confidence and relieved their anxiety about the computer-based task sufficiently to allow their potential ability at the tracking task to be realized. The task was a simple one that involved tracking a moving icon on a screen, with scores corresponding to percentage of time on target, and it closely resembled a pursuit rotor task for which positive social facilitation effects were found in the early days of research into audience effects (see, e.g., [27]). Male subjects showed a modest social facilitation effect, especially with a female audience which was presumably more arousing for them than a male audience, but the female subjects showed a much larger social facilitation effect in the presence of the female audience and none at all in the presence of the male audience. When working alone or in the presence of a male audience, perhaps the female subjects' level of confidence was so low and their anxiety so high that their tracking performance was depressed. What is clear, in any event, is that male and female subjects were differentially affected by the presence of a same-sex audience and, in contrast to Robinson-Staveley and Cooper's [20] finding with inexperienced subjects, the same-sex audience greatly enhanced the performance of the female subjects.

Evidence from the subjects' responses to the rating scales confirms the suggestion in the previous paragraph that performance was related to anxiety about computers: there was a significant negative correlation of $r = -.336$ between subjects' self-rated levels of computer-related anxiety and their tracking scores, suggesting that about 11 percent of the variance in tracking scores may have been due to computer-related anxiety. Computer-related anxiety was also negatively correlated with self-rated level of computer usage ($r = -.548$) and self-rated computer competence ($r = -.567$). This suggests that people who used computers comparatively rarely and considered themselves less competent at using them were more anxious about them. It is tempting to conclude from these findings that computer-related anxiety and consequent lack of competence are both therefore attributable to lack of experience of computer usage [13] and that more experience would eliminate the anxiety and raise the competence levels, but of course correlations cannot on their own establish causality, and it is possible that lack of usage was caused by computer-related anxiety rather than the other way around.

What is quite clear, however, is that self-rated levels of computer usage and competence were positively, significantly, and highly correlated ($r = .758$), and that self-rated levels of computer use and tracking scores in the experiment were also positively and significantly correlated ($r = .349$). In other words, the comparatively lower competence of women compared with men, both in general computer use and in the tracking task in our experiment, may have been caused either directly by computer-related anxiety or indirectly by lack of computer usage and practice, which in turn may have been due to computer-related anxiety. However, the fact that female subjects in our experiment performed virtually as well as male subjects when they were in the presence of a person of the same sex suggests that their relatively poor performance in the other treatment conditions was caused directly by computer-related anxiety. Had it been due to a general lack of previous experience with computers, it is hard to see how it could have been eliminated by the same-sex audience effect. This finding also tends to support Elkjaer's interpretation of gender differences in computer use in terms of socially constructed social spheres [3].

Women are probably just as aware as men of the value of information technology skills [3, 6]. In fact, in our experiment, the proportion of women who answered "Yes" to the questionnaire item, "It's difficult to get on now if you don't understand computers" (92%) was higher than the proportion of men who answered "Yes" (64%). This difference, which is statistically significant, may also reflect the generally higher levels of computer anxiety among women than men. There is no evidence that women have a lower opinion of computer users than men; in fact, in response to the questionnaire item, "I think that people who like computers are often not very sociable," the proportion of women who answered "Yes" (5%) was significantly smaller than the proportion of men who answered "Yes" (22%). This adds further weight to the main conclusion of this study, namely that it is women's anxiety about computers and consequent lack of confidence that lies at the root of their generally inferior performance at tasks involving computers.

This conclusion has important implications for educational policy and practice. In the right circumstances, women are probably just as able as men to acquire computer skills [7, 8]. The fact that women tend to approach computers with less confidence and more anxiety than men has been corroborated by earlier studies, e.g., [9]. The findings reported in this article have shown that this tendency is greatly attenuated, and massive positive social facilitation occurs, in women who are working at a computer task in the presence of a same-sex audience.

It may therefore be desirable for early experience of computers in school settings to take place in same-sex groups, so that girls are exposed from an early stage to the potential social facilitation of a female audience or coactors. This presumably already happens in girls-only schools, where anecdotal evidence confirms that anxiety and lack of confidence in relation to computers is much less than in mixed schools, but computer instruction in mixed schools generally takes place in mixed-sex groups. In these more usual circumstances, it is possible that the presence of boys inhibits girls' skill acquisition, as appears to have happened in the experiment reported in this article, and it may therefore be desirable to separate boys and girls for computer instruction. These educational policy implications assume that the Gender × Audience interaction turns out to be replicable and that larger, mixed-sex audiences have similar effects to single-person, opposite-sex audiences.

REFERENCES

1. S. B. Weinberg and M. Fuerst, *Computerphobia: How to Slay the Dragon of Computer Fear*, Banbury Books, Wayne, Pennsylvania, 1984.

2. D. Zubrow, How Computing Attitudes Change during the Freshman Year, in *Computing and Change on Campus*, S. B. Kiesler and L. S. Sproull (eds.), Cambridge University Press, New York, pp. 195-211, 1987.
3. B. Elkjaer, Girls and Information Technology in Denmark: An Account of a Socially Constructed Problem, *Gender and Education, 4*, pp. 25-40, 1992.
4. J. Brosnan and M. J. Davidson, Computerphobia: Is it a Particularly Female Phenomenon? *The Psychologist, 7*, pp. 73-78, 1994.
5. C. B. DiCesare, Changes in the Occupational Structure of U.S. Jobs, *Monthly Labor Review, March, 98*:3, pp. 24-34, 1975.
6. M. E. Lockheed, A. Nielson, and M. K. Stone, An Empirical Study of Some Determinants of Microcomputer Literacy in High School Students, *Journal of Educational Computing Research, 1*, pp. 81-96, 1985.
7. M. E. Lockheed, A. Nielsen, and M. Stone, *Sex Differences in Microcomputer Literacy*, paper presented at the National Educational Computer Conference, Baltimore, June 6, 1983.
8. M. E. Lockheed, Women, Girls, and Computers: A First Look at the Evidence, *Sex Roles, 13*, pp. 115-122, 1985.
9. G. Wilder, D. Mackie, and J. Cooper, Gender and Computers: Two Surveys of Computer-Related Attitudes, *Sex Roles, 13*, pp. 215-228, 1985.
10. L. D. Rosen, D. C. Sears, and M. M. Weil, Computerphobia, *Behavior Research Methods, Instruments & Computers, 19*, pp. 167-179, 1987.
11. S. Turkle, *The Second Self: Computers and the Human Spirit*, Simon & Schuster, New York, 1984.
12. P. J. Caplan, G. MacPherson, and P. Tobin, Do Sex-Related Differences in Spatial Ability Really Exist? A Multilevel Critique with New Data, *American Psychologist, 40*, pp. 786-799, 1985.
13. E. C. Arch and D. E. Cummins, Structured and Unstructured Exposure to Computers: Sex Differences in Attitude and Use among College Students, *Sex Roles, 20*, pp. 245-254, 1989.
14. T. Levin and C. Gordon, Effect of Gender and Computer Experience on Attitudes toward Computers, *Journal of Educational Computing Research, 5*, pp. 69-88, 1989.
15. R. Zajonc, Social Facilitation, *Science, 149*, pp. 269-274, 1965.
16. C. F. Bond, Jr., Social Facilitation: A Self-Presentational View, *Journal of Personality and Social Psychology, 42*, pp. 1042-1050, 1982.
17. C. F. Bond, Jr. and L. J. Titus, Social Facilitation: A Meta-Analysis of 241 Studies, *Psychological Bulletin, 94*, pp. 265-292, 1983.
18. N. B. Cottrell, Performance in the Presence of Other Human Beings: Mere Presence, Audience and Affiliation Effects, in *Social Facilitation and Imitative Behavior*, E. C. Simmel, R. A. Hoppe, and G. A. Milton (eds.), Allyn & Bacon, Boston, Massachusetts, pp. 91-110, 1968.
19. B. Guerin, Mere Presence Effects in Humans: A Review, *Journal of Experimental Social Psychology, 22*, pp. 38-77, 1986.
20. K. Robinson-Staveley and J. Cooper, Mere Presence, Gender, and Reactions to Computers: Studying Human-Computer Interaction in the Social Context, *Journal of Experimental Social Psychology, 26*, pp. 168-183, 1990.

21. M. Crawford and R. K. Unger, Gender Issues in Psychology, in *Companion Encyclopedia of Psychology*, Vol. 2, A. M. Colman (ed.), Routledge, London, pp. 1007-1027, 1994.
22. K. E. Grady, Sex Bias in Research Design, *Psychology of Women Quarterly, 5*, pp. 628-636, 1981.
23. M. D. McHugh, R. D. Koeske, and I. H. Frieze, Issue to Consider in Conducting Nonsexist Psychological Research: A Guide for Researchers, *American Psychologist, 41*, pp. 879-890, 1986.
24. B. J. Skrypnek and M. Snyder, On the Self-Perpetuating Nature of Stereotypes about Women and Men, *Journal of Experimental Social Psychology, 18*, pp. 277-291, 1982.
25. S. M. J. Towson, M. P. Zanna, and G. MacDonald, Self-Fulfilling Prophecy: Sex-Role Stereotypes and Expectations for Behavior, in *Representations: Social Constructions of Gender*, R. K. Unger (ed.), Baywood, Amityville, New York, pp. 97-107, 1989.
26. B. A. Collis, Sex-Related Differences in Attitudes toward Computers: Implications for Counselors, *The School Counselor, 33*:2, pp. 120-130, 1985.
27. L. E. Travis, The Effects of a Small Audience upon Eye-Hand Coordination, *Journal of Abnormal and Social Psychology, 20*, pp. 142-146, 1925.

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