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AUTHOR Marsh, Herbert W.; Byrne, Barbara
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ABSTRACT

Masculinity (M) and femininity (F) were related to multiple dimensions of self-concept (SC) for responses to the: Bem Sex Role Inventory and the Self Description Questionnaire III (SDQ-III) by 898 Canadian university students (61% female) in Study 1, and Australian Sex-Role Scale and the SDQ-II by 1,858 Australian high school students (49% female) in Study 2. In Study 1, subjects' significant others were asked to provide ratings of subject SCs. In Study 2, students in Sydney (Australia) were followed from grade 7 through grade 11. Androgyny theory predicts that both M and F contribute to SC, but previous research, relying on undifferentiated SC measures, has found no unique contribution by F. These two studies show that both M and F contributed to the prediction of well-differentiated facets of SC. Consistent with a new model of MF/SC relations, the differentiated additive androgyny model, the relative contributions of M and F varied substantially depending on the area of SC: F contributed more positively to facets for which girls had higher SCs than boys; in some areas the contribution of F was more positive than the contribution of M. In Study 1, the pattern of MF/SC relations was similar for self-responses and ratings by significance others. In Study 2, the MF/SC relations were consistent across the 5 years of school studied, spanning the early to middle adolescence period. In conclusion, the two studies support neither the androgyny interactive nor sex-typed models, and provide only weak support for the additive androgyny and the masculinity models. In contrast, both studies strongly support the differentiated additive model. Eight tables provide study data; and an appendix describes the SDQ-II and SDQ-III scales. A 55-item list of references is included. (SLD)

The Differentiated Additive Androgyny Model: Relations Between Masculinity, Femininity and Multiple Dimensions of Self-Concept

Herbert W. Marsh, The University of Western Sydney, Macarthur

Barbara Byrne, The University of Ottawa

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The Differentiated Additive Androgyny Model: Relations Between Masculinity, Femininity and Multiple Dimensions of Self-Concept

ABSTRACT

Masculinity (M) and femininity (F) were related to multiple dimensions of self-concept for responses by 898 Canadian University students (study 1) and by 1858 Australian high school students (Study 2). Androgyny theory predicts that both M and F contribute to self-concept, but previous research, typically relying on undifferentiated self-concept measures, has found the unique contribution of F to be nil. In contrast the two studies presented here found that both M and F contributed to the prediction of well differentiated facets of self-concept. Consistent with a new model of MF/self-concept relations, the differentiated additive model, the relative contribution of M and F varied substantially depending on the area of self-concept; F contributed more positively to self-concept facets for which girls had higher self-concepts than boys, and in some areas the contribution of F was more positive than the contribution of M. In Study 1 the pattern of MF/self-concept relations was similar for self-responses and ratings by significant others. In study 2 the MF/self-concept relations were consistent across five years in school spanning the early to middle adolescence period.

Most researchers prior to 1973 assumed that M and F were the end-points of a single, bipolar dimension. Constantinople (1973), Bem (1974), Spence (1984), and others subsequently argued that it is logically possible to be both M and F, and the existence of both in the same person has been labeled androgyny. There has been considerable debate over the content of the M and F scales. For example, Marsh (1985; Marsh & Myers, 1986), Spence (1984), Paulhus (1987) and many others (see Cook, 1985) have argued that the M and F traits measured by most instruments are two trait constellations: assertiveness, dominance and instrumentality (M); nurturance, empathy, and interpersonal orientation (F). Marsh and Myers (1986; also see Marsh, 1985; Marsh & Richards, 1989; Marsh, Antill & Cunningham, 1989) specifically proposed a hierarchical model in which global-M and global-F are defined by more specific facets of M and F. Nevertheless, correlations tend to be substantially positive among specific M traits, among specific F traits, and among M and F assessed by different instruments. These results apparently support the construct validity of M and F as self-descriptive, global, traits, but not necessarily the theoretical basis of androgyny theory.

The two key assumptions to androgyny theory are that M and F are independent dimensions, and that individuals high on both are socially more effective as indicated by measures such as self-concept. In tests of the first assumption, correlations between M and F have been found to vary from moderately positive to close to -1.0 depending on the MF instrument (Marsh, 1985; Marsh, Antill & Cunningham, 1987; Marsh & Myers, 1986; Paulhus, 1987), so that these results do not provide unequivocal support for either the androgyny or the bipolar assumptions. Hence, support for androgyny theory rests on the assumption that both M and F contribute uniquely and positively to the prediction of appropriate outcomes such as self-concept.

MF/Self-concept Relations

Theoretical Models.

Four theoretical models of how MF is related to total or global self-concept have been studied widely (Antill & Cunningham, 1980; Cook, 1985; Hall & Taylor, 1985; Lubinski, Tellegen & Butcher, 1983; Marsh, 1987; Marsh, Antill & Cunningham, 1987; Spence, 1984; Taylor & Hall, 1982; Whitley, 1983) and so are summarized only briefly here. Support for each of these models is interpreted from the results of ANOVA or regression analyses that relate total self-concept to the main effects of M and F, the M-by-F interaction, and the interaction of these effects with gender.

1. The Sex-Typed Model. This model posits that the acquisition of a masculine identity by males and of a feminine identity by females leads to higher self-concepts, and that, perhaps, support for such a model should be strongest during early adolescent years when such acquisition processes are typically assumed to be

most important (e.g., Kohlberg, 1966; Lamke, 1982). Support for this model requires that the effects of M and F each interact with gender in an appropriate way.

2. Additive Androgyny Model. As described by Spence (1984) and others, and apparently consistent with Bem's original formulation, this model posits that M and F each contribute positively and uniquely to the prediction of self-concept. This implies that the main effects of both M and F will be statistically significant.

3. Masculinity Model. This model posits that self-concept, at least in modern Western societies, is primarily determined by M rather than F, and is sometimes called the "masculine supremacy effect" (Cook, 1985, p. 96). This model appears to be prompted primarily by empirical findings rather than theory, though it may be consistent with feminist perspectives on the organization of society. Support for this model implies a main effect of M but no main effect of F, or perhaps a main effect of F in which F contributes negatively to self-concept after controlling for the main effect of M.

4. Interactive Androgyny Model. This model proposes that androgyny is more than the additive sum of M and F. In the ANOVA approach this model posits an M-by-F interaction and in the multiple regression approach it posits that the MF crossproduct contributes significantly to the prediction of self-concept beyond the contribution of M and F. Hall and Taylor (1985) distinguished between what they called a balance interactive model that posits an M-by-F interaction without main effects of M or F, and an emergent interactive model that posits significant effects of M, F, and M-by-F.

Empirical Support

In order to test these models Lubinski et al. (1983) recommend an ANOVA or regression approach that tests the main effects of M, F, gender and each of the possible interactions; the main effects of M and F test the additive androgyny model and the masculinity model, the M-by-F interaction tests the interactive androgyny model, and interactions between these effects and gender test the sex-typed model. Empirical support (e.g., Antill & Cunningham, 1979; 1980; Marsh, Antill & Cunningham, 1987), literature reviews and meta-analyses (e.g., Bassoff & Glass, 1982; Cook, 1985; Hall & Taylor, 1985; Spence, 1984; Taylor & Hall, 1982; Whitley, 1983) of MF/self-concept relations consistently provide the strongest support for the masculinity model. In perhaps the most systematic single study Antill and Cunningham (1979) related responses from five different MF instruments -- including measures specifically designed to measure a bipolar MF -- and two different self-esteem measures. They concluded that: "In every case masculinity showed significant positive correlations with self-esteem in both sexes whereas the correlations with femininity were generally nil or negative" (1979, p. 783). Meta-analyses by Taylor and Hall and by Whitley found that most of the variance in MF/self-concept relations could be explained by M, while little contribution was made by the main effect of F or M-by-F

interactions, and that these findings were consistent across responses by males and by females. Bassoff and Glass's meta-analysis of a wider variety of mental health measures reached similar conclusions. In her review Cook notes that: "The best documented and robust association in the androgyny literature is the between masculinity and paper and pencil tests of self-esteem. Femininity is more weakly related, if at all" (1985, p. 94). Hence, androgyny researchers have been unable to find much support for either the additive or interactive models that are derived from and central to androgyny theory, and this represents, perhaps, the most devastating appraisal of androgyny theory.

Previous research has typically found that self-concept is positively related to M and relatively uncorrelated with F. These results do not support theoretical models based on androgyny theory, but neither do they support a bipolar perspective of MF. According to the bipolar perspective, any variable that is substantially related to M should be negatively related to the F, and vice versa. Thus, for example, Marsh and Jackson (1986) found that participation in athletics was substantially and positively related to M for high school and young adult women, but that athletic participation was not related to F. They interpreted these findings as a contradiction to bipolar perspective of MF and as support for androgyny theory. The implication was that athletic participation positively influenced M without negatively influencing F, though such an interpretation based on correlational data needs to be made cautiously. Stronger support was found by Marsh and Richards (1989) in their study of the effects of participation in the Outward Bound program on MF. Historically, the Outward Bound program was intended to "make men out of boys" and focused on the development of traditionally M characteristics. More recently, however, an increasing proportion of participants have been women and the aims of the program include development of characteristics related to F. Consistent with a priori predictions, Marsh and Richards found that participation in the Outward Bound program had a substantial and positive effect on M and a small, positive effect on F. These effects were reasonably consistent across gender, across different MF measures, and across different groups of participants. Although they did not consider self-concept, previous research (Marsh, Barnes & Richards, 1986a; 1986b) found that participation in the Outward Bound program positively affected self-concept.

Participation in athletics and in the Outward Bound program are logically expected to have a positive influence on M, and so the finding that participation has little effect or a small positive effect on F is important. According to androgyny theory, however, self-concept should be positively correlated with both M and F, but F is typically not found to be positively correlated with total self-concept. From this perspective, support for androgyny theory requires the demonstration that F contributes substantially to a variety of different variables. Particularly strong support would be the demonstration that F contributes more positively than M for some

relevant criterion variables. Thus, whereas the pattern of relations in these studies considered here offers little support for bipolar perspective of MF, the typical failure of F to contribute positively to the prediction of appropriate criterion variables substantially undermines support for androgyny theory.

Limitations With Existing Research

Most previous studies of MF/self-concept relations suffer from three limitations that will be examined here. First, most studies have used MF instruments that assess only positively valued M and F characteristics, even though these may be unduly influenced by social desirability, and MF stereotypes include undesirable as well as desirable characteristics. The Bem Sex Role Inventory (BSRI) and Personal Attributes Questionnaire (PAQ) are the most widely used androgyny instruments and the basis of most studies of MF/self-concept relations. Their reliance only on socially desirable attributes, however, may constitute an important weakness. For example, a social desirability response bias may affect the correlation between M and F, and MF/self-concept relations (Baumrind, 1982; Kelly, Caudill, Hathorn & O'Brien, 1977; Kelly & Worell, 1977; Marsh & Myers, 1986; Pedhazur & Tetenbaum, 1979). In response to this potential weakness, Spence, Helmreich and Holahan (1979) expanded PAQ to include socially undesirable characteristics, and Antill, Cunningham, Russell and Thompson (1981) developed the Australian Sex-Role Scale (ASRS) to measure M and F with negatively valued characteristics (M- and F-) as well as positively valued characteristics (M+ and F+). In addition, both the BSRI and ASRS include "control" scales consisting of socially desirable and socially undesirable attributes that were specifically constructed to be neutral with respect to M and F. In each case there is a potential control for social desirability effects, though little empirical research has explored the effects of social desirability on MF/self-concept relations.

Second, most studies and reviews are based on a 2 x 2 design (Hall & Taylor, 1985; Lubinski, et al., 1983; Taylor & Hall, 1982; Whitley, 1983) in which levels of M and F are each dichotomized. This approach is inherently weak, throwing away much systematic variance in the M and F responses. Furthermore, Spence (1984) noted that there are many theoretically meaningful forms of an M-by-F interaction that cannot be tested with the 2x2 design. The use of dichotomous M and F scores is neither necessary nor desirable, and more sophisticated designs are readily available (e.g., Cohen & Cohen, 1975; Pedhazur, 1982). Spence (1984), for example, recommended a 4 x 4 ANOVA design in which M and F are divided at the quartiles instead of at the medians. This design is preferable to the 2x2 design in that it provides stronger tests of the main effects and tests of more complex interactions. Alternatively, using a regression approach to ANOVA (e.g., Marsh, Antill & Cunningham, 1987), M and F scores do not need to be divided into discrete categories at all.

Third, and particularly relevant to the present investigation, most research has used undifferentiated, global self-concept measures. As described below, however, recent self-concept research and theory emphasizes the multidimensionality of self-concept.

A Multidimensional Self-concept: A Construct Validity Approach

Historically, self-concept research has emphasized a total, undifferentiated self-concept like that considered in androgyny studies. Systematic reviews of this self-concept research (e.g., Burns, 1979; Shavelson, Hubner & Stanton, 1976; Wells & Marwell, 1976; Wylie, 1974; 1979), however, have emphasized the lack of theoretical models, the poor quality of instruments, methodological shortcomings, and a general lack of consistent findings. In an attempt to remedy this situation Shavelson et al. (1976) reviewed theoretical and empirical research, and posited a multifaceted model of self-concept in which separate facets of self-concept were clearly differentiated. More recently, theoretical and empirical research has provided strong support for the multidimensionality of self-concept (Byrne, 1984; Dusek & Flaherty, 1981; Fleming & Courtney, 1984; Harter, 1982; Marsh, in press-a; in press-b; in press-c, 1988; 1989; Marsh, Barnes & Hocevar, 1985; Soares & Soares, 1982).

Using a construct validity approach, Marsh (in press-a; Marsh, Byrne & Shavelson, 1988; Marsh & Shavelson, 1985) reviewed empirical support for the multidimensionality of self-concept and concluded that: a) self-concepts in specific areas will be more positively correlated with external criteria than will broad measures of general self-concept; b) self-concepts in specific areas will be more positively correlated to external criteria to which they are most logically and theoretically related than will other specific or general facets; and c) the relation between self-concept and other constructs cannot be adequately understood if the multidimensionality of self-concept is ignored. The basic tenet of this construct validity approach is that the pattern of relations between self-concept facets and other constructs will vary substantially depending on the particular facet. This approach is particularly relevant to the study of self-concept/MF relations because these studies typically have not incorporated the recent emphasis on the multidimensionality of self-concept.

The Differentiated Additive Androgyny Model

The differentiated additive androgyny model of self-concept/MF relations (Marsh, 1987) is based in part on the construct validity approach used in self-concept research, and in part on previous MF research. It is apparently the only theoretical model to incorporate explicitly the multidimensionality of self-concept. As has been demonstrated in self-concept research with other constructs, it is posited that M and F will be more positively correlated to the specific areas of self-concept that they are most logically and theoretically related. Though not specifically formulated as a theoretical model, the logic of this approach has been used in previous

MF research. Bem (1975), for example, related BSRI responses to the display of " 'masculine' independence when under pressure to conform, and 'feminine' playfulness when given the opportunity to interact with a tiny kitten" (p. 634). Although the results were complicated by the way the BSRI was scored, the results indicated that independence was more strongly related to M than F whereas playfulness was more positively related to F than M. Reviews and meta-analyses of the self-concept/MF relation (Cook, 1985; Taylor & Hall, 1982; Whitely, 1983) frequently note that reliance on a global measure of self-concept may obscure more specific associations based on specific dimensions of self-concept. Flaherty and Dusek (1980) concluded that "the relation of masculinity and femininity to self-concept depends on the aspect of self-concept that is being measured. If the self-concept measure reflects a traditional masculine orientation, then androgynous and masculine subjects, regardless of sex, will score high. If the self-concept measure reflects the traditionally female expressive role, the androgynous and feminine subjects will score high" (1980, p. 990).

Marsh (1987) formulated the differentiated additive androgyny model of self-concept/MF relations. Like the additive model, this model posits that M and F each contribute positively to the prediction of self-concept. Its critical prediction, however, is that the relative contribution of M and F will differ systematically according to the specific facet of self-concept. Consistent with the construct validity approach used in other self-concept research, Marsh posited that: "M will be significantly more strongly related (for both males and females) to those facets of self-concept that are more logically related to M; and (b) F will be significantly more strongly related (for both males and females) to those facets of self-concept that are more logically related to F" (1987, p. 96). There is a danger, however, of a applying a post-hoc logic in testing this predicted pattern of relations by assuming that facets that are more strongly related to M or to F are more logically related to M or to F. In an attempt to overcome this potential problem I offer two suggestions. First, it is important to demonstrate that the support for the patterns of relations generalizes across different studies, different instruments, and different populations. Second, it is desirable to operationalize the determination of whether a facet is more logically related to M or F.

One possible basis for generating predictions as to which self-concept facets will be most highly related to M and F respectively, is to derive them from theoretical definitions of M and F. Whereas it is typically noted that M and F reflect expressive/communal and instrumental/agentic characteristics respectively (e.g., Cook, 1985), these broad generalizations are too vague to generate unambiguous predictions. Instead, I operationalize the determination of whether a facet is more logically related to M or F by examining sex differences in the self-concept facets. Implicit in this approach is the assumption that self-concept facets on which women score more positively are more stereotypically F whereas facets of self-concept on which men

score more positively are more stereotypically M. Thus, it is predicted that F will contribute more strongly to those facets of self-concept in which sex differences favor women and M will contribute more strongly to self-facets in which sex differences favor men.

In support of the differentiated additive androgyny model Marsh (1987) found that: a) the relative contribution of M and F varied substantially according to the specific area of self-concept; b) the contribution of M was relatively larger for those facets for which males had higher self-concepts; c) the contribution of F was relatively larger for those facets for which females had higher self-concepts; and d) this pattern of results was similar for males and females.

The Present Investigation.

The purpose of the present investigation is to examine MF/self-concept relations in two large studies with respect to the theoretical models and issues discussed earlier. Study 1 is based on 895 responses by Canadian university students to the BSRI and the Self Description Questionnaire (SDQ) III, a multidimensional self-concept instrument designed for university-aged subjects. Study 2 is based on 1858 responses by Australian high school students to the ASRS and the SDQ II, a multidimensional self-concept instrument designed for high school students. The major prediction in both studies is that the differentiated additive model will be supported in that: a) the relative contribution of M and F will vary substantially according to the specific area of self-concept; b) the contribution of M will be relatively larger for those facets for which males have higher self-concepts; and c) the contribution of F will be relatively larger for those facets for which females have higher self-concepts. Whereas the focus in both studies is on the differentiated additive model, there are important characteristics of each study that extend previous research.

1. Both studies are based on psychometrically strong self-concept instruments that have been shown to differentiate among multiple dimensions of self-concept.

2. Both the ASRS and the BSRI have control scales consisting of socially desirable and undesirable attributes selected to be neutral with respect to M and F. These are used to examine the effects of partialling out social desirability from MF/self-concept relations.

3. In study 1, each student selected the person in the world who knew him or her the best and their significant other was asked to provide ratings of the student on the SDQIII. Self-concepts inferred by significant others are frequently used to test the validity of self-concept responses and to evaluate other theoretical issues in self-concept research (see Marsh, Barnes & Hocevar, 1985, for further discussion). It should be emphasized that self-concepts are most appropriately based on self-report responses and that inferred self-concepts represent a different construct. However, Marsh, Barnes and Hocevar (1985) found that the two constructs were

substantially correlated under circumstances like those in the present investigation. The present focus is not on self-other agreement on multiple dimensions of self-concept, but on the similarity of the pattern of self-concept/MF relations to the pattern of inferred self-concept/MF relations. If the predicted pattern of relations is found for both self-concept and inferred self-concept responses, then support for the predictions is strengthened. In particular, relations between self-report MF responses and self-concepts inferred by significant others provide tests of the theoretical models that are not based on two sets of self-report responses completed by the same person. This is important because MF/self-concept relations may be influenced by shared method variance when both instruments are completed by the same person.

4. Study 1 is based on large groups of students in five different school years (7th grade to 11th grade) spanning the early to middle adolescent period (ages 12-13 to 16-17). This provides a valuable test of the prediction that support for the sex-typed model (see earlier discussion) will be strongest during early adolescence.

Method.

Sample and Procedures.

Study 1. Subjects were 898 (61% females) introductory psychology students in a large Canadian university who volunteered to participate as partial fulfillment of a course requirement. Students completed the BSRI and the SDQIII, and then were asked to choose the person in the world who knew them best -- a significant other -- to also complete the SDQIII. The significant others were asked to imagine that they were the student who had given them the survey and to complete the SDQIII items as if they were that person. Students were explicitly instructed not to discuss the survey with their significant other. A pre-addressed envelope was included with the survey that was given to the significant other and they were explicitly instructed to return the survey without discussing their responses with the student. Although the relationship between students and the significant other was not obtained, informal queries suggested that more than half of the significant others were an intimate partner (i.e., spouse, live-in partner, or boy friend/girl friend) whereas most of the remaining significant others were immediate family members -- most frequently a parent. Analyses described here are based on the 898 sets of responses which had complete data for the BSRI, the SDQIII completed by the student, and the SDQIII completed by the significant other. Although not the focus of the present investigation, Marsh and Byrne (1989) reported that the 13 correlations representing self-other agreement on each of the 13 SDQIII scales varied from .40 to .77 (mean r = .56) and that the psychometric properties (i.e., reliabilities and factor structure) were strong and similar for self-responses and responses by others. (The results of this part of the

study were very similar to the earlier study of self-other agreement by Marsh, Barnes & Hocevar, 1985, that it was designed to replicate).

Study 2. The sample consisted of 1858 (49% female) high school students (grades 7 - 11) who attended one of two neighboring coeducational high schools that served the same predominantly middle class suburb of metropolitan Sydney, Australia. The subjects were all students in attendance on the day the instruments were administered. The two instruments, the SDQ II and the ASRS, were administered to large intact groups of students in each of the two high schools near the end of each of two consecutive academic years. For both self-report instruments, instructions were read aloud, several practice items were presented, questions about the instructions were answered, and then the items were read aloud at a fairly rapid pace (though students had a copy of the instruments in front of them so they could read along if they chose to do so). The primary purpose of reading the items aloud was to ensure that students spent a standard amount of time on each item and finished within the time allocated for the task. The instruments were administered by researchers not otherwise connected with the schools.

Because nearly all students attended school through 10th grade, students in grades 7 to 10 were similar except for age. At the end of 10th grade, however, students have the option of leaving school with a school leaving certificate or continuing their education. In study 2, only about half of the 10th grade students continued on to 11th grade. Because the 11th grade students are self-selected, comparisons with other students must be made cautiously. In study 2, students were assured of the anonymity of their responses and encouraged -- but not required -- to put their names on the instruments. Because approximately 25% did not put their name on the questionnaires, it was not possible to match students who completed surveys in both years of the study. In preliminary analyses, however, MF/self-concept relations were shown to be similar in both years of study 1 and so this feature of the study was not considered further.

The Instruments.

The SDQII and SDQIII instruments. The set of three SDQ instruments are designed to measure multiple dimensions of self-concept for preadolescents (SDQI; Marsh, 1988), for early and middle adolescents (SDQII; Marsh, in press-b), and for late adolescents and young adults (SDQIII; Marsh, in press-c). The instruments are based on the Shavelson et al. (1976) model of self-concept and the facets of self proposed in that model. A detailed review of the instruments is presented in the respective test manuals, and is beyond the scope of this brief overview. More than 30 published factor analyses have identified the factors that each instrument is designed to measure. Other research (see various test manuals and Marsh, in press-a) has shown that: (a) the reliability of each scale is generally in the .80s and 0.90s whereas correlations among the factors

are quite small (median rs less than .20), (b) the self-concept responses are substantially correlated with self-concepts in matching areas inferred by significant others, (c) academic achievement indicators are substantially correlated with academic areas of self-concept but nearly uncorrelated or even negatively correlated with nonacademic areas of self-concept and general self-concept, (d) self-concept factors are systematically and logically related to a variety of other constructs including gender, locus of control, self-attributions for the causes of academic successes and failures, physical fitness and participation in sports, and interventions designed to enhance self-concept. This research provides strong support for the construct validity of responses to the SDQ instruments.

The SDQII used in study 2 is designed to measure 11 areas of self-concept (see Appendix) defined by responses to 102 items, half of which are negatively worded, on a "1=False" to "6=True" response scale. The SDQIII used in study 1 is designed to measure 13 areas of self-concept (see Appendix) defined by responses to 136 items, half of which are negatively worded, on a "1=Definitely False" to "8-Definitely True" response scale. The SDQIII instrument contains two additional scales (Problem Solving, Religion/Spiritual Values) not contained on the SDQII. The wording of many items on the two instruments is similar. In both studies, SDQ scores were an unweighted average of responses to items designed to measure each factor as described in the respective test manuals. In both studies, self-responses for each scale were then standardized (mean = 0, SD = 1) to facilitate interpretations. Responses by significant others in study 1 were standardized with respect to the mean and standard deviation of the corresponding self-responses so that both sets of responses varied along the same metric.

The BSRI MF instrument. The BSRI (Bem, 1974), because it is so well-known and widely used, is summarized only briefly (see Bem, 1974; Cook, 1985; Marsh & Myers, 1986; Marsh, Antill & Cunningham, 1989; Pedhazur & Tetenbaum, 1979; Spence, 1984; Thompson, 1988). The BSRI is based on socially desirable items empirically rated to be more desirable for one sex or the other. The BSRI consists of 20 masculine attributes and 20 feminine attributes which are responded to on a 1 (never or almost never true) to 7 (always or almost always true) scale. In addition to the 40 MF items, the BSRI also contains 10 socially desirable attributes and 10 socially undesirable attributes that were specifically selected to be neutral with respect to M and F. Although these items were originally intended to form a Social Desirability scale to control for social desirability responding (Bem, 1974), they are typically used as "filler" items. Coefficient alpha estimates of reliability and relations between BSRI scales and other variables are summarized in Table 1.

Insert Table 1 About Here

The ASRS MF instrument. In constructing the ASRS, Antill et al. (1981) began with a pool of items including the entire pool of items used to develop the BSRI and items from other MF instruments. Subjects rated each item as a desired characteristic and an expected characteristic for males and for females, and these responses were used to select items. Form A and Form B (Form A was used here) each consist of 50 personality-like characteristics and subjects respond to each item according to how true it is as a self-description on a "Never or almost never true" (1) to "Always or almost always true" (7) scale. Each form contains 20 M items, 20 F items and 10 neutral (with respect to M and F) items with half the items within each category being positively valued (i.e., socially desirable) and half negatively valued. The M+, M-, F+, F- scores are each represented as the unweighted sum of responses to ten items. Examples of items representing each scale are: firm, confident, skilled in business (M+); noisy, aggressive, boastful (M-); patient, sensitive to the needs of others, responsible (F+); and dependent, shy, weak (F-). Marsh and Myers (1986) presented psychometric properties for each of these four scales based on earlier research (also see Antill, et al., 1981) and used confirmatory factor analysis to demonstrate that a four-factor (M+, M-, F+, F-) solution provided an adequate fit to ASRS responses. As with the BSRI, the 10 items on the social desirability scale have been primarily used as filler items. Coefficient alpha estimates of reliability and relations between ASRS scales and other variables are summarized in Table 1.

Statistical Analyses.

Preliminary ANOVA Analyses. Repeated measures ANOVA were used to make preliminary tests of the five theoretical models. In addition to the effects of M, F, gender, and their interactions that have been the focus of previous research, each different facet of self-concept corresponds to one level of the repeated measures variable called (self-concept) scales for present purposes. The differentiated additive model posits that there will be a significant M-by-scale interaction (that the effect of M will vary with the facet of self-concept) and a significant F-by-scale interaction (that the effect of F will vary with the facet of self-concept). Depending on the results of the preliminary ANOVAs, subsequent analyses are required to whether the posited interactions correspond to predictions of specific models.

For purposes of the preliminary ANOVAs, subjects were divided into one of four F groups and one of four M groups. In study 1, the tests consisted of a 4 (levels of F) by 4 (levels of M) by 2 (gender) by 13 (SDQIII self-concept scales -- a repeated-measures variable) analysis conducted with the MANOVA procedure of SPSSx (SPSS, 1988). Separate analyses were conducted on self-responses and responses inferred by significant

others. In study 2, the tests consisted of a series of 4 (levels of F) by 4 (levels of M) by 2 (gender) by 5 (Age -- year in school) by 11 (SDQII self-concept scales -- a repeated-measures or within-subject variable) analyses. Separate analyses were conducted for groups based on positively valued MF items, on negatively valued MF items, and on their total. In all ANOVAs a regression approach was used such that the variance attributed to each effect was the variance uniquely explained by that effect.

Tests involving the repeated measures require an assumption of multisample circularity (Kirk, 1982, pp. 500-505), and its violation positively biases the conventional F-test. The typical approach to this problem as used here is to adjust the df according to an empirically determined correction factor -- epsilon -- that depends on the departure from the required form. The SPSSx (1988) MANOVA procedure provides two estimates of epsilon -- the Greenhouse-Geisser epsilon and the Huynh-Feldt epsilon -- that were considered here. In both studies the violation of multisample circularity was small and all effects deemed to be statistically significant using conventional procedures were also statistically significant when the various correction procedures were applied. For this reason, these corrections are not considered further.

Multiple Regression Analyses. In both studies, specific multiple regression models were used to follow-up results from the preliminary ANOVAs and to test more specific predictions from the theoretical models. For purposes of these analyses, the original M and F scores (standardized mn=0, SD=1) were used instead of the categorized scores used in the ANOVA analyses. The size and direction of first-order correlations, and of standardized beta weights from the multiple regressions, were used to examine the contributions of various MF scores to the prediction of the multiple self-concepts.

Results of Study 1

ANOVA Tests of Five Theoretical Models of MF/Self-concept Relations.

Support for the five theoretical models of the MF/self-concept relations can be inferred from results of the 2 (Gender) x 4 (M) x 4 (F) x 13 (SDQIII scales; a repeated measures variable) ANOVAs summarized in Table 2. Separate analyses are reported for self-report self-concept responses and self-concepts inferred by significant others. The four widely described models -- the sex-typed, masculinity, additive androgyny, and interactive androgyny models -- all make predictions in terms of total self-concept scores. In the present analyses the between-subject effects refer to effects averaged across all areas of self-concept (i.e., total self-concept) and thus provide tests of these models. The differentiated additive model predicts that the effects of M and F will vary depending on the facet of self. In the present analyses the within-subject effects test the extent

to which between-subject effects vary according to the area of self-concept, and so the M x scales and F x scales interactions provide critical tests of the differentiated additive model.

Insert Table 2 About Here

The sex-typed model posits that the effect of the M and F on total self-concept will interact with gender, but these interactions were not significant for either self-concept or inferred self-concept responses (Table 2). The androgyny interactive models posit an M-by-F interaction, but this interaction was not significant for either self-concept or inferred self-concept responses. An anonymous reviewer suggested that interaction effects involving just the linear components of M and F might be statistically significant even though more general tests based on the combined effects of linear, quadratic, and cubic components were not. Whereas tests of the linear effects may be unjustified following non-significant results in Table 2 unless it is argued that these constituted a priori predictions, unreported analyses indicated that the linear components of M and F also failed to interact significantly with each other or with gender.

For self-responses the effects of both M and F on total self-concept are statistically significant (Table 2). Whereas both effects are positive, the contribution of M is larger than that of F (these results and statistical tests of the relative contribution of M and F are presented later). For responses by significant others, the effects of M and F are substantially smaller, and the main effect of F fails to reach statistical significance. The effects of both M and F, however, vary substantially depending on the particular facet of self-concept, and so these results need to be interpreted cautiously.

The within-subject effects provide tests of the extent to which between-subject effects vary according to the particular facet of self-concept (called scales in Table 2). If these interactions are statistically significant and large, then interpretations of between-subject effects may be problematic. The differentiated additive model specifically predicts that the contributions of M and F will vary substantially depending on the self-concept facet and so the M-by-scales and F-by-scales interactions provide a preliminary test of the model. Both these interactions are statistically significant for self-concept and inferred self-concept responses (Table 2).

In summary, the preliminary ANOVA results provide no support at all for the interactive androgyny and sex-typed models, weak support for the additive androgyny model and, perhaps, the masculinity model. For both self-responses and responses by others, however, the strongest support is for the differentiated additive model in that the relative contribution the M and F varies substantially with the particular facet of self-concept

The differentiated additive model, however, makes much more specific predictions than those tested by these preliminary results. Thus, the purpose of analyses in the next section are to determine whether the particular form of these interactions is consistent with the differentiated additive model.

MF correlations with Multiple Dimensions of Self-concept.

Correlations and beta weights relating BSRI M and BSRI F to the 13 SDQIII scores are presented in Table 3. For each MF score the three beta weights indicate its contribution after controlling for the other MF score (b1), the other MF score and gender (b2), and the other MF score and Social Desirability (b3). Both M and F contribute positively to total self-concept scores, but the contribution of M is larger. Consistent with the differentiated additive androgyny model, the sizes and directions of MF/self-concept relations differ substantially depending on the area of self-concept. Whereas the sizes of relations are much smaller for responses by significant others than for self-responses, the pattern of results is similar for both sets of responses.

Insert Table 3 About Here

The correlations in Table 3 tend to support the differentiated additive model, but the large number of coefficients complicates interpretations so that a more objective index is needed. The size, direction, and statistical significance of the correlations between each self-concept facet and bipolar MF scores (i.e., M minus F) provides such an index: if the correlation is positive then M contributes more positively than F; if the correlation is negative then F contributes more positively than M; if the correlation does not differ significantly from zero then the contribution of M and F is similar. For 10 SDQIII scales the contribution of M was significantly more positive than F, whereas the contribution of F was more positive for two scales (Honesty and Religion) and the contribution of M and F was similar for one scale (Parents). For responses by others, the contribution of M was more positive for 8 scales, the contribution of F was more positive for 3 scales (Honesty, Parents and Religion) and the relative contributions were similar for two other scales (Verbal and School). Thus the pattern of results is reasonably similar across the two sets of raters.

Insert Table 4 About Here

As operationalized here, the differentiated additive model posits that F will contribute more positively to those areas of self-concept in which women have higher self-concepts and that M will contribute more positively in those areas in which men have higher self-concepts. Inspection of Table 4 suggests that the relative contributions of M and F to the different areas of self-concept varies systematically with gender differences in each area of self-concept. Thus, for example, the largest sex differences favoring males are for Physical and Problem Solving self-concepts and these are the areas of self-concept in which the contribution of M -- relative to F -- are most positive. Similarly, the largest sex difference favoring women is for Honesty self-concept and this is the area in which the contribution of F -- relative to M -- is most positive.

In order to test this observation more formally, the set of correlations between bipolar MF scores and SDQIII scales was related to the set of correlations between gender and SDQIII scales. The set of 13 correlations between the bipolar MF scores and multiple self-concepts provides a quantitative index of the relative contribution of M and F to each area of self-concept, and similarly correlations between gender (1=male, 2=female) and each area of self-concept provide a quantitative index of gender differences in each area of self-concept. The relations between the two sets of correlations -- correlations between bipolar MF scores and self-concept and correlations between gender and self-concept -- provides a succinct test of the differentiated additive model. This correlation was -.71 and -.84 for self-concept and inferred self-concept responses respectively. Thus, the areas of self-concept most favoring girls (i.e., those where correlations with gender are most positive) are the ones in which the positive contribution of F is larger than M (i.e., correlations with bipolar MF are most negative). These findings provide strong support for the differentiated additive model, and the consistency of the results across self-responses and responses by others offers support for the generality of the conclusions.

Results of Study 2

ANOVA Tests of Five Theoretical Models of MF/Self-concept Relations.

Support for the five theoretical models of the MF/self-concept relations can be inferred from results of the 2 (Gender) x 5 (Age) x 4 (M) x 4 (F) x 11 (SDQII scales) ANOVAs summarized in Tables 5 and 6. Three separate analyses are reported for groupings based on positive MF attributes, negative MF attributes, and their total. The four widely described models -- the sex-typed, masculinity, additive androgyny, and interactive androgyny models -- all make predictions in terms of total self-concept scores. In the present analyses the between-subject effects (Table 5) refer to effects averaged across all areas of self-concept (i.e., total self-concept) and thus provide tests of these models. The differentiated additive model predicts that the effects of M and F will vary depending on the facet of self. In the present analyses the within-subject effects (Table 6) test

the extent to which between-subject effects vary according to the area of self-concept, and so the M x scales and F x scales interactions provide critical tests of the differentiated additive model. These analyses differ from those in Study 1 in that separate analyses are conducted for positively and negatively valued MF responses (the BSRI used in Study 1 contains only positively valued attributes) and the effects of age are considered.

Insert Tables 5 and 6 About Here

The sex-typed model posits that the effect of M and F on total self-concept will vary according to gender and, perhaps, that the size of these effects will vary according to age for the early to middle adolescent period considered here. For total self-concept (i.e., the between-subject effects in Table 5) the M x gender interaction was not statistically significant in any of the analyses, and this lack of interaction did not depend on age. The F x gender interaction was statistically significance for just the positively valued F attributes ($p<.05$), though this interaction did not vary with age in any of the analyses. Further analyses, however, showed that F was somewhat more strongly related to self-concept for males than females. This effect, though small and not consistent across the different analyses, is opposite to the predictions from the sex-typed model. Subsequent, unreported analyses considering just the linear components of M, F, and age were suggested by an anonymous reviewer, but these also resulted nonsignificant results. Hence, the results provide no support for predictions based on the sex-typed model.

The androgyny interactive models posit an M-by-F interaction, though different variations of this model may imply different forms of the interaction and not all interactions are consistent with androgyny theory. However, the M-by-F interaction fails to reach statistical significance (Table 5) for MF groups based on positively valued MF items, negatively valued MF items, or their total. Furthermore, this lack of M-by-F interaction is consistent across age and across gender. Subsequent, unreported analyses considering just the linear components of M, F, and age were suggested by an anonymous reviewer, but these also resulted in nonsignificant results. Thus, the results provide no support for the androgyny interactive model.

The additive androgyny model is supported for MF groups based on positively valued items in that both M and F contribute substantially to total self-concept and the direction of the contribution is positive (as will be discussed later). However, the substantial M-by-scale and F-by-scale interactions (the within-subject effects in Table 6) demonstrate, as predicted by the differentiated additive model, that the size of the positive contribution of M and F varies significantly with the particular facet of self-concept. These interactions and

their relation to the specific pattern of results posited in the differentiated additive model will be the focus of subsequent analyses.

Tests of the additive and differentiated additive models are more complicated for MF groupings based on the negatively valued MF items, and the sum of the positively and negatively valued items. For the negatively valued items, the contribution of M across the areas of self-concept is not statistically significant while the significant contribution of F is negative (i.e., the self-endorsement of negatively valued F items is associated with a lower self-concept). For the MF groups based on the total of positively and negatively valued items, the contribution of M is significant and positive (due primarily to the positive contribution of M+ items) but the contribution of F is not significant (i.e., the positive contribution of F+ and the negative contribution of F- cancel each other). However, the substantial M-by-scale and F-by-scale interactions in both of these analyses (Table 6) again demonstrates that the effects of M and of F vary significantly with the particular facet of self-concept as predicted by the differentiated additive model.

The masculinity model posits that the main effect of M on total self-concept will be positive, whereas the effect of F will be nonsignificant or negative. For the the positively valued MF attributes there is no support for this model in that the contributions of both M and F are positive. Support based on the negatively valued MF attributes is ambiguous in relation to this model in that both the effects of M and F are negative, though the effect of M is less negative than F. It should be noted, however, that it makes sense for negatively valued attributes to be negatively related to self-concept and for positively related attributes to be positively related to self-concept. From this perspective, the relative contribution of M and F is more important. (The relative contribution of M and F will be specifically evaluated for each component of self-concept in the next section).

For the total MF scores, the effect of M on total self-concept is positive (i.e., the positive effects of M+ more than outweigh the negative effects of M-) whereas the effects of F are not significant (i.e., the positive effects of F+ balance out the negative effects of F-). Results based on the total MF scores support the masculinity model. Furthermore, the contribution of M is more positive (or less negative) in all three analyses. In each of the three analyses, however, the effects of M and F vary substantially with the particular facet of self-concept.

In summary, the preliminary ANOVA results provide no support at all for the interactive androgyny and sex-typed models. Support for the masculinity model is strongest for the total MF scores, but the consistently positive contribution of F+ undermines this support. Support for the additive model is strong for the positive MF scores, but weaker for the total and negative MF scores. Across all three analyses, the strongest support is for the differentiated additive model in the that relative contribution the M and F varies substantially

with the particular facet of self-concept. The purpose of analyses in the next section is to determine whether the form of this interaction is consistent with the additive differentiated model.

MF correlations with Multiple Dimensions of Self-concept.

Correlations and beta weights relating the four ASRS scores to the 11 SDQII scores are presented in Table 7. For each MF score the three beta weights indicate its contribution after controlling for the other MF scores (b1), the other MF scores and gender (b2), and the other MF scores and Social Desirability (b3). The contributions to total self-concept scores are most positive for M+, somewhat less positive for F+, slightly negative for M-, and substantially negative for F-. Consistent with the differentiated additive androgyny model, the size and direction of MF/self-concept coefficients differs substantially depending on the area of self-concept. Whereas the size of coefficients tend to be smaller when the other MF scores and particularly social desirability are controlled, the pattern of results is similar for each set of coefficients.

Insert Table 7 About Here

The correlations in Table 7 tend to support the differentiated additive model but the large number of coefficients and the influence of social desirability on the ASRS scores complicate the interpretations. As described in study 1, the size, direction, and statistical significance of the correlations between each self-concept and bipolar MF scores (M minus F) provides an index of the relative contributions of M and F: significantly positive correlations indicate that M scores contribute more positively (or less negatively) than do F scores; significantly negative correlations indicate that F scores contribute more positively (or less negatively) than M scores; nonsignificant correlations indicate that the relative contribution of M and F scores is similar. In study 2 bipolar MF scores were computed separately for positively valued items (M+ minus F+), negatively valued items (M- minus F-), and their total (Mtot minus Ftot). To the extent that the social desirability of corresponding M and F scores is similar, than social desirability should have little effect on these correlations. For each of the three bipolar MF scores the correlations (see Table 8) were: (a) significantly positive for 6 or 7 of the 11 self-concept scores, indicating a more positive contribution for M than for F; (b) significantly negative for 2 or 3 self-concept scores, indicating a more positive contribution for F than M; and (c) not significantly different from zero for 2 or 3 areas of self-concept, indicating a similar contribution of M and F. The consistency of this pattern of results for the positively and negatively valued MF items offers support for the generality of the conclusions.

Insert Table 8 About Here

The differentiated additive model posits that F will contribute more positively to those areas of self-concept in which women have higher self-concepts and that M will contribute more positively in those areas in which men have higher self-concepts. As described in study 1, the bipolar MF/self-concept correlations index the relative contribution of M and F to each area of self-concept, the gender/self-concept correlations index gender differences in each area of self-concept, and the relations between the two sets of correlations provides a succinct test of the differentiated additive model. This correlation is -.66, -.73 and -.59 for the total, positive, and negative MF scores respectively. Thus, the areas of self-concept most favoring girls (i.e., those where correlations with gender are most positive) are the ones in which the positive contribution of F is larger than M (i.e., correlations with bipolar MF are most negative). These findings provide strong quantitative substantiation for conclusions based on the correlations in Tables 7 and 8, and offer strong support for the differentiated additive model. The consistency of the results across positively and negatively valued MF items supports the generality of the conclusions.

Summary and Implications

The primary purpose of both studies was to examine MF/self-concept relations with respect to five theoretical models. In both studies, there was no support for either the androgyny interactive or sex-typed models, and only weak support for the additive androgyny and, perhaps, the masculinity models. In contrast, both studies provided strong support for the differentiated additive model. As predicted, the relative contribution of M and F varied substantially and predictably with the specific area of self-concept. The contribution of F was more positive in the areas of self-concept where women had higher self-concepts, and the positive contribution of M was greater in those areas where men have higher self-concepts.

Study 1 provides what appears to be a unique variation in testing relations between MF and self-concept responses. All such studies known to the authors have been based on self-report responses to two instruments completed by the same person. For this reason, the results are liable to many counter-interpretations related to possible self-report biases. In study 1, however, self-concepts were inferred from both self-report responses by the student and inferred self-concept responses by a significant other chosen by the student as the person in the world who knew him or her the best. Because the inferred self-concept responses were not based

on self-reports, MF/self-concept relations based on these responses are less liable to alternative explanations. Not surprisingly, MF/self-concept relations were stronger when both sets of responses were based on self-responses. What is important, however, is that the pattern of relations and support for the differentiated additive model were similar for both sets of analyses. Thus, support for the differentiated additive model is not limited to self-report data.

Study 2 also provided a different perspective to the study of MF/self-concept relations. Previous research, like the present investigation, has found little support for the sex-typed model of the MF/self-concept relations. Most previous research, however, has been based on responses by university students and adult samples. As described earlier, support for this model is predicted to be stronger in early adolescence when the acquisition of an appropriate gender identity is posited to be particularly important. Hence, the results of study 2 are particularly important. Not only was there no support for the sex-typed model during early to middle adolescence, but this lack of support was consistent across five grade levels spanning this period. Thus, the lack of support for the sex-typed model found in study 2 is much stronger than reported elsewhere.

The social desirability of MF items, independent of whether they were M or F, was an important determinant of the MF/self-concept relations. In both studies, MF/self-concept relations were substantially smaller after controlling for social desirability. This effect was particularly clear in study 2 where M and F were determined separately on the basis of positively and negatively valued attributes as well as their total. Positively valued MF attributes were positively related to self-concept and the sizes of these relations were substantially less positive after controlling for social desirability. Negatively valued MF attributes were negatively related to self-concept and the sizes of these relations were less negative after controlling for social desirability. Because social desirability was not substantially correlated with either Mtot or Ftot scores in study 2 (see Table 1), controlling social desirability did not substantially affect these MF/self-concept relations. What is important to note however, is that support for the differentiated additive model was found for MF scores based on positively and negatively valued attributes and their total.

Social desirability in both studies was substantially correlated with MF responses based on positively valued attributes and with self-concept responses. This pattern of relations should not, however, be interpreted as invalidity in the MF or self-concept responses. Social desirability was one basis for selecting MF items in the instruments used in both studies and self-endorsing socially desirable items infers a positive self-concept. Indeed, if such a logical pattern did not exist, then the validity of the responses would be suspect. Nevertheless, the influence of social desirability has not, apparently, been fully recognized in previous research but has implications for future research. MF/self-concept relations are easier to interpret when M and F scales are

balanced with respect to social desirability, and particularly when M and F scales each contain positively and negatively valued attributes so that the total scores are unrelated to social desirability. Most studies, however, are based on just positively valued attributes (e.g., those using BSRI and PAQ). In such studies, correlations between MF responses self-concept responses are likely to be substantially influenced by social desirability. Variance uniquely explained by M and by F is, however, likely to be relatively unrelated to social desirability, whereas variance common to M and to F is likely to substantially related to social desirability. Also, so long as the social desirability in M is similar to that in F, social desirability is unlikely to affect relations between bipolar MF scores and self-concept.

Previous research has consistently shown that the contribution of F to total self-concept is minimal. In marked contrast to previous research but consistent with predictions from the differentiated additive model, the contribution of F is positive for many areas of self-concept in the present investigation. Furthermore, the contribution of F is substantially more positive than M for a few areas of self-concept. Despite considerable differences between the two studies -- the age, nationality, and educational levels of the students, and the MF instrument completed -- there was consist support for this finding in both studies. Hence, the results of the present investigation provide stronger support for androgyny theory than do previous studies of MF/self-concept relations.

The results of this study also contribute further support for the multidimensionality of self-concept, the construct validity of SDQ responses, and particularly the claim that self-concept cannot be adequately understood if its multidimensionality is ignored. The richness of the MF/self-concept relations observed here and support for the differentiated additive model could not have been even considered if we had relied on a global, undifferentiated measure of self-concept.

An important, implicit assumption in this study is that facets of self-concept in which women have higher self-concepts are more stereotypically feminine whereas facets of self-concept in which men have higher self-concepts are more stereotypically masculine. This objective operationalization allowed us to predict a priori the pattern of relations between M, F, and specific facets of self-concept. This operationalization has limitations and advantages. The empirical, atheoretical nature of the operationalization leaves unanswered the important question of why M and F are more or less related to different self-concept facets. A stronger approach that may be useful in future research would be to derive a priori relations from theory and use empirical findings to test the theory. An important strength of the present approach, however, is that it does not assume that conceptions of stereotypical M and F are necessarily the same in different studies, and provides an empirical approach to test the generality in different studies. It is important to note, however, that the generally

consistent findings in the present research based on Canadian university students, significant others chosen by the Canadian students, and Australian high school students of different ages suggests the generality of stereotypical conceptions of M and F.

Throughout this study we have used the descriptive trait labels "masculinity" and "femininity" to summarize scores based on responses to the BSRI and the ASRS. Alternatively, as suggested by an anonymous reviewer, we could have summarized the content of these scales using traditional personality labels such dominance, nurturance, etc. Using these alternative descriptions, it makes sense that dominance contributes more strongly to perceptions of athletic abilities whereas nurturance contributes more strongly to perceptions of relations with parents. Support for the construct validity of the responses does not depend on the particular labels given to summary scores from the two MF instruments. A relevant question, however, is whether responses to the BSRI and ASRS are better summarized as measures of M and F, or as measures of more specific personality traits that are related to M and F. The perspective taken here is that global-M and global-F are hierarchical constructs comprised of more specific constructs like those incorporated -- imperfectly, perhaps -- into the construction of the BSRI and the ASRS. Because neither of these instruments was specifically designed to measure a priori components of global-M and global-F, they are not appropriate for exploring the dimensionality of these global traits. Other researchers (e.g., Spence, 1984) have argued for the multidimensionality of these constructs and have proposed multidimensional, hierarchical models of global-M and global-F (e.g., Marsh & Myers, 1986; also see Marsh, 1985) analogous to those used in self-concept. In the same way that self-concept researchers have argued that self-concept cannot be adequately understood if its multidimensionality is ignored, it is likely that the understanding of global-M and of global-F is hindered by implicitly ignoring the multidimensionality of these constructs.

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Table 1

Reliabilities of MF Measures and Relations With Other Variables for Study 1 (above the main diagonal) and Study 2 (below the Main diagonal)

Scales	1	2	3	4	5	6	7	8	9	10	11	12
Masculinity												
1. Mtot	---											
2. M+	77	---			-12			75		-26		16
3. M-	86	34	---									
Femininity												
4. Ftot	-02	07	-01	---								
5. F+	04	34	-21	75	---			-75		36		34
6. F-	-07	-23	08	77	14	---						
Bipolar MF												
7. MFtot	71	49	66	-72	-50	-58	---					
8. MF+	64	57	48	-59	-53	-33	86	---		-42		-12
9. MF-	69	42	68	-63	-26	-68	92	60	---			
Other Variables												
10. Sex (1=male, 2=female)	-19	-14	-16	24	25	12	-30	-34	-21	---		
11. Year in School	00	-06	06	00	00	00	00	-05	03	00	---	
12. Social Desirability	07	44	-25	01	41	-39	04	03	10	-05	00	---
Coefficient Alphas												
Study 1	81	68	77	74	68	81	78	52	77	---	---	67
Study 2	---	86	---	---	78	---	---	84	---	---	---	70

Note: Correlations, presented without decimal points, greater than .07 (Study 1) and .04 (study 2) are statistically significant ($p < .05$). In study 2 separate masculinity (M) and femininity (F) scores were computed for positively valued (+) and negatively valued (-) attributes and their total (tot) based on responses to the Australian Sex Role Scale (ASRS). The Bem Sex Role Inventory (BSRI) used in study 1 contained only positively valued M and F characteristics. Both the ASRS and the BSRI contain social desirability scales based on responses positively and negatively valued attributes that are neutral with respect to M and F. Year in school in study 1 varied from 7th grade (mostly 12 and 13 year olds) to 11th grade mostly (16 and 17 year olds).

Table 2

Study 1: ANOVA of Effects of Gender, Masculinity (M) and Femininity (F) on Multiple Facets of Self-concept For Self-Responses and Responses by Significant others

		Self Responses		Responses By others	
Effect	df	MS	F-Ratio	MS	F-Ratio
Between Subject Effects					
Gender (G)	1	9.56	3.74	2.83	.90
Masculinity (M)	3	152.67	59.75***	22.14	7.01***
Femininity (F)	3	8.54	3.34*	3.62	1.15
G x M	3	2.97	1.16	2.23	0.71
G x F	3	0.18	0.07	1.47	0.46
M x F	9	3.38	1.32	1.71	0.54
G x M x F	9	2.67	1.04	1.75	0.55
Error	866	2.55		3.16	
Within Subject Effects					
Scale (S)	12	0.82	1.06	10.79	14.80***
S x G	12	9.72	13.04***	8.62	11.82***
S x M	36	6.92	9.29***	3.38	4.63***
S x F	36	1.54	2.07***	1.24	1.71**
S x G x M	36	1.53	2.06***[a]	0.95	1.30
S x G x F	36	0.94	1.27	0.94	1.29
S x M x F	108	0.90	1.21	0.73	1.00
S x G x M x F	108	0.66	0.88	0.67	0.92
error	10392	0.75		0.73	
Total	11673	1.00		1.02	

Note. Subjects were divided into four groups on the basis of their M and F scores and a 2 (Gender) x 4 (M) x 4 (F) x 13 (Self-concept scales -- a repeated measure variable) was performed on the multidimensional self-concept responses with the MANOVA procedure from the SPSSx (SPSS, 1988). Separate analyses were performed on self-concept scores derived from SDQIII self-responses and SDQIII responses by significant others.

* p < .05; ** p < .01 ; *** p < .001.

Table 3

Study 1: Relations Among Masculinity/Femininity (MF) Scores and Multiple Self-concepts for Self-responses (S) and Responses By Others (O): Simple correlations (r) and beta weights from 3 multiple regressions (b1-b3).

		MF Scores								Other Predictors						
		M				F				Gender		Soc Desir		Mult R		
Self-concept Scale	Rater	r	b1	b2	b3	r	b1	b2	b3	r	b2	r	b3	(1)	(2)	(3)
Verbal	S	28*	29*	34*	24	02	06	-03	-02	14*	24*	25*	22*	286*	361*	350*
	O	09*	10*	15*	07*	06	07*	00	02	17*	21*	15*	14*	116*	224*	170*
Math	S	08*	06	04	04	-15*	-14*	-11*	-18*	-16*	-11*	05	10*	162*	189*	188*
	O	01	00	-02	-02	-12*	-12*	-09*	-15*	-13*	-11*	03	09*	122*	155*	146*
School	S	26*	27*	32*	21*	08*	11*	05	00	14*	20*	35*	32*	285*	340*	407*
	O	11*	11*	14*	08*	04	05	02	00	06	09*	17*	16*	121*	147*	192*
Physical	S	47*	47*	42*	46*	-09*	-03	03	-05	-31*	-21*	13*	07*	476*	513*	480*
	O	36*	35*	30*	35*	-09*	-05	03	-05	-30*	-23*	05	02	362*	418*	362*
Appearance	S	41*	42*	41*	40*	04	09*	10*	05	-10*	-03	13*	20*	421*	422*	436*
	O	21*	21*	19*	21*	00	03	06	03	-13*	-10	04	00	208*	228*	208*
Same Sex	S	26*	28*	29*	22*	10*	13*	11*	02	02	06	34*	30*	294*	299*	405*
	O	14*	14*	14*	12*	-01	01	02	-03	-05	-02	13*	11*	142*	143*	179*
Opposite Sex	S	40*	42*	47*	39*	14*	20*	13*	13*	11*	19*	30*	19*	445*	476*	479*
	O	28*	30*	32*	28*	08*	12*	09*	09*	04*	09*	16*	08*	307*	317*	316*
Parent	S	05	06	07*	01	12*	13*	12*	04	05	02	27*	25*	139*	140*	269*
	O	-03	-03	-03	-06	08*	08*	08*	01	03	-01	17*	18*	083*	084*	182*
Honesty	S	02	05	08*	-05*	27*	27*	22*	09*	21*	15*	53*	51*	270*	303*	542*
	O	-08*	-06	-02	-10*	21*	21*	15*	12*	22*	16*	27*	25*	221*	262*	317*
Emotional	S	31*	31*	31*	23*	-01	03	03	-12*	-08*	00	42*	43*	312*	312*	502*
	O	19*	18*	15*	15*	-09*	-06	-01	-12*	-19*	-15	15*	16*	202*	243*	252*
General	S	51*	52*	54*	45*	02	08*	05	-04	-02	10*	39*	34*	514*	522*	600*
	O	30*	30*	31*	27*	-02	01	01	-05	-06	01	20*	17*	302*	303*	342*
Religion	S	-05	-03	-01	-04	21*	20*	21*	18*	08*	00	13*	07*	210*	210*	220*
	O	-07	-04	-03	07	19*	18*	16*	14*	12*	05	14*	10*	192*	198*	214*
Problem Solve	S	47*	47*	46*	44*	-08*	-01	01	-07*	-19*	-08*	19*	14*	475*	480*	492*
	O	27*	26*	25*	26*	-07	-04	-01	-05	-07	-15*	06	03	271*	281*	273*
Total Self	S	52*	54*	55*	45*	09*	15*	14*	-01	-05	05	51*	44*	543*	545*	675*
	O	27*	27*	27*	23*	03	06*	08*	-02	-08*	-04	25*	22*	275*	277*	341*

Note. Two sets of 3 multiple regressions was conducted to relate the M and F to the 13 SDQIII scales for self-responses (S) and for responses by others (O). The simple correlations and standardized beta weights resulting from these analyses are presented. The 3 regressions contained the 2 MF scores (betas are labeled b1), the 2 MF scores plus gender (the b2s), and the 2 MF scores plus social desirability (the b3s).

* $p < .05$

Table 4

Study 1: Relations Among Bipolar Masculinity/Femininity (MF) Scores, Gender and the SDQIII Scales For Self-responses and Responses By Others

	Self Responses		Responses By Others	
Self-concept Scales	Bipolar M - F	Gender	Bipolar M - F	Gender
Verbal	.17**	.14**	.02	.17**
Math	.15**	-.16**	.09**	-.13**
School	.12**	.14**	.05	.06
Physical	.38**	-.31**	.30**	-.30**
Appearance	.25**	-.10**	.14**	-.13**
Same Sex	.11**	.02	.10**	-.05
Opposite Sex	.17**	.11**	.13**	.04
Parent	-.05	.05**	-.08*	.03
Honesty	-.17**	.21**	-.20**	.22**
Emotional	.21**	-.08*	.19**	-.19**
General	.33**	-.02	.22**	-.06
Religion	-.18**	.08*	-.17**	.12**
Problem Solve	.37**	-.19**	.23**	-.15**
Total	.29**	-.05	.16**	-.07
Gender	-.42**	1.00	-.42**	1.00

Note: For each of the Bipolar MF scores (defined to be M minus F), positive correlations with self-concept scores mean that M contributed more positively than F, while negative correlations mean that F contributed more positively than M. The relative size of the positive contribution of M and F was related to gender differences in the set of 13 self-concepts by correlating the values of the 13 correlations in the MF column with (excluding the Total and correlation) with the corresponding 13 correlations in the Gender column. The results self-responses (-.71) and for the responses by others (-.84) are both statistically significant ($p < S.05$). These subsequent analyses demonstrate that areas of self-concept in which F contributed relatively more positively than M are the areas in which females have higher self-concepts than males, and the similarity in the patterns is both strong and consistent across responses to positively and negatively valued MF items.

* $p < .05$; ** $p < .01$

Table 5

Study 2: ANOVA of Effects of Gender, Masculinity (M) and Femininity (F) on Multiple Facets of Self-concept For Positively Valued and Negatively Valued MF Items: Between-Subject Effects (see Table 6 for Within-Subject Effects)

		Total		Positive		Negative	
Effect	df	MS	F-Ratio	MS	F-Ratio	MS	F-Ratio
Between Subject Effects							
Gender (G)	1	0.15	0.03	6.46	1.91	1.71	0.45
Age (A)	4	7.73	1.83	9.28	2.75*	8.82	2.35
Masculinity (M)	3	37.51	8.90***	44.69	13.24***	21.07	5.62***
Femininity (F)	3	8.56	2.03	44.03	13.04***	230.69	61.52***
G x A	4	10.11	2.40*	5.76	1.70	8.06	2.15
G x M	3	8.85	2.10	3.87	1.15	2.23	0.59
G x F	3	9.22	2.19	9.19	2.72*	0.43	0.11
A x M	12	9.34	2.21**	4.69	1.39	4.01	1.07
A x F	12	5.18	1.23	1.43	0.42	8.11	2.16*
M x F	9	4.74	1.12	0.95	0.28	3.24	0.86
G x A x M	12	2.48	0.59	1.98	0.59	5.94	1.58
G x A x F	12	2.35	0.56	1.73	0.51	2.13	0.57
G x M x F	9	2.26	0.53	3.65	1.08	1.24	0.33
A x M x F	36	4.29	1.02	3.86	1.14	2.46	0.66
G x Y x M x F	36	3.46	0.82	4.01	1.18	3.18	0.85
Error	1698	4.22		3.38		3.75	

Note. Subjects were divided into four groups on the basis of their M and F scores and a 2 (Gender) x 5 (Age -- Year in school) x 4 (M) x 4 (F) x x 12 (Self-concept scales -- a repeated measure variable) was performed on the multidimensional self-concept responses with the MANOVA procedure from the SPSSx (SPSS, 1986). Separate analyses were performed on M and F derived from positively valued items, negatively valued items, and their total.

* p < .05; ** p < .01 ; *** p < .001.

Table 6

Study 2: ANOVA of Effects of Gender, Masculinity (M) and Femininity (F) on Multiple Facets of Self-concept For Positively Valued and Negatively Valued MF Items: Within-Subject Effects (see Table 5 for Between-Subject Effects)

		Total		Positive		Negative	
Effect	df	MS	F-Ratio	MS	F-Ratio	MS	F-Ratio
Within Subject Effects							
Scale (S)	10	0.42	0.73	0.31	0.52	0.71	1.22
S x G	10	2.31	3.99***	0.87	1.48	27.60	47.60***
S x A	40	3.39	5.86***	1.37	2.32***	3.12	5.38***
S x M	30	13.55	23.42***	3.50	5.93***	13.40	23.16***
S x F	30	7.60	13.14***	3.30	5.57***	9.13	15.78***
S x G x A	40	0.91	1.57*	0.81	1.37	0.75	1.29
S x G x M	30	1.08	1.87*	0.73	1.23	0.90	1.55*
S x G x F	30	0.57	0.98	0.93	1.58*	0.45	0.78
S xA x M	120	0.79	1.37*	0.66	1.11	0.77	1.33*
S x A x F	120	0.68	1.18	0.80	1.36*	0.73	1.26*
S x M x F	90	0.70	1.21	0.94	1.59**	0.66	1.14
S x G x A x M	120	0.57	0.99	0.68	1.14	0.52	0.89
S x G x A x F	120	0.50	0.86	0.54	0.91	0.58	1.00
S x G x M x F	90	0.59	1.03	0.96	1.62**	0.53	0.91
S x A x M x F	360	0.54	0.93	0.65	1.10	0.59	1.02
SxGxYxMxF	360	0.64	1.11	0.70	1.19*	0.55	0.95
error	16980	0.58				0.59	0.58

Note. Subjects were divided into four groups on the basis of their M and F scores and a 2 (Gender) x 5 (Age -- Year in school) x 4 (M) x 4 (F) x x 12)(Self-concept scales -- a repeated measure variable) was performed on the multidimensional self-concept responses with the MANOVA procedure from the SPSSx (SPSS, 1986). Separate analyses were performed on M and F derived from positively valued items, negatively valued items, and their total.

* p < .05; ** p < .01 ; *** p < .001.

Table 7

Study 2: Relations Among Masculinity/Femininity (MF) Scores and Multiple Self-concepts: Simple correlations (r) and beta weights from 3 multiple regressions (b1-b3)

	MF Scores								Other Predictors					
	M+		M-		F+		F-		Gender		Soc Desir		Mult R	
Self-Concept Scale	r b2	b1 b3	r b2	b1 b3	r b2	b1 b3	r b2	b1 b3	r	b2	r	b3	--- (2)	(1) (3)
Verbal	20*	10*	-10*	-07*	25*	23*	-19*	-20*	---	---	---	---	---	352*
	13*	-03	-07*	03	18*	15*	-20*	-10*	17*	16*	40*	32*	382*	423*
Math	16*	17*	-09*	-13*	04	12*	-14*	-10*	---	---	---	---	---	241*
	14*	08*	-13*	-06*	08*	-01	-10*	-03	-11*	-12*	23*	28*	267*	292*
School	29*	26*	-16*	-19*	19*	29*	-20*	-15*	---	---	---	---	---	435*
	26*	13*	-19*	-09*	18*	10*	-15*	-09*	05	03	48*	34*	436*	502*
Phys	40*	35*	09*	-01	11*	02	-26*	-18*	---	---	---	---	---	432*
	31*	30*	-01*	03	07*	-02	-17*	-13*	-21*	-23*	31*	14*	459*	432*
Appear	40*	29*	17*	10*	05	01	-36*	-30*	---	---	---	---	---	488*
	23*	18*	09*	18*	09*	-06	-09*	-21*	-29*	-23*	38*	29*	533*	531*
SSex	32*	19*	01	02	24*	22*	-25*	-24*	---	---	---	---	---	413*
	24*	13*	02	06*	15*	18*	-24*	-20*	18*	21*	33*	13*	456*	424*
OSex	45*	26*	22*	19*	15*	14*	-34*	-32*	---	---	---	---	---	535*
	26*	19*	19*	24*	15*	09*	-31*	-26*	-10*	-03	34*	18*	536*	551*
Parent	13*	16*	-35*	-35*	34*	22*	-10*	-06*	---	---	---	---	---	475*
	14*	09*	-35*	-30*	25*	18*	-06*	-01	-01	-10*	37*	18*	484*	493*
Honest	07*	08*	-44*	-39*	42*	32*	-06	-05*	---	---	---	---	---	557*
	08*	01	-39*	-34*	31*	27*	-05	01	14*	02	38*	19*	558*	573*
Emotion	36*	28*	-11*	-15*	13*	07*	-55*	-48*	---	---	---	---	---	625*
	26*	19*	-14*	-08*	09*	02	-48*	-41*	-09*	-04*	50*	23*	626*	647*
General	48*	38*	-03	-09*	29*	19*	-39*	-32*	---	---	---	---	---	602*
	35*	23*	-09*	02	21*	09*	-32*	-21*	-12*	-10*	58*	36*	609*	658*
Total	47*	36*	-11*	-15*	34*	24*	-41*	-34*	---	---	---	---	---	636*
	34*	22*	-15*	-04*	25*	14*	-34*	-23*	-06	-05*	62*	37*	638*	636*

Note. Three sets of multiple regressions was conducted to relate the four MF scores (M+, M-, F+ & F-) to the 11 self-concept scores. The simple correlations and standardized beta weights resulting from these analyses. The three sets of regressions contained the 4 MF scores (betas are labeled b1), the 4 MF scores plus gender (the b2s), and the 4 MF scores plus social desirability (the b3s).

Table 8

Study 2: Relations Among Bipolar Masculinity/Femininity (MF) Scores, Gender and Multiple Self-concepts

Self-concept Scales	Bipolar MF Scores: Mtot - Ftot	Mpos - Fpos	Mneg - Fneg	Gender
Verbal	.00	-.05*	.07**	.17**
Math	.03	.04*	.04	-.11**
School	-.01	.00	.03	.05*
Physical	.26**	.25*	.26**	-.21**
Appearance	.37**	.30**	.39**	-.29**
Same Sex	.13**	.07**	.19**	.18**
Opposite Sex	.37**	.26**	.41**	-.10**
Parent	-.23**	-.18**	-.19**	-.01
Honesty	-.35**	-.30**	-.28**	.14**
Emotional	.28**	.20**	.32**	.09**
General	.21*	.17**	.26**	-.12**
Total	.16**	.11**	.22**	-.06*
Gender	.30**	.34**	.21**	1.00

Note: For each of the Bipolar MF scores (defined to be M minus F), positive correlations with self-concept scores mean that M contributed more positively than F, while negative correlations mean that F contributed more positively than M. The relative size of the positive contribution of M and F was related to gender differences in the set of 11 self-concepts by correlating the values of the 11 correlations (excluding the Total and correlation) in each of the first three columns with the corresponding 11 correlations in the fourth column. The results, -.66 (Total), -.73 (positive MF items) and -.59 (negative MF items) were all statistically significant ($p < .05$). These subsequent analyses demonstrate that areas of self-concept in which F contributed relatively more positively than M are the areas in which females have higher self-concepts than males, and the similarity in the patterns is both strong and consistent across responses to positively and negatively valued MF items.

* $p < .05$; ** $p < .01$

Appendix 1

A Summary Description of the Scales From the SDQII and SDQIII Instruments

Scales

Physical Abilities (SDQII, SDQII): Student perceptions of their skills and interest in sports, games, and physical activities.

Physical Appearance (SDQII, SDQII): Student perceptions of their physical attractiveness, how their appearance compares with others, and how others think they look.

Opposite Sex Relationships (SDQII, SDQIII): Student perceptions of their popularity with members of the opposite sex, how easily they make friends with members of the opposite sex, and the quality of their interactions with members of the opposite sex.

Same Sex Relationships (SDQII, SDQIII): Student perceptions of their popularity with members of the same sex, how easily they make friends with members of the same sex, and the quality of their interactions with members of the same sex.

Honesty/Trustworthiness (SDQII, SDQIII): Student perceptions of their honesty, reliability and trustworthiness.

Parent Relationships (SDQII, SDQIII): Student perceptions of how well they get get along with their parents, whether they like their parents, and the quality of their interactions with their parents.

Spiritual Values/Religion (SDQIII only): Student self-perceptions of themselves as a spiritual/religious person and the importance of spiritual/religious beliefs in their how they conduct their life.

Emotional Stability (SDQII, SDQIII): Student self-perceptions of themselves as being calm and relaxed, their emotional stability, and how much they worry.

General (SDQII, SDQIII): Student self-perceptions of themselves as effective, capable individuals who have self-confidence and self-respect and are proud and satisfied with the way they are.

Verbal (SDQII, SDQIII): Student self-perceptions of their ability and interest in reading (for the SDQI). Student self-perceptions of their verbal skills, verbal reasoning ability and interest in verbal activities (for the SDQII and SDQIII).

Math (SDQII, SDQIII): Student self-perceptions of their mathematical skills, mathematical reasoning ability and interest in mathematics.

School (SDQII, SDQIII): Student self-perceptions of their skills, ability and interest in school subjects in general.

Problem Solving (SDQIII only): Student self-perceptions of their ability to solve problems and think creatively and imaginatively