Multidimensionality of gender schemas: Implications for the development of gender-related characteristics

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Author Note

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Abstract

The developmental implications of J. T. Spence's (e.g., 1985) gender identity theory were tested with a meta-analysis. Available data on the interrelations of gender schema measures were examined to determine if gender schemas become more differentiated with age. No clear age-related patterns emerged. However, the interpretation of the lack of age differences must await future research because there was little age variation present in these samples. Even the significant age effects that occurred must be interpreted with caution because of small numbers of samples and restricted age ranges. Thus, no sufficient data exist yet to test adequately the developmental aspect of Spence's theory.

I began graduate school just as Spence, Helmreich, and Stapp (1974) and Bem (1974) were simultaneously publishing their scales of instrumental and expressive personality traits (the Personal Attributes Questionnaire [PAQ] and the Bem Sex-Role Inventory [BSRI], respectively). Bem had hypothesized a causal relation between the degree of stereotyping in one's self-descriptions on these gender-related trait dimensions and significant gender-related behaviors. This hypothesis was later elaborated to include the notion of an overarching gender schema (Bem, 1981). (For a summary see Bem, 1985.)

Spence, however, went on to propose a more elaborate theory of gender identity (e.g., Spence, 1985) and to investigate empirically the interrelations of various measures of gender schemata. Her work on multifactorial models of gender schemas has strongly influenced my recent thinking and research. In this chapter, I will examine the developmental implications of Spence's model. The first questions I address are: Why there is a need to consider multiple components of gender schemas and what are some of those components? The developmental implications of Spence's theory are then identified and tested through meta-analysis.

IS THERE ONE GENDER SCHEMA?

Bem's gender schema theory in its various incarnations proposes a very attractive hypothesis for anyone who would like to see less gender-based categorization and decision-making in our society. Bem (1981) maintained that "sex typing derives, in part, from a generalized readiness to process information on the basis of sex-linked associations that constitute the gender schema" (p. 355). She further proposed that the way to raise "gender-aschematic" children is to teach them that gender refers only to certain physical characteristics (e.g., Bem, 1983).

One of the clear implications of Bem's (1981) theory is that one should be able to identify those persons who are viewing the world through a gender schema. Such persons, whom she called "gender-schematic," should be more likely to organize information on the basis of gender. Organizing by gender should be reflected in standard measures of category use in memory, such as clustering in free recall. Gender-based organization of information should also lead to bias in both recognition and recall favoring gender-stereotype-consistent information. Bem (e.g., 1981) identified gender schematics through their "sex-typed" scores on the BSRI: women with high scores on expressivity and low scores on instrumentality and men with the reverse pattern.

Numerous attempts to replicate Bem's (1981) initial finding that gender schematics show a consistent pattern of gender bias in information processing have been unsuccessful with adults (e.g., see Edwards & Spence, 1987). In an example from my own work (Signorella, 1992), I asked college students to recall either gender-related pictures or words. Because the stimulus materials had no direct self-relevance to the participants, I hypothesized that, contrary to

Bem's theory, BSRI scores would not predict memory. Rather, I expected that a measure of participants' tendencies to assign traits to others based on gender would be a better predictor of whether the participants could remember gender-stereotyped materials or cluster those materials in recall. These hypotheses were supported, in that the gender stereotyping of the traits predicted men's and women's recall of both pictures and words, men's and women's clustering of pictures in recall by gender category, and men's clustering of words in recall by gender category.

Similar findings are noted when adults are asked to complete various measures reflecting gender schemas. Strong relations are much less likely when measures share fewer common features, even though all the items may be gender stereotyped (e.g., Bigler, Liben, Lobliner, & Yekel, 1997; Spence, 1993). As a consequence, self-schema measures, such as the BSRI, are not likely to predict measures of attitudes toward others, such as whether one thinks that both sexes should possess a trait or choose an occupation (e.g., Spence & Helmreich, 1980).

WHAT ARE THE COMPONENTS OF GENDER SCHEMAS?

The implication of the failure to find a single, simple, and sovereign gender schema is a need to examine separately the various aspects of gender schemas. Huston (1983), for example, identified multiple components of gender schemas, and was an early advocate in the developmental area for research using multiple measures (see also Ruble & Martin, 1998). Figure 1 displays some of the components that Huston and Ruble and Martin have identified, and that I discuss here.

Rebecca Bigler, Lynn Liben, and I (Signorella, Bigler, & Liben, 1993;) also used some of Huston's and others' similar categories for our meta-analysis of gender schemas about others (see also Bigler, 1997). The developmental literature is characterized by considerable conceptual and methodological confusion concerning the components of gender schemas. One of the first distinctions we felt was important to make was between schemas about others versus self-schemas. Children can be asked about their own preferences and about what people in general do, yet both types of questions are characterized in the same vague terms, such as s*tereotyping* or *sex typing*. In some cases, the various measures are deliberately used interchangeably, under the assumption of an overriding characteristic called sex typing, not unlike Bem's (1981) gender schema. It appears, however, that this was inappropriate, given the variations by measure we observed in developmental patterns (Signorella et al.).

In the meta-analysis (Signorella et al., 1993) our initial focus was on the gender schemas about others (because of practical considerations); within that component we implemented a further distinction between knowledge and attitudes. *Knowledge* refers to the information children possess about which sex usually performs which activities and occupations or possesses personality traits differentially associated with the sexes. The concept *attitudes* refers to a

more affective judgment about who should perform the activities or possess the traits.

Developmental Patterns in Gender Schemas about Others

Once separated, interesting differences in the developmental trends emerged between these two types of measures (Signorella et al., 1993). Knowledge was assessed by either forced-choice questions requiring children to choose one or the other sex, or by explicit questions about who "usually" or is "likely" to do an activity. The meta-analysis shows that children were increasingly accurate with age in identifying societal stereotypes, as would be anticipated.

Attitudes were assessed by unconstrained measures in which children were not forced to choose one sex or the other in conjunction with being asked who "should" or "can" do an activity or possess a trait. The analysis of attitude measures revealed a peak in stereotyped responding around kindergarten followed by a decline through elementary school (Signorella et al., 1993). Whether stereotyping in such measures continues to decline through adolescence is still an open question (Ruble & Martin, 1998), because of fewer available studies and less consistent findings with adolescents.

Many questions remained from the Signorella et al. (1993) meta-analysis. First, were we justified in labeling as "attitudes" those types of measures in which children were allowed to make a nonstereotyped response to the question of who should or can do an activity or possess a trait? Such measures are often referred to in the developmental literature by the more neutral name of "flexibility" (e.g., Serbin, Powlishta, & Gulko, 1993), because children demonstrate flexibility when they assign items to both sexes. Further data are needed to determine if flexibility is primarily a cognitive aspect of stereotyping or has a substantial affective component (i.e., an attitude) (cf., Martin, 1993; and Ruble & Martin, 1998). Pretest data from my gender and memory study (Signorella, 1992) showed that college students who had more liberal scores on the Attitudes Toward Women Scale (AWS; Spence & Helmreich, 1972) assigned more traits to both sexes. I also have data showing that children and adolescents with more liberal scores on an adapted AWS (Galambos, Petersen, Richards, & Gitelson, 1985) are more likely to assign activities to both sexes (Signorella, Frieze, & Hershey, 1997). These data support the hypothesis that "flexibility" represents attitudes toward stereotypes, but an alternative hypothesis that still needs to be ruled out is that both "flexibility" measures and scales such as the AWS share a cognitive flexibility component.

Self-Schema Measures

A second major gap exists with self-schema measures. The developmental trends do not appear to be as consistent as are observed with knowledge or flexibility measures; they may also depend on the particular

component being assessed (e.g., see Ruble & Martin, 1998). Another little noticed issue is that both Huston (1983) and Ruble and Martin used separate categories for self-perception versus preferences or attitudes. Measures such as the BSRI or PAQ would fall under the self-perception category because individuals are asked how they view themselves or what personality attributes they possess. Perhaps self-perceptions are parallel to the knowledge individuals have about stereotypes for people in general. In contrast, a preference or attitude measure would ask the person what he or she would like to be, such as a measure of "ideal self" (e.g., Newcombe & Dubas, 1992). Similarly, for activities, a self-perception or knowledge measure might assess how frequently one participates in an activity (e.g., Bigler et al., 1997; Signorella et al., 1997), whereas a preference measure would assess how much one likes or prefers the activity (e.g., Spence & Hall, 1996). It is possible that one's aspirations and values (i.e., the more affective aspects of self-schemas) predict a different aspect of behavior than do one's self-knowledge, as occurred with the parallel measures of schemas about others (Signorella et al., 1993).

There was an enormous number of potential components of gender schemas, as Figure 1 also illustrates. Even though possible domains for which there is relatively less information were eliminated, there remained 24 categories to investigate (for example, self knowledge of masculine traits). If each possible category is correlated with all other possible categories (except itself), there are 276 unique pairs of gender schema components that could be investigated. Needless to say, there has not been anything close to complete coverage of these many areas. Becker and Schram (1994) noted that such missing information prevents complete testing of complex models but that identifying the areas of incomplete data can also provide directions for future research.

DEVELOPMENTAL IMPLICATIONS OF SPENCE'S THEORY

Spence (e.g., 1985) has argued for the early importance of one of the components of gender schemas, one's gender identity or "basic phenomenological sense of one's maleness or femaleness that parallels awareness and acceptance of one's biological sex and is established early in life" (p. 91). Spence argued that as one of the earliest gender schemas acquired, gender identity drives the development of other gender-related characteristics only in young children. Older children and adults should show "considerable diversity within each sex" (p. 91), because of the multiple influences on the components of gender schemas. As a consequence, older children and adults would have fewer significant relations among various measures of gender schemata.

Spence's (1985) gender identity theory does not specify at what age the weaker relations among measures are observed or whether age-related decreases in the interrelations are linear. However, at least two reasonable hypotheses can be made based on other aspects of gender schema development. Children establish a gender identity by 24 to 36 months (Ruble &

Martin, 1998), thus suggesting that the strongest relations among gender schemata might be observed in preschoolers. Alternatively, Spence and Hall (1996) suggested that the increase in stereotype flexibility observed during elementary school might signal the period in which the interrelations among gender schemas are weakened. I tested Spence's (e.g., 1993) multifactorial theory and the developmental implications using meta-analysis (cf., Becker & Schram, 1994)

A META-ANALYSIS OF AGE CHANGES IN THE INTERRELATIONS OF GENDER SCHEMATA

Using the scheme in Figure 1 as a guide, I searched the literature for studies in which more than one measure of gender schemas had been administered to children or adolescents. Unfortunately, only a small number of studies have more than one usable gender schema measure. Although I agree with Ruble and Martin (1998) about the recent and laudable increase in the tendency for researchers to use multiple measures in investigations of children and adolescents (e.g., Biernat, 1991b; Downs & Langlois, 1988; Katz & Ksansnak, 1994; Serbin et al.,1993), the change has been too recent to provide many studies in which two or more gender schema measures are used. In addition, even if more than one measure is used, the relevant data for a meta-analysis also must be reported, which may not be the case (e.g., Pigott, 1994). Table 1 shows the subset of gender schema measures analyzed in the meta-analysis.

Standard meta-analytic techniques were used to test for the significance of the associations between pairs of gender schema measures (e.g., see Cooper & Hedges, 1994), and all were computed using DSTAT (Johnson, 1989). Average effect sizes and other meta-analytic statistics were only computed if there were five or more independent effects available, and only if those effects came from more than one study. The analyses were performed using *d*, the unbiased estimate of effect size produced by weighting *g* by the variance of the sample size. Effects are displayed in Table 1 as *r*, because of that latter statistic's common use to represent associations between continuous measures.

The statistic Q_W or within-groups Q was used as a test of the homogeneity of the *d*s from a set or subset of studies (see Table 1). A significant Q_W means that homogeneity of effect sizes is rejected and that other variables should be considered in explaining the variation in effect sizes. If homogeneity was rejected in the overall analysis, two potential moderator variables were examined: age and sex.

For the test of age effects, an age contrast (Rosenthal, 1991) was performed using the average age of the sample as the predictor of effect size. To have sufficient points of comparison, I conducted the age contrast only if there were three or more ages in a sample of effect sizes. If the age contrast was significant, the relation between average age and effect size was also graphed, as significance can be obtained with various patterns. The magnitudes

of the effect sizes may have become larger or smaller with age, or the sign of the effects may have changed, such as the developmental shift from positive to negative correlations reported by Biernat (1991a) between masculine and feminine self ratings.

Sex-related effects for samples with significant heterogeneity were tested with the between-groups Q or Q_B, which tests the differences in the distribution of d between groups. If there was a significant sex effect, the results were reported separately by sex (see Table 1). If within either sex there continued to be significant heterogeneity of effect sizes, the age contrast was performed on the sex subgroup (as long as there were different ages represented in the samples).

Several general points about Table 1 should be noted. First, some of the components originally identified in Figure 1 had to be eliminated, combined, or altered (see also Table 1's note).[1] There remained 16 categories of measures that were used in at least one study--a possible 120 unique pairs of measures. Only 26 comparisons met the criteria of five or more effects from two or more separate studies. Self knowledge of masculine and feminine traits and self knowledge of masculine and feminine activities were among the better represented measures. Thus, to examine the multidimensional nature of gender schemas, more researchers need to examine and report on more aspects of gender schemas.

For the key test of age changes in the interrelations, it should first be noted that out of the 58 effect sizes displayed in Table 1, 26 could not be tested for age differences because of little or no variation in the participants' ages. Out of the remaining 32 effects, 19 showed no significant age differences (including those for which homogeneity of effect sizes was retained, thus precluding any further testing). The remaining 13 effects that did show an age difference consisted of 6 showing a smaller magnitude of effect with age, 2 showing a larger magnitude of effect with age, 4 that changed sign from negative to positive, and 1 that changed sign from positive to negative. Thus, no consistent age-related pattern emerged.

A major limitation in the age analyses was that most of the studies included in the meta-analysis had either elementary-school-aged children or adolescents as the participants, with the majority in fourth to sixth grade. Although preschoolers have been tested frequently on measures of gender schemata, it is not typically in the same way as with older children. There also seems to be more variation in the way the preschool measures are used, resulting in fewer studies with common measures.

Finally, there were some sex-related differences in the patterns of the correlations. One set of correlations seems to form an understandable pattern. With only a few exceptions, nonstereotyped attitudes were correlated with characteristics associated with the other sex. For girls, less stereotyped attitude scores (or higher flexibility) were associated with self-perceptions of masculine traits, self-reports of participating in masculine activities and not participating in feminine activities, a liking for masculine occupations, and a disliking for

feminine occupations. For boys, less stereotyped attitude scores (or higher flexibility) were associated with self-perceptions of feminine traits, self-reports of participating in feminine activities, and a liking for feminine occupations. This pattern may indicate that "attitudes" (or "flexibility") are an aspect of gender schemas that indicate how likely one is to accept the crossing of gender boundaries (cf., Katz & Ksansnak, 1994).

In contrast to the results from the measures of attitudes toward others, there are fewer sex differences in the patterns obtained for the correlations within self-schema measures. When sex differences did occur, they did not always show a difference in pattern, but rather in magnitude. In general, those who had high scores on one self-schema measure also did on another, regardless of the stereotyping of the items. One possible explanation would be the “generalized acquiescence bias” (Spence & Hall, 1996, p. 683) detected by the authors in their data. Such a bias, in which the participants endorse everything indiscriminately, cannot be evaluated in the present meta-analysis. Another possibility is that there is a general tendency for those children who are more active in general to be interested in many different occupations and to have instrumental personality characteristics (Kelly & Smail, 1986; Spence & Hall, 1996).

CONCLUSIONS

The developmental implications of Spence’s (e.g., 1985) gender identity theory were tested with a meta-analysis. Available data on the interrelations of gender schema measures were examined to determine if gender schemas become more differentiated with age. No clear age-related patterns emerged. However, the interpretation of the lack of age differences must await future research because there was little age variation present in these samples. Even the significant age effects that occurred must be interpreted with caution because of small numbers of samples and restricted age ranges. Thus, no sufficient data exists yet to test adequately the developmental aspect of Spence’s theory. It will be important for future research to provide such data. Notably missing and crucial to a complete test of a developmental change in the interrelations of gender schema measures are sufficient data on preschoolers. It is possible, however, to use the available data to evaluate the various gender schema approaches. Spence and Hall (1996), for example, outlined the one-factor, two-factor, and multifactorial theories.

The one-factor model (e.g., Bem, 1981) argues for a single gender schema, with some individuals overapplying this schema ("gender schematics") and others rarely using it ("aschematics"). The present data do not support the one-factor model. The only possible evidence was the tendency for children with less stereotyped (i.e., nontraditional) attitudes toward others to report participation in other-sex activities, possession of other-sex traits, and preference for other-sex occupations. Most of those correlations, however, were quite small. Furthermore, those same attitudes toward others did not consistently predict same-sex preferences or knowledge, as also would be

expected in the one-factor model. Finally, it is hard to see how the pattern of positive correlations observed among the self-schema measures could be consistent with the one-factor model. First, there should have been more sex differences in these correlations. Second, the sex differences present in the data showed cross-gender relations opposite to what would be predicted by the one-factor theory (boys with higher feminine trait scores said they participated in more masculine activities). Consistent with this interpretation, Spence and Hall (1996) tested the one-factor model in their data using Masculine X Feminine interaction terms in multiple regression and found no supporting evidence.

The two-factor model argues for independent factors of masculinity and femininity that only predict behaviors within their own gender. Thus, masculine scales correlate with one another, feminine scales correlate with one another, but feminine and masculine scales are not be correlated. The present data show instead a general tendency for all scales (masculine and feminine) to be positively correlated, thus contradicting the two-factor model.

The last theory to be considered, Spence's (1993) multifactorial theory, is the best fit to the present data. Many of the correlations are extremely small, and as discussed earlier, there are few consistent or easily interpretable patterns. Spence and her colleagues (e.g., Spence & Hall, 1996; Spence & Helmreich, 1980) have been careful to note that "it is not our view that gender-related measures are never related to one another" (Spence & Hall, 1996, p. 686) but that

> categories of gender-related attributes, beliefs, and behaviors typically contribute to separate factors whose relationships to other factors are variable in magnitude, even though often close to zero, and are often complex (p. 686).

The challenge for future research will be to fill the many gaps in the existing knowledge through the assessment of multiple aspects of gender schemas from preschool to adulthood. It is important not only for the sake of completeness but also because the accumulating evidence suggests that children have many gender schemas with diverse developmental trends and loose interconnections.

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Footnotes

[1] One type of measure excluded is knowledge of others. Such measures are more typically used with preschoolers, as knowledge of stereotypes reaches ceiling levels by elementary school (Ruble & Martin, 1998), and there were no comparisons with a sufficient number of samples to make the meta-analytic comparisons. Although correlates of knowledge measures (called "forced choice") were previously examined in the Signorella et al. (1993) meta-analysis, Table 11 from that meta-analysis shows that there is only one category (toy preferences) of relevance to the present study, and that the $\underline{n} = 6$ was obtained only through combining disparate measures. The other major exclusion is measures of preschooler toy preference, which is most often correlated with the above-mentioned knowledge measures.

Table 1

Meta-Analysis of Gender Schema Components

Schema Pair	k[a]	N	r	Q_w	Age[b]
Self Pref Act M - Self Pref Act F	11	1500	.08*	60.6*	Sm
Self Pref Act M - Self Know Tr M	9	1449	.11*	33.9*	n/a
Self Pref Act M - Self Know Tr F	9	1449	-.03	64.1*	n/a
Boys	4[c]	618	.08*	21.7*	n/a
Girls	4[c]	686	-.08*	8.4	n/a
Self Pref Act F - Self Know Tr M	9	1449	.01	13.8	n/a
Self Pref Act F - Self Know Tr F	9	1449	.18*	136.6*	n/a
Self Pref Occ NON[d] - Self Know Occ NON[d]	5[e]	233	.74*	57.0*	Lg
Self Pref Occ NON[d] - Other Att Act/Occ[f]	6	734	.12*	5.8	
Self Pref Occ M - Self Know Act M	6	452	.36*	21.3*	n/a
Self Pref Occ M - Self Know Act F	6	452	.43*	24.4*	n/a
Boys	3	220	.32*	6.5	n/a
Girls	3	232	.52*	3.4	n/a
Self Pref Occ M - Other Att Act[f]	8	502	.16*	39.0*	NS
Boys	4	248	.09	18.1*	Sm
Girls	4	254	.22*	16.1*	NS
Self Pref Occ F - Self Know Act M	6	452	.16*	14.7*	n/a
Boys	3	220	.27*	1.2	n/a
Girls	3	232	.05	2.8	n/a
Self Pref Occ F - Self Know Act F	6	452	.52*	11.2*	n/a

Schema Pair	k[a]	N	r	Q_w	Age[b]
Self Pref Occ F - Other Att Act[f]	8	504	.02	43.9*	n/a
Boys	4	248	.17*	17.7*	n/a
Girls	4	256	-.11*	6.2	n/a
Self Know Tr M - Self Know Tr F	20	2170	.16*	250.5*	NS
Boys	9[c]	873	.21*	117.4*	NS
Girls	10[c]	1152	.14*	117.0*	NS
Self Know Tr M - Self Know Act M	9	525	.26*	18.1*	NS
Self Know Tr M - Self Know Act F	9	524	.23*	22.7*	NS
Self Know Tr M - Other Att Act/Occ[f]	11	850	.08*	49.9*	Lg
Boys	5	280	-.06	24.8*	Sm
Girls	6	570	.14*	9.8	
Self Know Tr M - Other Att Act[f]	10	558	.17*	27.4*	NS
Self Know Tr M - Other Att Occ[f]	9	942	.06*	38.7*	n/a
Self Know Tr F - Self Know Act M	9	522	.06*	36.2*	P/N
Self Know Tr F - Self Know Act F	9	520	.32*	23.4*	NS
Self Know Tr F - Other Att Act/Occ[f]	11	843	.05	49.0*	N/P
Boys	5	280	.22*	11.5*	N/P
Girls	6	563	-.03	13.1*	N/P
Self Know Tr F - Other Att Act[f]	10	553	.07*	32.5*	NS
Boys	4[c]	169	.19*	10.5*	N/P
Girls	5[c]	351	.01	14.4*	NS
Self Know Tr F - Other Att Occ[f]	9	942	.04	28.3*	n/a

Schema Pair	k[a]	N	r	Q_w	Age[b]
Self Know Act M - Self Know Act F	13	18225	.26*	52.8*	Sm
Boys	6	13460	.27*	12.7*	Sm
Girls	7	4765	.23*	26.7*	Sm
Self Know Act M - Other Att Act[f]	9	525	.11*	56.4*	NS
Boys	4	169	-.13*	6.5	
Girls	5	356	.22*	21.9*	NS
Self Know Act M - Other Att Occ[f]	10	18150	.03*	75.7*	n/a
Boys	5	13510	.02*	31.5*	n/a
Girls	5	640	.07*	24.3*	n/a
Self Know Act F - Other Att Act[f]	9	524	.01	20.3*	NS
Boys	4	169	.11	7.7	
Girls	5	355	-.04	7.7	
Self Know Act F - Other Att Occ[f]	10	18150	.06*	124.2*	n/a
Boys	5	13510	.09*	4.7	n/a
Girls	5	4640	-.02*	21.2*	n/a
Other Att Occ[f] - Other Att Act[f]	7	492	.57*	114.2*	n/a

Note. The following abbreviations were used: Pref = preference, know = knowledge, att = attitude, act = activities, occ = occupations, tr = traits, M = masculine, F = feminine, NON = nontraditional, Sm = smaller, n/a = not available, Lg = larger, P/N = positive to negative, N/P = negative to positive. [a] Number of independent samples. [b] The column labeled age provides the results of the contrast using average age on effect size. [c] Some samples are excluded from the sex comparison because data were reported only for the sexes combined. [d] Responses to these measures were scored by the stereotyping of the choice (M or F); higher scores indicate nontraditional choices. [e] No sex comparison was possible because there was only one effect size for boys. [f] Measures of attitudes toward others were combined across masculine and feminine items. Such measures are often reported in that way,

and for an obvious reason--the high correlation between the masculine and feminine items of measures of attitudes toward others (see Bigler et al., 1997; Signorella et al., 1997). Higher scores indicate nontraditional (i.e., nonstereotyped) responses.
* $p < .05$.

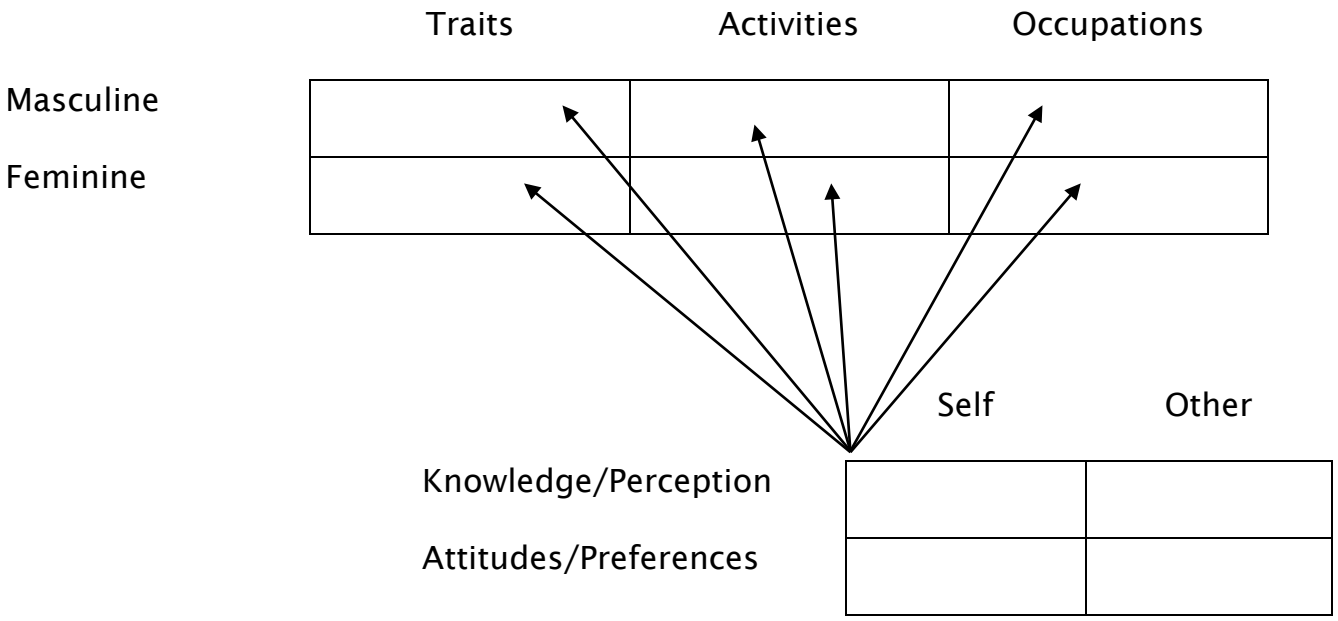

Figure 1. Components of Gender Schemas