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4 Is having an older sister or older brother related to younger siblings' gender typing?

A meta-analysis

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In one of our classes on the psychology of gender, a regular question raised by students is whether having an older brother or older sister has an impact on individuals' gender development. Studies that have tested for sibling gender effects have considered various aspects of children's gender typing including social behaviours, activity preferences, self-concepts and attitudes (see Wagner et al., 1993, 1996). To consider the overall significance of older siblings' gender on younger siblings' gender typing, we carried out a quantitative meta-analysis.

When evaluating the older sibling's gender as a predictor of gender typing, we included studies investigating multiple aspects of gender development. According to the multidimensional view of gender (Liben & Bigler, 2002; Spence, 1993), gender typing occurs in several domains. These include self-perceived traits (agency and communion), social behaviours (e.g. nurturance, aggression), and activity preferences (e.g. dolls, trucks). Furthermore, because gender development does not end in childhood (see Ruble et al., 2006 Leaper, 2013) and older siblings may have an ongoing influence, we included studies investigating participants from early childhood to preadolescence and late adolescence.

The potential importance of older siblings

For most people, sibling relationships will be the longest relationships of their lives. These relationships are often characterized by high emotional intensity and high intimacy, a combination that creates much opportunity for mutual influence (Dunn, 2002). Although some work has looked at the potential influence of younger sibling gender (e.g. Rosenberg & Sutton-Smith, 1971), from a socialization perspective the influence of older siblings is more relevant. Social cognitive theory emphasizes the importance of observational learning during gender development (Bussey & Bandura, 1999). Older siblings can be role models and also facilitate opportunities for younger siblings to practise particular behaviours (e.g. through shared play). Research guided by this approach indicates that higher-power and higher-status models may be especially salient and effective as role models (e.g. Bussey & Bandura, 1984; Revels & Gutkin, 1983). Accordingly, past research has found that younger siblings more often observe older siblings than the other way around (Stoneman et al., 1985). Social cognitive theory also

emphasizes the importance of direct tuition in gender socialization. Indeed, older siblings have been shown to play the role of teacher and younger siblings the role of learner more often than the reverse (Stoneman et al., 1986).

The impact of older siblings may partly depend on their gender. Brothers may have a stronger effect than do sisters on younger siblings' gender typing. Much research suggests that gender functions as a status marker with higher status typically accorded to males than females (see Ridgeway & Bourg, 2004). Although enacting masculine-stereotyped behaviours can sometimes enhance girls' status, adopting feminine-stereotyped behaviours typically diminishes boys' status (Leaper, 1994). For example, one study found that children rated boys higher than girls in competence in a classroom task despite there being no objective evidence of differences in performance (Lockheed et al., 1983). Thus, children are likely aware that they could gain status by acting in masculine-stereotyped ways and lose status by acting in feminine-stereotyped ways; therefore, both girls and boys may choose to adopt more masculine gender-typed characteristics when a male sibling is available as a role model. By contrast, they may choose not to adopt more feminine gender-typed characteristics even if a female sibling is available as a model.

We also hypothesized that there would be differences in the extent to which sibling gender was related to gender typing among girls and boys. There is ample evidence that girls and women are often more gender-flexible than are boys and men (e.g. Katz & Ksansnak, 1994; Signorella et al., 1993; Twenge, 1997). It is not uncommon for girls to identify as tomboys (see Gottschalk, 2003). Also, adults are more likely to condone cross-gender activities for girls than boys (Cahill & Adams, 1997; Martin, 1990). Boys tend to experience much stricter gender boundaries and feel significantly more pressure to conform to gender stereotypes than do girls (Egan & Perry, 2001; Leaper, 2013). Given the strong pressure from society, parents and peers to conform to traditional gender roles, it is plausible that boys may be less prone to influence from any one source of socialization (e.g. older sibling). Thus, we may find a stronger effect of sibling gender on gender typing for girls compared to boys.

Two alternative hypotheses were considered regarding the possible relation of the older sibling's gender to the younger sibling's gender typing. One possibility is that younger siblings are more likely to differentiate themselves from their older siblings' gender (e.g. a boy with an older sister becomes more gender-typed). Several decades ago, Schachter et al. (1976) proposed that younger siblings often differ from older siblings because they want to carve out their own identities. In a similar manner, Sulloway (1996) advanced an evolutionary argument that younger siblings are motivated to find their own unique niche in a family and therefore tend to differ in personality from older siblings. Thus, to highlight her differences with her older brother, a girl would be more likely to adopt feminine gender-typed characteristics and less likely to adopt masculine gender-typed qualities.

An alternative hypothesis is that younger siblings tend to move toward the gender-typed pattern associated with the older sibling's gender (e.g. a girl with an older sister becomes more feminine gender-typed). According to social cognitive theory (Bussey & Bandura, 1999) one of the main processes of gender socialization is observational learning. Thus, children observe their older siblings and imitate their gender-typed behaviours, self-perceptions and preferences. Although past research shows that children are more likely to imitate same-gender models, they also can and do imitate cross-gender models, especially if the models are perceived as powerful (Bussey & Bandura, 1984). Thus, a girl with an older brother may be more likely to adopt masculine-stereotyped characteristics compared to a girl with an older sister; in contrast, a girl with an older sister may be more likely to adopt feminine-stereotyped characteristics.

Further support for this hypothesis can be inferred from findings of a 'social dosage effect' in same-gender peer groups (Martin & Fabes, 2001). Martin and Fabes (2001) observed that preschool children who spent more time playing with same-gender peers in autumn were more likely to increase their gender-typed behaviours later in the spring. For example, boys who spent more time playing with other boys in autumn were more likely to play in masculine-typed ways in spring; they were also more likely to be aggressive and to engage in rough-and-tumble play. Thus, interactions with peers enhanced the propensity to be gender-typed in various domains (e.g. play, social behaviour). Although this research investigated relationships with same-age, non-sibling peers, it is plausible that analogous effects would be found with siblings. That is, spending time with older siblings may lead to adopting some of their behaviours. Indeed, researchers find that children generally spend considerable time interacting with their siblings (see Dunn, 2002; McHale & Crouter, 1996). For example, children with a same-gender older sibling may be more likely than children with other-gender older siblings to spend time in gender-typed activities; conversely, children with an other-gender older sibling may spend more time than children with same-gender older siblings in cross-gender-typed activities. Indeed, some research has found that the time boys spent with brothers was positively associated with their own instrumentality (a masculine-stereotyped trait) and the time girls spent with sisters was negatively associated with their own instrumentality (McHale et al., 2004).

Moderators

Whether or not there is an overall effect across studies, there might be effects within different gender domains; for example, older siblings' gender may predict younger siblings' gender-typed activity preferences but not self-perceived traits. Further, effects may vary by the age of participants. Thus, we consider gender-typing domain and participant age as potential moderators.

Gender domain

A multidimensional view of gender suggests that individuals may develop and exhibit gender-typed characteristics in some domains (e.g. self-perceived traits) less so, or not at all, compared to others (e.g. activities). Accordingly, studies investigating

sibling gender influences have included various gender-related outcome variables such as self-perceived traits (e.g. expressivity, instrumentality; McHale et al., 2001), leisure activity preferences and behaviours (e.g. Leventhal, 1970; McHale et al., 2001), social behaviours (friendship intimacy, friendship control; Updegraff et al., 2000), adjustment (externalizing/internalizing behaviours and symptoms; e.g. Buist, 2010), and occupational interests (e.g. engineering; Leventhal, 1970). For the present review, we coded the outcome measures of studies for each of these dimensions. In addition, there are some studies that utilized a global measure of gender typing (e.g. Bigner, 1972; Leventhal, 1970; Rust et al., 2000).

Unfortunately, the small number of studies in each category did not allow for testing the categories separately as moderators. Therefore, we compared two types of studies. In one set, we considered studies using global measures of gender typing. In the other set, we included studies examining specific domains of gender typing (e.g. leisure activities). Children are often inconsistent across domains in their gender typing (Liben & Bigler, 2002); that is, they may prefer traditional play activities but endorse non-traditional attitudes about occupations. Given these common inconsistencies in gender typing across domains within individuals, we reasoned that global measures would be more reliable indices of gender typing. Accordingly, we hypothesized that sibling-gender effects would be stronger among studies using global measures than those using domain-specific measures of gender typing.

Age group

We include studies in the meta-analysis with participants ranging in age from early childhood to emerging adulthood. Sibling gender may be more strongly related to gender typing earlier in life compared to later. Children's social interactions with peers increase steadily through childhood and adolescence (Ellis et al., 1981). The importance of siblings may thus be weakened with the addition of so many other potential sources of socialization. However, it is also possible that siblings constitute such important and pervasive relationships (see Dunn, 2002), that their influences last equally through development.

Summary

Based on theory and past empirical evidence, we hypothesize the following: 1) older sibling gender will predict younger siblings' gender typing among both girls and boys, with a possibly stronger effect among the younger girls; 2) younger siblings will be more likely to be gender-typed toward (rather than away from) the pattern associated with their older sibling's gender; 3) younger siblings will be more likely to adopt their brothers' masculine-stereotyped traits rather than their sisters' feminine-stereotyped traits; and 4) effects of older sibling gender may be moderated by domain of gender typing and age of participants. All of the hypothesized patterns are correlational in nature. It is not possible to test for causality in the meta-analysis.

Method

Literature search

Seven relevant studies were identified to use in the meta-analysis (see Appendix Table 4a for the characteristics of each study). They included six independent samples of younger female siblings and ten independent samples of younger male siblings. The studies were found through the PsycINFO database using the search terms 'gender' and 'sibling'. All journal article abstracts in the search results were then skimmed for relevant measures and analyses: sibling gender as a predictor and gender typing as outcome. Additional studies were found in literature reviews and reference lists of relevant journal articles. Dissertation abstracts found using the same search terms were also inspected, but none was found to be useable based on our selection criteria (described later). Three other studies were found that measured older sibling gender as predictor and gender typing as outcome, but they were excluded because of insufficient statistical information regarding the findings (Rosenberg & Sutton-Smith, 1968, 1971; Vroegh, 1971).

Coding moderators

Outcome measures were coded into several categories based on domain of gender typing. These included self-perceived traits (e.g. expressivity, instrumentality), leisure activities/interests (e.g. sports, handicrafts), occupational interests (e.g. engineering), social behaviours (e.g. intimacy behaviours, controlling behaviours) and global measures of gender typing (i.e. measures comprising multiple gender domains; It Scale for Children; Preschool Activities Inventory; Minnesota Multiphasic Personality Inventory (MMPI) Femininity-Masculinity Scale). In addition, we classified the domain (or global) as either feminine- or masculine-stereotyped. The first author and an undergraduate research assistant independently coded studies' outcome measures according to these categories; inter-coder reliability was excellent (Cohen's kappa = .81).

Many domain categories were represented by only one study due to the limited number of available studies. Therefore, we could not consider specific domains of gender typing as a moderator. Instead, we made a comparison between samples that were based on a measure of a specific gender-typing domain with those that were based on global measures of gender typing.

We tested younger sibling's age as a possible moderator using age as both a continuous and categorical variable. Three categories of age groups were used: early childhood (ages 3–6), preadolescence (ages 9–13), and late adolescence (ages 18–20). There were no samples of girls in the late adolescence age group.

Statistical analyses

Unit of analysis

Analyses were carried out using the Comprehensive Meta-Analysis statistical software package. For all analyses, except those testing gender domain as

moderator, independent samples were used as the unit of analysis. Thus, if a study reported more than one outcome measure for the same sample, effect sizes were averaged across outcomes. When testing domain as a moderator, we used the statistical test as the unit of analysis. This means that studies that measured more than one domain for the same independent sample were included more than once in the analysis of domain as a moderator.

Effect sizes

Most effect sizes were computed from means, standard deviations and sample sizes for each comparison group (i.e. girls with older brothers, girls with older sisters, boys with older brothers, boys with older sisters). In some cases, standard deviations were not available; if so, then means, sample sizes and F or t values were used. Finally, in a few cases, only means, sample sizes and p-values were available to impute the effect size. In these cases, if the finding was reported as non-significant, we entered $p = .99$; if the finding was reported as significant at the $p < .05$ level, we entered $p = .049$. These estimates are conservative and may underestimate the effect size. However, only three statistical tests from a single study (Leventhal, 1970) had imprecise statistics.

As a measure of effect size, we calculated and report Cohen's d (i.e. the standard difference in means). Guidelines for interpreting Cohen's d are the following: a value of less than .20 is considered a negligible difference between groups, a value between .20 and .49 is considered a small difference, a value between .50 and .79 is considered a medium difference, and a value of .80 or higher is considered a large difference.

Random-effects model

Overall analyses of effect sizes were conducted separately for girls and boys using a random-effects model. A random-effects model assumes that effect sizes vary among sample studies not just because of differences among participant samples (as assumed by a fixed-effects model), but also because of measurement differences among studies. A mixed-effects model was used when analysing the effects of moderators. In a mixed-effects model, the effect sizes of studies within a subgroup are combined using a random-effects model, whereas the effect sizes of the subgroups are analysed using a fixed-effects model.

Results

Overall analyses

All analyses were conducted separately for girls and boys. There were six independent samples of girls comprising a total sample size of 1698. There were ten independent samples of boys comprising a total sample size of 2773. Results are reported in Table 4.1. There was an overall positive effect of older sibling gender

Table 4.1 Effect of older sibling's gender on younger sibling's gender typing: overall effects and effects by gender typing dimension

Analysis	*k*	*N*	*d*	*95% CI*	*Z*	Q_w
Overall						
Females	6	1708	.22*	.00/.43	1.97*	15.58**
Males	10	2773	.17	−.06/.41	1.45	68.18***
Masculine-stereotyped						
Females	6	1708	.31*	.07/.55	2.57*	19.51**
Males	8	2384	.21+	−.01/.44	1.87+	38.69***
Feminine-stereotyped						
Females	3	1255	−.02	−.42/.39	−.09	9.64**
Males	6	1764	.16	−.21/.57	−.79	57.16***

Note. Independent sample was the unit of analysis, and k refers to the number of relevant independent samples for each condition. Positive effect sizes indicate a higher mean score for participants with older brothers for masculine-stereotyped outcomes and participants with older sisters for feminine-stereotyped outcomes. Q_w is a test for homogeneity of variance in effect sizes within a condition for a particular moderator.

+$p = .06$; *$p < .05$; **$p < .01$; ***$p < .001$.

on gender typing that was significant for girls ($d = .21$, 95% CI = [−.01/.43], $p = .049$). Thus, there was a small combined effect for girls' gender typing in the direction of their older sibling's gender. There was no significant effect for boys ($d = .17$, 95% CI = [−.06/.41], $p = .145$).

To gain a better understanding of this overall effect we conducted separate analyses for masculine-stereotyped and feminine-stereotyped outcomes. For masculine-stereotyped outcomes, results showed a significant positive effect for girls ($d = .31$, 95% CI = [.07/.55], $p = .010$), and a marginal positive effect for boys ($d = .21$, 95% CI = [−.01/.44], $p = .062$). Thus, girls and boys with an older brother tended to be somewhat more masculine-stereotyped than their counterparts with an older sister. There were no significant effects of older sibling gender on feminine-stereotyped outcomes.

Test of publication bias

To test for publication bias, we used funnel plots (see Figures 5.1 and 5.2). In a funnel plot, effect sizes are plotted against standard error. If studies scatter relatively symmetrically around the overall effect size, the chance of publication bias is low. The funnel plots of effect sizes for girls and boys in the studies included in this meta-analysis indicate that publication bias is not a likely problem. However, they should be interpreted with some caution because of the small number of studies.

Moderator analyses

Domain

Because the test of heterogeneity of variance was significant among samples of girls and boys (see Table 4.1), we tested the effects of potential moderators.

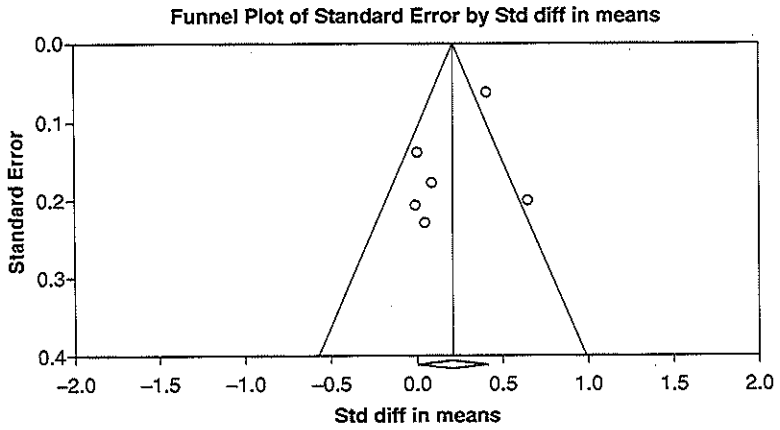

Figure 4.1 Funnel plot of effect size as a function of standard error for samples of girls

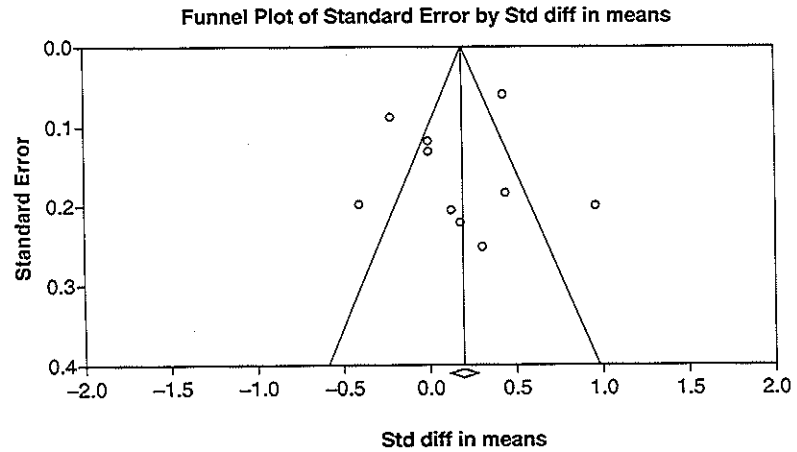

Figure 4.2 Funnel plot of effect size as a function of standard error for samples of boys

Results from the moderator analyses are summarized in Table 4.2. Gender-typing domain was a significant moderator of the relationship between gender typing and older sibling gender for girls. For boys, there was a marginal effect for the same moderator. Specifically, girls tended to be more gender-typed in the direction of their sibling's gender in studies using global measures ($d = .45$) compared to domain-specific measures ($d = .03$). For boys, the combined effect size for global measures was larger ($d = .44$) than that for domain-specific measures ($d = .04$).

Table 4.2 Effect of older sibling's gender on younger sibling's gender typing: effects by domain and younger sibling's age

Analysis	*k*	*N*	*d*	*95% CI*	*Z*	Q_W	Q_B
Domain							
Females							11.43**
Global	2	1186	.45***	[.28, .62]	5.22***	1.23	
Specific domain	4	522	.03	[−.14, .21]	.36	.16	
Males							
Global	3	1539	.44*	[.02, .85]	2.07*	19.52***	2.82+
Specific domain	7	1222	.04	[−.18, .25]	.32	17.85**	
Age							
Females							11.47**
Young child	2	1186	.45***	[.28, .62]	5.22***	1.23	
Preadolescence	4	522	.03	[−.14, .21]	.36	.16	
Males							8.54*
Young child	2	1255	.66*	[.15, 1.18]	2.53*	6.37*	
Preadolescence	4	530	.16	[−.04, .36]	1.61	3.85	
Late adolescence	4	976	.11	[−.33, .11]	−1.00	7.01	

Note. For tests of domain as moderator, statistical test was the unit of analysis, and *k* refers to the number of relevant statistical tests for each condition. For tests of age as moderator, independent sample was the unit of analysis, and *k* refers to the number of relevant independent samples for each condition. Positive effect sizes indicate a higher mean score for participants with older brothers for masculine-stereotyped outcomes and participants with older sisters for feminine-stereotyped outcomes. Q_B is an overall test of significance for a particular moderator. Q_W is a test for homogeneity of variance in effect sizes within a condition for a particular moderator.

+$p = .10$; *$p < .05$; **$p < .01$; ***$p < .001$.

Age

Age group was significantly and negatively correlated with effect size for both girls ($r = -.87$) and boys ($r = -.70$). Because ages tended to cluster in three distinct groups, we also tested age as a categorical moderator using three age groups: early childhood, preadolescence and late adolescence (see Table 4.2). For girls, studies with samples of children in early childhood ($d = .45$) found an overall stronger effect compared to studies of preadolescents ($d = .03$). (There were no samples of girls at the late adolescence age level.) For boys, studies with samples of children in early childhood ($d = .66$) indicated an overall stronger effect compared to studies of preadolescents ($d = .16$) and late adolescents ($d = -.11$).

Caveat

The domain and the age moderators were confounded. Among the studies using global measures, all of the samples of girls and most of the samples (two out of three) of boys were based on young children. Thus, it is not possible to determine which of the two moderators may have accounted for the differences in findings.

Discussion

Our findings indicate that across multiple studies there was a small yet statistically significant effect of older sibling's gender on gender typing among girls; the effect was not significant among boys. These results are in line with our hypothesis that girls would be more prone than boys to sibling influence regarding gender typing. Girls, compared to boys, tend to enjoy more allowances for gender-role flexibility both from themselves (Katz & Ksansnak, 1994) and from others in their lives (Cahill & Adams, 1997; Martin, 1990). Compared to boys, girls also tend to feel less pressure in general to conform to traditional gender-roles (Egan & Perry, 2001; Leaper, 2013).

In addition, the overall effect for girls was in the direction of, rather than in contrast to, the older sibling's gender. This finding supports the hypothesis that younger siblings would emulate older siblings' self-perceptions, behaviours, interests and attitudes. Past theoretical and empirical work also corroborates this finding. Social cognitive theory predicts that children learn from others by observation and imitation, and that this is especially true of children observing higher-status models such as older siblings (Bussey & Bandura, 1999). In addition, research on the social dosage effect suggests that when children spend more time with same-gender peers, they tend to exhibit proportionally more gender-typed behaviour later. Because siblings are peers with whom children spend a considerable amount of time, it makes sense for this effect to apply to them. Finally, research investigating the time spent with siblings indicates that children who spend more time with brothers or sisters score higher and lower on masculine-typed traits, respectively (McHale et al., 2004).

We next analysed the overall effect of older sibling gender on masculine- and feminine-stereotyped outcomes separately. As expected, there was a stronger (though small) overall effect for masculine-stereotyped outcomes compared to feminine-stereotyped outcomes for both girls and boys. Thus, girls and boys were more likely to be masculine-stereotyped if they had an older brother than if they had an older sister. However, girls and boys were not likely to have more feminine-stereotyped outcomes if they had an older sister than if they had an older brother. These findings make sense when we consider that gender functions as a status characteristic in our society. Boys and men often enjoy higher perceived and actual status compared to girls and women (see Leaper, 1994; Ridgeway & Bourg, 2004). Thus, members of both genders may feel that they gain status by acting in more masculine-stereotyped ways and lose status by acting in more feminine-stereotyped ways. In a related manner, higher status and higher power models tend to be more effective teachers than their lower status and lower power counterparts (Bussey & Bandura, 1984; Revels & Gutkin, 1983); older brothers may represent models who occupy an even higher status than older sisters, and thus their behaviours, traits and preferences may be more likely to be emulated by younger siblings.

In addition, we found that the type of outcome measure (domain-specific or global) and age (younger children versus early adolescence and older) moderated the effects of the older sibling's gender on the younger siblings' gender typing.

Unfortunately, these two factors were confounded. Nearly all of the studies using global measures were based on younger children and most studies using domain-specific measures were based on older children or adolescents. We discuss below the potential influences of domain and age as moderators, but our interpretations should be viewed cautiously.

When domain was tested as a moderator, the association between sibling gender and gender typing was significantly stronger when the study used a global measure compared to a domain-specific measure. This finding indicates that for both girls and boys older siblings may influence younger siblings somewhat in multiple domains. Furthermore, measuring any individual domain alone may not yield large effects; however, when these effects are pooled using a global measure, they may become more prominent. Perhaps pooling across multiple domains may allow for greater reliability in assessment.

With regard to age, it was significantly and negatively correlated with effect size for both girls and boys. In addition, when we tested age as a categorical moderator, there was a stronger overall effect among samples of young children compared to older ages for both genders. These findings support our prediction that sibling-gender effects would be more likely for younger than older children. As children grow, they are exposed to more and more peers and outside influences (Ellis et al., 1981); thus, the impact of a sibling may partly be overshadowed by the many other sources of influence in a child's life.

Because age and type of measure were confounded in the sample of available studies included in the meta-analysis, it is unclear whether just one or both of these variables moderated the sibling gender effects. As we have suggested, there are reasons to suspect that both may be true. With more studies, this relationship may become clearer.

Limitations and future directions

The present meta-analysis is the first to statistically synthesize the findings of research on older sibling's gender and younger sibling's gender typing. Our findings suggest that older siblings' gender may be related to younger siblings' gender typing and this relationship seems to vary based on several variables (e.g. participant gender, masculine- or feminine-stereotyped outcome). Despite this potentially helpful information, the meta-analysis needs to be viewed cautiously.

The most important limitation of the present meta-analysis is the small number of available studies that we could use. There have been surprisingly few studies testing for the association between older sibling's gender and younger siblings' gender typing. Among those studies that have been conducted on this topic, many of them (especially older studies) did not provide adequate statistical information about the effects. Interest in the topic of siblings and gender, however, appears to have increased. Most of the studies included in the meta-analysis were published after 2000. Thus, despite this limitation, the present study offers researchers who are increasingly interested in this area of study a first systematic look at the statistical effects of older sibling's gender on younger sibling gender typing.

A second limitation was that we could not consider whether the older sibling's gender was related to specific domains of gender typing more than others. Many domains of gender typing were only considered in one or two samples that we found. We did compare studies using comprehensive measures of gender typing with all studies testing specific domains of gender typing, and we found a stronger effect size with the former than the latter. However, if it was possible to compare effect sizes associated with different gender-typing domains, perhaps there would be some in which sibling-gender effects are stronger than others. For example, because siblings often play together, perhaps one would find stronger effects associated with gender-typed activities than other domains such as personality traits or academic/occupational interests.

A third limitation is that we could not address causal influences in our review. Although there are theoretical reasons to presume a causal link between sibling gender and participants' gender typing, the findings from the meta-analysis are exclusively correlational. The use of longitudinal studies can help to highlight possible causal relationships in this regard (e.g. McHale et al., 2001).

Another important and related point is that we only investigated the effect of older siblings' gender on younger siblings' gender typing. The relationship between older sibling gender and younger siblings' gender typing is likely complex. If there is a causal link between these factors, it may happen through modelling and direct tuition by the older sibling. If this is the case, past research suggests that other important factors to consider are amount of time spent with the older sibling (McHale et al., 2004), the level of gender typing of older sibling (McHale et al., 2001) and the age spacing between siblings (Bigner, 1972; Koch, 1956; Pepler et al., 1981). Further, in accordance with the social dosage hypothesis, a few studies have investigated the effects of having fewer or more siblings of a certain gender (e.g. Grotevant, 1978; Hines et al., 2002) or interacting less or more with siblings of a certain gender (e.g. Colley et al., 1996). As more research is conducted on these topics, future reviews should summarize the effects of these variables in addition to sibling gender.

Authors' note

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Appendix Table 4a Meta-analysis study characteristics by younger sibling's gender

Study	*N*	*Mean age*	*Outcome measure*	*Direction for high scores*	*Statistical value*	*d*
Female samples						
Bigner (1972)	104	5.25	Global	Masculine-stereotyped	*M* & *SD*	.96
Buist (2010)	128	12	Externalizing	Masculine-stereotyped	*M* & *SD*	.09
McHale et al. (2001)	97	10.25	Self-perceptions	Masculine-stereotyped	*M* & *SD*	.07
McHale et al. (2001)	97	10.25	Self-perceptions	Feminine-stereotyped	*M* & *SD*	−.11
McHale et al. (2001)	96	10.25	Leisure	Masculine-stereotyped	*M* & *SD*	.31
McHale et al. (2001)	96	10.25	Leisure	Feminine-stereotyped	*M* & *SD*	−.19
Rust et al. (2000)	1082	3	Global	Masculine-stereotyped	*M* & *SD*	.55
Rust et al. (2000)	1082	3	Global	Feminine-stereotyped	*M* & *SD*	.28
Updegraff et al. (2000)	77	12.42	Social behaviour	Masculine-stereotyped	*M* & *SD*	.41
Updegraff et al. (2000)	77	12.42	Social behaviour	Feminine-stereotyped	*M* & *SD*	−.31
Williams et al. (2007)	210	12.11	Externalizing	Masculine-stereotyped	*M* & *SD*	0
Male samples						
Bigner (1972)	112	5.25	Global	Masculine-stereotyped	*M* & *SD*	.65
Buist (2010)	128	12	Externalizing	Masculine-stereotyped	*M* & *SD*	.44
Leventhal (1970) – Study 1	105	19	Self-perceptions	Feminine-stereotyped	$F = 4.20$	−.40
Leventhal (1970) – Study 2	522	18.5	Leisure	Masculine-stereotyped	$F = 8.70$	−.26
Leventhal (1970) – Study 2	509	18.5	Occupational Interests	Masculine-stereotyped	$p = .049$	−.18
Leventhal (1970) – Study 3	56	20.2	Internalizing	Feminine-stereotyped	$F = 5.29$	.62
Leventhal (1970) – Study 3	78	20.2	Self-perceptions	Masculine-stereotyped	$p = .99$	0
Leventhal (1970) – Study 4	284	18.3	Global	Feminine-stereotyped	$p = .99$	0
McHale et al. (2001)	96	10.25	Self-perceptions	Masculine-stereotyped	*M* & *SD*	−.04
McHale et al. (2001)	96	10.25	Self-perceptions	Feminine-stereotyped	*M* & *SD*	−.03
McHale et al. (2001)	94	10.25	Leisure	Masculine-stereotyped	*M* & *SD*	.39
McHale et al. (2001)	94	10.25	Leisure	Feminine-stereotyped	*M* & *SD*	.21
Rust et al. (2000)	1143	3	Global	Masculine-stereotyped	*M* & *SD*	.17
Rust et al. (2000)	1143	3	Global	Feminine-stereotyped	*M* & *SD*	.70
Updegraff et al. (2000)	77	12.42	Social behaviour	Masculine-stereotyped	*M* & *SD*	.40
Updegraff et al. (2000)	77	12.42	Social behaviour	Feminine-stereotyped	*M* & *SD*	−.04
Williams et al. (2007)	231	12.11	Externalizing	Masculine-stereotyped	*M* & *SD*	0

Note. *N* = Number of participants; *M* & *SD* = effect size computed from reported means and standard deviations; *d* = aggregate effect size.

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