

Title: The relationship between mathematics *anxiety* and social desirability as a function of gender.

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Abstract: Investigates the relationship between mathematics *anxiety* and social desirability as a function of gender in the Mathematics *Anxiety* Rating Scale (MARS). Testing of MARS with Edwards and Marlowe-Crowne rating scales; Correlation of MARS with male participants only; Implications of using MARS.

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THE RELATIONSHIP BETWEEN MATHEMATICS ANXIETY AND SOCIAL DESIRABILITY AS A FUNCTION OF GENDER

The Mathematics *Anxiety* Rating Scale (MARS) has been recommended as a screening tool for use with college students. Its use, however, may be limited by its differential susceptibility to a socially desirable response set/style as a function of gender. To investigate this issue, the MARS and two measures of social desirability, the Edwards and Marlowe-Crowne, were administered to a sample of college students. The MARS was found to correlate significantly with both measures of social desirability for male participants only. Implications of the findings for using the MARS as a screening instrument and outcome measure within treatment programs for *math anxiety*, particularly with male college students, are discussed.

Math anxiety increasingly has been implicated as a factor affecting educational and career choices of college students, in general, and of women students in particular (Betz, 1978; Chipman, Krantz, & Silver, 1992; Resnick, Viehe, & Segla, 1982; Singer & Stake, 1986). One of the more widely used instruments to assess *math anxiety* is the Mathematics *Anxiety* Rating Scale (MARS; Suinn, 1972). While there has been some disagreement about the psychometric properties of the MARS (Knapp, 1985; Rounds & Hendel, 1980; Walsh, 1978; Weinberg, 1992), there appears to be greater consensus about its possible use as a screening tool to identify college students experiencing high levels of *math anxiety* (Hannafin, 1985; Kline, 1978).

The present study was designed to address two related concerns involved in using the MARS to identify *math* anxious students within a college population. One of these is uncertainty about the degree to which the instrument may be prone to "faking" and social desirability (Hannafin, 1985; Kline, 1978; McMorris, 1992). In particular, to the extent that the acknowledgment of *math*

anxiety is related inversely to a socially desirable response set or style, the utility of the MARS as a screening tool may be seriously compromised. To investigate this issue, the MARS and two measures of social desirability were administered to a sample of college students.

The two measures of social desirability employed were the Edwards Social Desirability Scale (Edwards, 1957) and the Marlowe-Crowne Social Desirability Scale (Crowne & Marlowe, 1960). The Edwards scale consists of items drawn from the MMPI validity scales (Hathaway & McKinley, 1942) and the Manifest *Anxiety* Scale (Taylor, 1953). Accordingly, the Edwards appears to be poorly designed to assess social desirability independently of psychopathology. By contrast, the items of the Marlowe-Crowne scale were deliberately selected to be independent of psychopathology. To the extent that the MARS assesses what it purports to and is relatively uncontaminated by a social desirability response set/style, scores from the MARS should correlate significantly (negatively) with the Edwards but not with the Marlowe-Crowne.

Approximately an equal number of male and female college students participated in the study. A deliberate effort was made to sample both sexes as it was anticipated that the relationship between *math anxiety* and the two social desirability scales might vary as a function of gender. This seemed possible for several reasons and presents a second concern addressed by this study associated with using the MARS to screen college students for *math anxiety* treatment programs. Females tend to report higher levels of specific types of *anxiety* and worry than males (Betz, 1978; Reyes, 1984; Stavosky & Borkovec, 1987). With regard to the MARS, while some studies have found significantly higher levels of *math anxiety* among female college students (e.g., Ashcraft & Faust, 1994; Dew, Gallassi, & Gallassi, 1983), others have not (e.g., Resnick et al., 1982; Richardson & Suinn, 1972).

The equivocal findings concerning gender differences with the MARS suggest that differences in levels of *math anxiety* between male and female students may vary as a function of the particular university involved. Both studies that obtained a gender difference on the MARS sampled students at state universities, while one of the two that failed to find such a difference (Resnick et al., 1982) was conducted at a private institution. Because the present study was conducted at a mid-size, state university with an open admissions policy, it was expected that female students would report significantly higher levels of *math anxiety*.

Why females tend to report higher levels of *math anxiety* has been the focus of considerable debate and investigation (e.g., Felson & Trudeau, 1991), but has yet to be clearly resolved. The most common explanation offered is that females may be socialized to focus greater attention on their internal states and sense of psychological well-being. Also as a result of the same process, it may be more socially acceptable for females than it is for males to admit to experiencing *math anxiety*. To the extent that this may be the case, gender differences in *math anxiety* might be attenuated by controlling for social desirability (cf., McCann, Stewin, & Short, 1991). In addition, any differential relationship between *math anxiety* and social desirability as a function of gender would suggest that the MARS, in particular, may have to be used more cautiously in screening for the presence of *math anxiety* among male college students. These issues were addressed in the present study by analyzing correlation coefficients between the MARS and the two measures of social desirability for gender differences. Specifically, it was anticipated that female participants would report significantly higher levels of *math anxiety*, but that the

correlation coefficient between the MARS and Marlowe-Crowne would be significantly weaker than that found for male participants. Because the Edwards putatively provides a more contaminated measure of social desirability, no gender difference was expected for the relationship between it and the MARS.

Method

Participants

Participants were 229 students (103 men and 126 women) enrolled in sections of introductory psychology at a midsize, state-supported, urban Midwestern university. The mean age of the sample was 22.9 years, and reflects the substantial proportion (55%) of nontraditional students enrolled at the university. There was no age difference between men and women participants.

Materials

Participants were administered a survey consisting of the Edwards Social Desirability Scale, Marlowe-Crowne Social Desirability Scale, and MARS, presented in a semicounter-balanced order. The Edwards and Marlowe-Crowne were always presented in that order and were grouped together because of identical response format (true-false). The order in which the MARS was presented was counterbalanced with respect to the Edwards and Marlowe-Crowne. The Edwards consists of 39 items and the Marlowe-Crowne of 33 items. The MARS is a 98-item, 5-point Likert-format scale composed of scenarios that may elicit different levels of *math anxiety*. A total score is calculated by summing across ratings of the individual items.

Results

Preliminary analyses indicated no main effects nor interactive effects for the order in which the three instruments were administered. Accordingly, data were collapsed across order and were evaluated as an aggregate in all subsequent analyses.

Descriptive statistics for each of the three instruments are presented in Table 1. While female participants reported slightly higher levels of *math anxiety* as assessed by the MARS, this difference was not statistically significant as had been expected. Also, no gender differences were obtained on the two measures of social desirability.

Correlations between the MARS and the two social desirability scales are presented in Table 2. For the full, male, and female samples, the MARS, as expected, correlated significantly (negatively) with the Edwards. Also, as anticipated, a test of correlation coefficients indicated no significant difference between male and female participants.

In contrast to its relationship with the Edwards, the MARS was not expected to correlate significantly with the Marlowe-Crowne. This was found to hold for female participants only. Correlation coefficients between the MARS and Marlowe-Crowne were statistically significant for the full ($p < .01$) and male samples ($p < .05$). It also was anticipated that the relationship

between the MARS and Marlowe-Crowne for female participants ($r = -.17$) would be significantly weaker than for male participants ($r = -.19$). This was not the case.

In order to more fully evaluate the differential relationship between the MARS and the two measures of social desirability, tests of correlation coefficients between the MARS-Edwards and MARS-Marlowe-Crowne were conducted. The difference between the two coefficients was found to be statistically significant for only the full ($p < .005$) and female samples ($p < .01$).

Discussion

As expected, the degree to which the MARS purportedly assesses *math anxiety* independently of social desirability was found to vary as a function of gender. Specifically, the MARS appears to be relatively uncontaminated by a social desirability response set/style when used with female participants. It correlated significantly (negatively) with the Edwards, but not with the Marlowe-Crowne. Additionally, the correlation coefficient between the MARS and Edwards ($r = -.40$) was significantly higher than that between the MARS and Marlowe-Crowne ($r = -.17$). The pattern of results for male participants was noticeably different. The MARS correlated significantly with both social desirability scales and the coefficients did not differ significantly from each other, suggesting that responses of male participants to the MARS were affected by social desirability.

These findings suggest several caveats especially in using the MARS with male college students. One concern involves using the MARS to determine the prevalence of *math anxiety* among college students and/or select and screen participants for programs designed to reduce *math anxiety*. The number of male college students experiencing *math anxiety* typically may be underestimated to the extent that it is less socially acceptable for them to present themselves as being *math* anxious and/or as being deficient in their *math* skills. Also, because scores on the MARS may underestimate levels of *math anxiety* for males, a lower criterion than that used for females may have to be established in screening participants for treatment programs for *math anxiety*. While the MARS primarily has been used as a screening instrument, additional concerns arise when it is used also as a dependent variable in such programs (e.g., Foss & Hadfield, 1993; Schneider & Nevid, 1993; Wadlington, Austin, & Bither, 1992). Pre to posttreatment decreases in MARS scores may have to be interpreted differently for male and female participants. In particular, there would appear to be more reason to question whether reductions in MARS scores for male participants reflect valid changes in levels of *math anxiety*.

While this study's findings were not as robust as had been anticipated, the overall findings suggest that the gender of participants should be considered in using the MARS for both research and clinical purposes. One possible explanation for this might involve the failure to obtain an expected gender difference in levels of *math anxiety*. As mentioned, other studies that have documented a gender difference in MARS scores have surveyed students at state-supported universities that generally have less rigorous admission standards than private institutions. Because the current study was conducted at a state-supported university with an open admissions policy, it is not clear why a gender difference in *math anxiety* was not found. Other researchers (Resnick et al., 1982) have suggested that *math anxiety* be viewed as a "local phenomenon" and that generalizations from one college population to another be done so cautiously. Accordingly, it may be necessary to replicate this study at other institutions where there is a pronounced

gender difference in levels of *math anxiety* to evaluate more thoroughly the possibility that the relationship between the MARS and social desirability significantly varies as a function of gender.

Table 1 Means and Standard Deviations for MARS and Measures of Social Desirability

Legend for Chart:

- A - Measure
- B - Male (n=103), M
- C - Male (n=103), D
- D - Female (n=126), M
- E - Female (n=126), D
- F - Full Sample (N=229), M
- G - Full Sample (N=229), D

A	B	C	D	E	F	G
MARS	204.55	66.50	210.14	64.08	207.61	65.10
Edwards	27.93	6.52	27.27	5.76	27.57	6.11
Marlowe-Crowne	15.15	4.89	16.05	5.71	15.64	5.36

Table 2 Correlations Between MARS and Measures of Social Desirability

	Male	Female	Full Sample
Edwards	-.31 [b]	-.40 [b]	-.36 [b]
Marlowe-Crowne	-.19 [a]	-.17	-.17 [b]

a $p < .05$. b $p < .01$.

References

- Ashcraft, M.H., & Faust, M.W. (1994). Mathematics *anxiety* and mental arithmetic performance: An exploratory investigation. *Cognition and Emotion*, 8, 97-125.
- Betz, N.E. (1978). Prevalence, distribution, and correlates of *math anxiety* in college students. *Journal of Counseling Psychology*, 25, 441-448.
- Chipman, S.F., Krantz, D.H., & Silver, R. (1992). Mathematics *anxiety* and science careers among able college women. *Psychological Science*, 3, 292-295.
- Crowne, D.P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology*, 24, 349-354.
- Dew, K.M.H., Galassi, J.P., & Galassi, M.D. (1983). Mathematics *anxiety*: Some basic issues. *Journal of Counseling Psychology*, 30, 443-446.
- Edwards, A.L. (1957). *The social desirability variable in personality assessment and research*. New York: Dryden.

- Felson, R. B., & Trudeau, L. (1991). Gender differences in mathematics performance. *School Psychology Quarterly*, 54, 113-126.
- Foss, D. H., & Hadfield, O. (1993). A successful clinic for the reduction of mathematics *anxiety* among college students. *College Student Journal*, 27, 157-165.
- Hannafin, M.J. (1985). Review of the Mathematics *Anxiety* Rating Scale. In J.V. Mitchell, Jr. (Ed.), *The ninth mental measurements yearbook*. (pp. 909-911). Lincoln, NE: Buros Institute of Mental Measurements.
- Hathaway, S.R., & McKinley, J.C. (1942). *Minnesota Multiphasic Personality Inventory*. Minneapolis: University of Minnesota Press.
- Kline, W.E. (1978). Review of the Mathematics *Anxiety* Rating Scale. In O.K. Buros (Ed.), *The eighth mental measurements yearbook* (pp. 899-900). Highland Park, NJ: The Gryphon Press.
- Knapp, J.R. (1985). Review of the Mathematics *Anxiety* Rating Scale. In J.V. Mitchell, Jr. (Ed.), *The ninth mental measurements yearbook* (p. 911). Lincoln, NE: Buros Institute of Mental Measurements.
- McCann, S. J. H., Stewin, L. L., & Short, R. H. (1991). Sex differences, social desirability, masculinity, and the tendency to worry. *The Journal of Genetic Psychology*, 152, 295-301.
- McMorris, R.F. (1992). Review of the Mathematics *Anxiety* Rating Scale. In J.J. Kramer & J.C. Conoley (Eds.), *The eleventh mental measurements yearbook* (pp. 510-512). Lincoln, NE: Buros Institute of Mental Measurements.
- Resnick, H., Viehe, J., & Segal, S. (1982). Is *math anxiety* a local phenomenon? A study of prevalence and dimensionality. *Journal of Counseling Psychology*, 29, 39-47.
- Reyes, L. H. (1984). Affective variables and mathematics education. *The Elementary School Journal*, 84, 558-581.
- Richardson, F.C., & Suinn, R.M. (1972). The Mathematics *Anxiety* Rating Scale: Psychometric data. *Journal of Counseling Psychology*, 19, 551-554.
- Rounds, J.B., & Hendel, D.D. (1980). Measurement and dimensionality of mathematics *anxiety*. *Journal of Counseling Psychology*, 27, 138-149.
- Schneider, W. J., & Nevid, J. S. (1993). Overcoming *math anxiety*: A comparison of stress inoculation training and systematic desensitization. *Journal of College Student Development*, 34, 283-288.
- Singer, J.M., & Stake, J.E. (1986). Mathematics and self-esteem: Implications for women's career choice. *Psychology of Women Quarterly*, 10, 339-352.

Stavosky, J. M., & Borkovec, T. D. (1987). The phenomenon of worry: Theory, research, treatment and its implications for women. *Women and Therapy*, 6, 77-95.

Suinn, R.M. (1972). Mathematics *Anxiety* Rating Scale (MARS). Fort Collins, CO: Rocky Mountain Behavioral Science Institute.

Taylor, J. (1953). A personality scale of manifest *anxiety*. *Journal of Abnormal and Social Psychology*, 48, 285-290.

Wadlington, E., Austin, S., & Bither, J. (1992). The treatment of *math anxiety* and negative *math* self-concept in college students. *College Student Journal*, 26, 61-65.

Walsh, J.A. (1978). Review of the Mathematics *Anxiety* Rating Scale. In O.K. Buros (Ed.), *The eighth mental measurements yearbook*. (pp. 900-901). Highland Park, NJ: The Gryphon Press.

Weinburg, S.L. (1992). Review of the Mathematics *Anxiety* Rating Scale. In J.J. Kramer & J.C. Conoley (Eds.), *The eleventh mental measurements yearbook*. (pp. 512-513). Lincoln, NE: Buros Institute of Mental Measurements.

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