



# Early Gender Differences in Valuing Strength

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## Abstract

Being strong is a prominent male stereotype that children learn early in life; however, it is unknown as to when children start to *value* being strong and when gender differences in valuing strength might emerge. In the current study, we interviewed an ethnically diverse sample of 168 3–5 year-olds (88 girls, 80 boys) to address this gap in the literature. Results showed that boys as young as age 3 generally valued strength more than girls: (1) boys, on average, said it was more important to be strong than girls did, and (2) boys were more likely to prefer strength-related occupations than girls. Boys were also more likely to select boys than girls as the gender who cares more about physical strength. Additionally, with age, both girls and boys demonstrated knowledge of the stereotype that boys care about physical strength, with girls also being less likely to associate being a girl with being strong. Overall, the results suggest that valuing physical strength starts in early childhood, and gender differences in valuing strength are evident at the eve of gender identity development. Possible implications for boys' later well-being and health are discussed.

**Keywords** Values · Physical strength · Gender development · Early childhood · Gender stereotypes · Gender differences

## Introduction

Each individual is unique in what they personally value and how much importance they place on various domains (Schwartz, 2006). Our personal values can explain our motivations behind our behaviors and attitudes, having profound effects on the choices we make in our lives—they can affirm our sense of self and guide the use of our time, money, and efforts. Further, the gender identity that we adopt or are given can affect which values we prioritize (Knafo & Spinath, 2011). Observing young boys' spontaneous flexing of muscles and parading in superhero capes (Dinella, 2017; Paley, 1986) coupled with adolescent boys' and young men's expenditure of time and money toward achieving their ideal muscled bodies (Ricciardelli & McCabe, 2003; Settembre, 2018) suggests that the link between gender and valuing strength is highly relevant. The global dominance

of the superhero movie genre (Brown et al., 2009; Coyne et al., 2014; Do Rozarío, 2004), the influence of the muscle-building industry (\$17 billion protein supplement market; Eisenberg et al., 2012; Grand View Research, 2020), and the enduring ethos of instilling toughness among boys and men (Vandello & Bosson, 2013) can all influence how gender is related to the formation of valuing strength. Therefore, in this study, we focus on young children's development of valuing strength.

## The Importance of Understanding the Origins of Valuing Strength

Understanding the origins of valuing strength is important for several reasons. Being strong can be healthy and empowering. It can contribute to a sense of independence and agency and may reward boys, in particular, with a sense of fit with same-gender peers (Egan & Perry, 2001; Martin et al., 2017). However, placing too much importance on strength can potentially lead to physical and psychological harm over time if left unchecked. Making one's self-worth contingent on physical appearance, such as the need to have a certain type of muscled body, can manifest in unhealthy behaviors (Crocker, 2002; Or et al., 2019). For example, with the influence of the media preaching a muscular build as the ideal

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male body type, eating disorders and the abuse of dietary supplements and muscle-building products are increasingly becoming risks among adolescent boys and young men (Geller et al., 2015; Ward et al., 2019; Wilson et al., 2006).

Physical consequences, however, are not the only issues that may affect young boys and men dealing with societal pressures to be strong and thus “masculine.” Boys are often inclined to be emotionally withdrawn and socially isolated as well as hesitant to express their feelings in the quest to be strong and independent men, leading to a loss of intimacy even in close friendships (Way, 2013). Furthermore, endorsement of stereotypical masculinity norms prescribing male toughness and dominance has been correlated with internalizing and externalizing behaviors (Kulis et al., 2010) and increased risk taking (Granié, 2010). Conversely, learning to equate being a girl or displaying femininity to being weak can also affect girls’ and women’s well-being through the development of negative (outright “hostile”) or paternalistic (“benevolently sexist”) attitudes toward girls (Connor et al., 2017). Endorsing masculinity norms of toughness and dominance has also been linked to the perpetration of violence among adolescent boys (Reidy et al., 2015).

### Information Linking Maleness to Strength is Plentiful

According to cognitive theories of gender development, early childhood is a special time when children become aware of gender categories, form a basic gender identity, and are highly motivated to learn about gender and follow what they learn (Martin et al., 2002). They are keenly attuned to the information we provide as to what being a boy or a girl means and actively seek out this information as “gender detectives” (Martin & Ruble, 2004; Martin et al., 2002). Across many cultures and nations, society provides a deluge of information that boys and men should be strong and conversely that girls and women are weak (Courtenay, 2000; Kågesten et al., 2016). One potent source of this information is the media and its marketing by-products that depict male fictional figures who are muscular, bold, helpful, and independent (Dinella et al., 2017; Hill, 2011). More specifically, fairytales and superhero movies often present men and boys as saviors of “damsels in distress,” reinforcing children’s stereotypical understandings of gender (Baker & Raney, 2007; Brown et al., 2009; England et al., 2011; Fitzpatrick & McPherson, 2009; Leaper et al., 2002; Padilla-Walker et al., 2013; Paterson, 2014). Additionally, many toys and games often represent boys and men as more active and physically strong compared to girls and women (Cherney & London, 2006).

Parents, siblings, peers, and teachers may also play a major role in conveying that boys and men should be strong. For instance, household and childcare duties that require more physical strength (e.g., placing a bulky stroller into a car,

carrying toddlers) may be relegated to fathers and brothers if they are present (Crouter et al., 1995). Boys might show off their physical prowess to each other and tease those who fail to perform a strenuous physical task. Preschool teachers have been found to encourage strength-related play like pretending to be firefighters or superheroes more with groups of boys than with groups of girls (Granger et al., 2017). As a result, boys might learn that strength is required to be good fathers, partners, brothers, and sons. They may also learn of the social benefits and privileges that come with having a muscular and fit physical appearance, such as popularity, power, and riches.

### Children’s Sensitivity to Gender Stereotypes About Strength

Past literature suggests that children are sensitive to information that strength is a male domain, as shown in their gender categorization, gender stereotyping, and behaviors. Regarding gender categorization, children’s first recognition of gender differences may be based on physical cues and appearance such as height and build (Bigler et al., 1997; Martin et al., 2002)—physical cues that may be associated with strength. More recently, research has revealed that 3–5 year-old children associate certain features typical of men (e.g., facial hair, pronounced jawline) with having more power and authority (Terrizzi et al., 2018), features traditionally associated with masculinity (Koenig et al., 2011) and, therefore, strength.

Multiple studies have also examined strength-related gender stereotypes. Prominent gender stereotypes include the belief that boys and men are physically stronger than girls and women and must be stoic and self-reliant (Prentice & Carranza, 2002; Rudman et al., 2012). Girls and women are stereotyped as “nice and sweet,” nurturing, but weak (Prentice & Carranza, 2002; Rudman et al., 2012). Many young children between ages 3–5 years begin to exhibit knowledge of these gender stereotypes which consolidates through middle childhood and beyond (Drummond & Drummond, 2015; Paterson, 2014; Powlishta et al., 2001; Sani et al., 2003; Signorella et al., 1993). Other recent studies have found that boys (ages 3 to 11 years) generally endorsed that boys or men should be heroes and need to rescue others (Gutierrez et al., 2019; Hammond & Cimpian, 2021). These same studies found mixed results for girls depending on their age and the assessment method. Further, despite Disney’s attempts to make recent princesses more agentic, young girls still expressed that boys must be princes whose duties are to protect princesses (Golden & Jacoby, 2017).

In addition to categorization and stereotyping, children’s sensitivity to societal messages that boys and men should be strong can be seen in their behaviors, such as in their Halloween costumes and dress-up play. Young boys often dress up as muscled superheroes and engage in “dangerous” activities, while young girls often wear princess dresses and practice submissive or attentive roles (Dinella, 2017; Maccoby, 1988).

Several studies have also shown that young children often exhibit “appearance rigidity,” intensely interested in wearing gender-stereotypical attire and donning superhero capes and princess gowns even on non-holidays (DeLoache et al., 2007; Halim et al., 2014).

Cognitive theories of gender development posit that sensitivity to this information about gender and strength is heightened when children begin to form gender identities (Martin et al., 2002). As children begin to understand gender categories (There are girls and boys), adopt a basic identity (I’m a boy and being a boy is great!), and understand gender’s relative permanence (I was a baby boy and will grow up to become a man) (Kohlberg, 1966), cognitive theories of gender development predict that children will be highly motivated to learn gender stereotypes and adhere to the gender stereotypes that they learn (Martin et al., 2002). Notably, personally valuing strength is distinct from merely knowing gender-strength stereotypes. A girl can know that girls are stereotyped as weak, yet still be dedicated to becoming strong by drinking her milk and playing soccer. Most of these studies looked at descriptive knowledge of gender stereotypes regarding strength and weakness for groups of girls and boys and women and men in general (e.g., “Who is usually strong?” Or “Who is weak?”) and fewer examined prescriptive attitudes (e.g., “Who should be strong?” or “Who can be weak?”) (Signorella et al., 1993). To our knowledge, no research to date has directly examined young children’s personal valuing of physical strength (e.g., “Is being strong important to you?”) or stereotypes about who values strength (e.g., “Who cares about being strong?”) during the early childhood period. Stereotypes might inform the values a person adopts, but values reflect what is personally important to us (Schwartz, 2006). Values motivate our actions, guide our goals, are linked to affect, and have hierarchy in their relative personal importance across situations (Schwartz, 2006).

## Study Overview

The goals of this study are to understand whether there are early gender differences in how much children value strength, whether valuing strength is associated with age, and whether gender identity development can explain gender and age patterns in valuing strength. To address these goals, we interviewed 3–5 year-old children assessing gender identification, verbal and behavioral indications of valuing physical strength, and knowledge of strength-related gender stereotypes. We expected that boys would value strength more than girls, on average. Based on developmental trends on gender stereotyping (Signorella et al., 1993), with children becoming more exposed to cultural gender norms as they age, we expected to find positive associations between age and both valuing strength and awareness of gender-strength stereotypes among boys, but negative associations among girls. Finally, consistent

with cognitive theories of gender development (Martin et al., 2002), we expected greater gender identification to be positively associated with valuing strength and awareness of gender-strength stereotypes among boys, but to be negatively associated among girls. Thus, individual differences in gender identity within gender groups might contribute to differences in valuing strength. For example, a boy with a stronger sense of a masculine identity might value strength to a greater degree than a boy with a weaker sense of a masculine identity.

## Method

### Participants and Procedure

The current study included 168 3–5-year-old children (88 girls, 80 boys;  $M_{\text{age}} = 53.84$  months,  $SD_{\text{age}} = 7.01$  months; 36 3 year-olds [22 girls, 14 boys], 93 4-year-olds [50 girls, 43 boys], 39 5 year-olds [16 girls, 23 boys]) recruited from 12 preschools, child development centers, and local community programs located in Southern California. The sample was ethnically diverse (41.7% Latinx, 25.0% multi-ethnic, 19.0% Non-Hispanic White, 7.7% African American, 6.0% Asian or Pacific Islander, and 0.6% undisclosed). Legal guardians submitted consent forms to allow their children to participate in the study where they also provided the child’s gender, age, and ethnicity.

One-on-one interviews were conducted by trained research assistants following the child’s verbal assent to participate in the study. Strength-related measures were asked in the following order: gender identification (private regard and centrality), dumbbell lifts, preference for strength-related occupations, self-report of importance of strength, gender-strength stereotypes (self as target), and gender-strength stereotypes (others as targets). The study took an average of fifteen minutes to complete. Upon the completion of the interview, the child was thanked for their time and given a small goodie bag.

Of the 168 children sampled, 38 children who participated in the initial phase of the study completed a slightly different version of the preference for strength-related occupations task (identical occupations were presented, but were not matched on popularity) and did not complete the Gender-Strength Stereotypes (Others as Targets) questions, which were later added to the end of the interview protocol. Thus, for these two specific measures, the sample includes 130 children (70 girls, 60 boys;  $M_{\text{age}} = 53.60$  months,  $SD_{\text{age}} = 7.12$  months; 29 3-year-olds [19 girls, 10 boys], 73 4-year-olds [38 girls, 35 boys], 28 5-year-olds [13 girls, 15 boys]; 43.1% Latinx, 26.9% multi-ethnic, 16.2% Non-Hispanic White, 8.5% African American, 4.6% Asian or Pacific Islander, and 0.8% undisclosed). Post hoc power analyses (G\*Power v. 3.1) revealed that the sample (both  $N = 168$  and  $N = 130$ ) lent sufficient statistical power ( $\beta = 0.99$ ,  $\alpha = 0.05$ ) to detect effects.

## Measures

### Gender Identification (Private Regard and Centrality)

Children were asked four questions regarding how positively they felt about their gender (two questions on private regard; e.g., “Are you happy that you are a girl/boy or are you not happy that you are a girl/boy?”) and how important their gender was to their overall sense of self (two questions on centrality; e.g., “Is being a girl/boy important to you or not important?”). If a child answered affirmatively, they were asked to quantify their answer with “*How much?*” and given the options of “*A little*” or “*A lot*” (1 = *No*, 2 = *Yes, a little*, 3 = *Yes, a lot*) (Halim et al., 2017; Ruble et al., 2007). These four items were averaged together to make a scale ( $\alpha = 0.51$ ; Range: 1.00–3.00).

### Strength-Valuing Measures

**Preference for Strength-Related Occupations.** On each of four trials, the child was presented with four different male-typed occupational outfits reflecting various occupations and were asked which outfit they would like to wear. Occupations were selected based on children’s ratings of stereotypicality from previous studies validating the well-established occupation subscales of the Children’s Occupations, Activities, and Traits and Occupations, Activities, and Traits scales (Liben & Bigler, 2002), and through pilot testing which occupations were familiar to young children. All occupations were male-typed due to a lack of familiar strength-related and female-typed occupations identifiable by young children (Liben & Bigler, 2002). Furthermore, strength-related male-typed occupations were contrasted with non-strength-related male-typed occupations to provide a more stringent and focused assessment on children’s value of strength, particularly among boys. In each trial, two of the male-typed occupations were strength-related (e.g., soldier, sports athlete; both coded as 1) and two of the male-typed occupations were not strength-related (e.g., scientist, mail carrier; both coded as 0). The presentation order of strength-related and non-strength-related occupations was alternated and counterbalanced between trials. Responses from each trial were summed (Range: 0.00 to 4.00).

**Self-Report of the Importance of Strength.** Children were asked, “Do you think it’s important to be strong or not important to be strong?” If a child answered yes, they were asked to quantify their answer with, “*How much?*” and given the options of “*a little*” or “*a lot*” (1 = *No*, 2 = *Yes, a little*, 3 = *Yes, a lot*; Range: 1.00 to 3.00).

**Number of Dumbbell Lifts.** A research assistant introduced the child to a pair of 2-pound black dumbbells. The child was then told that they would “become stronger” the more times

they lifted the dumbbells by safely performing light bicep curls. They were subsequently offered the opportunity to lift the exercise tools “*as many times as [they] want.*” The child was then allowed to pick up the dumbbell(s) and begin lifting. The task was split up into three intervals, with a maximum of ten lifts per interval. If the child lifted the dumbbell(s) ten times, they were instructed to pause and asked whether they wanted to continue. At this point, the child could continue lifting until the end of the next interval or end the task there. This cycle would continue until the child completed all three intervals or ended the task prematurely. The number of lifts across all three intervals were summed (Range: 0.00 to 30.00).

### Gender-Strength Stereotype Measures

**Explicit Questions.** The child was asked two questions to see how much they associated being strong with their own gender: “To be a (same gender: girl/boy), do you need to be strong?” and, “Are (same gender: girls/boys) always strong?” If the child answered affirmatively, they were asked, “*How strong, a little strong or very strong?*” (1 = *No*, 2 = *Yes, a little*, 3 = *Yes, very*). These two items were averaged together to make a scale ( $r[167] = 0.47$ ,  $p < 0.001$ ; Range: 1.00 to 3.00).

**Inferences About Others.** To assess stereotype knowledge, children were introduced to three drawings depicting a lone boy, “Bobby,” a lone girl, “Lisa,” and both Bobby and Lisa standing together. The child was first asked, “Who cares about being strong? Bobby, Lisa, or both Lisa and Bobby?” with the research assistant pointing to the respective drawing. If the child chose both Lisa and Bobby, they were probed to choose only one (format adapted from Halim et al., 2017; Ruble et al., 2007; see Signorella et al., 1993) (0 = Lisa chosen, 1 = Bobby chosen) (Tables 1, 2).

## Results

Our first two research questions tested whether there were early gender differences in how much children value physical strength and whether stronger gender identification would predict greater valuing of strength among boys and lesser valuing of strength among girls. Our third and fourth research questions examined children’s understanding of the gender stereotype that boys care about being physically strong more than girls and tested whether stronger gender identification would predict greater knowledge of gender-strength stereotypes among both girls and boys. An exploratory approach was taken to examine any developmental change in potential gender differences.

To answer these questions, we first present descriptives of the measures across the whole sample, including zero-order correlations. Next, four separate hierarchical multiple regressions and one logistic regression were conducted.

**Table 1** Means (and standard deviations) of measures

	Whole sample	Girls	Boys
Gender identification	2.52 (0.46)	2.57 (0.45)	2.45 (0.50)
Strength-valuing measures			
Preference for strength-related occupations	2.28 (1.14)	1.76 (1.06)	2.88 (0.92)
Self-report of the importance of strength	2.33 (0.87)	2.24 (0.92)	2.49 (0.78)
Number of dumbbell lifts	9.38 (8.37)	9.29 (8.23)	10.56 (8.47)
Gender-strength stereotype measures			
Explicit questions	2.38 (0.71)	2.43 (0.70)	2.46 (0.70)
Inferences about others	62.9% (48.6)	48.5% (0.50)	79.0% (41.1)

Gender identification, self-report of the importance of strength, and explicit questions (gender-strength stereotype) scores could range from 1 to 3. Preference for strength-related occupations scores could range from 0 to 4. The number of dumbbell lifts could range from 0 to 30. Inferences about others (gender-strength stereotypes) scores reflect the proportion of children who selected the boy figure

**Table 2** Zero-order correlations between measures

Variable	1	2	3	4	5	6
1 Gender identification	–	.08	.29*	.00	.23*	.02
2 Preference for strength-related occupations	–.07	–	–.19	–.11	–.12	.08
3 Self-report of the importance of strength	.11	–.19	–	.36**	.48	.02
4 Number of dumbbell lifts	.08	.01	.09	–	.15	.28
5 Gender-strength stereotype: Explicit questions	.24*	–.07	.39**	.23*	–	–.18
6 Gender-strength stereotype: Inferences about others	.09	.17	–.05	.19	–.02	–

Correlations for girls are above the diagonal; correlations for boys are below the diagonal. \* $p < .05$ ; \*\* $p < .01$

For each hierarchical multiple regression, predictors on the first step of the model included the child's gender (with girls as the reference group), age in months (mean-centered), and gender identification (mean-centered). On the second step of the model, we tested the child gender by age interaction and the child gender by gender identification interaction as predictor variables. Our dependent variables included preference for strength-related occupations, self-report of the importance of strength, number of dumbbell lifts, and knowledge of gender-strength stereotypes (explicit questions and inferences about others). Due to the gender-strength stereotype (inferences about others) variable being dichotomous, a binary logistic regression with the same predictor variables was conducted. Main effects are reported from the first step of the model unless an interaction variable was significant. If the interaction variables were significant, coefficients are reported from the second step of the model. All estimated coefficients from the regression analyses can be found in Tables 3 and 4. Because we conducted several multiple regressions, to reduce concerns about making Type I errors, we also conducted an exploratory path analysis model with all of the same predictors and all of the tested outcome variables as endogenous variables using Mplus (v1.8). Results were substantially the same as described below.

## Descriptives

To get a sense of the measures, we report the grand means. Children, on average, strongly identified with their gender ( $M = 2.52$ ,  $SD = 0.46$ ), as is typical during the preschool years (Halim et al., 2011). Children selected a moderate number of strength-related occupations versus male-typed occupations ( $M = 2.28$ ,  $SD = 1.14$ ) and believed it was between “a little” to “a lot” important to be strong ( $M = 2.33$ ,  $SD = 0.87$ ). Children lifted the dumbbells approximately 9 times ( $M = 9.38$ ,  $SD = 8.37$ ). Children associated strength with their own gender between “a little” to “a lot” when answering explicit gender-strength stereotyping questions ( $M = 2.38$ ,  $SD = 0.71$ ). A majority of children said the target boy (“Bobby”) cared about looking strong (62.9%) compared to the target girl (“Lisa”) (37.1%). See Table 1.

For the sample as a whole, bivariate zero-order correlations revealed that gender identification was positively correlated with self-report of the importance of strength ( $r = 0.18$ ,  $p = 0.041$ ) and belief in same gender-strength stereotypes (measured with explicit questions) ( $r = 0.23$ ,  $p = 0.003$ ). Preference for strength-related occupations was positively correlated with gender-strength stereotypes (measured with inferences about others) ( $r = 0.25$ ,  $p = 0.005$ ). The number of dumbbell lifts was positively correlated with self-report

**Table 3** Results from four separate hierarchical regression results for children’s preferences for strength-related occupations, importance of strength, dumbbell lifts, and gender-strength stereotype (explicit questions)

Variable	Step 1					Step 2					<i>R</i> <sup>2</sup> (%)	$\Delta F$
	B	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>	B	<i>B</i>	<i>SE</i>	<i>t</i>	<i>p</i>		
<i>Preference for strength-related occupations</i>												
(Constant)		1.760	.120				1.746	.120			26.3	1.39 <sup>ns</sup>
Participant Gender	.491	1.120	.178	6.30	<.001	.488	1.112	.177	6.27	<.001		
Age	.052	.008	.012	.66	.508	-.053	-.009	.017	.50	.617		
Gender identification	.009	.023	.194	.12	.907	.072	.179	.261	.68	.495		
Participant gender × age						.154	.036	.025	1.45	.149		
Participant gender × gender identification						-.095	-.351	.388	.90	.368		
<i>Self-report of the importance of strength</i>												
(Constant)		2.212	.110				2.198	.111			9.4	.70 <sup>ns</sup>
Participant gender	.141	.244	.157	1.55	.124	.140	.242	.158	1.54	.128		
Age	-.022	-.003	.011	.24	.811	-.125	-.016	.016	.95	.343		
Gender identification	.269	.504	.169	2.98	.004	.300	.562	.235	2.40	.018		
Participant gender × age						.146	.025	.023	1.12	.267		
Participant gender × gender identification						-.055	-.148	.340	.44	.664		
<i>Number of dumbbell lifts</i>												
(Constant)		9.492	.878				9.563	.888			7.1	.26 <sup>ns</sup>
Participant gender	.054	.894	1.269	.70	.482	.054	.903	1.275	.71	.480		
Age	.249	.296	.091	3.25	.001	.269	.320	.129	2.47	.015		
Gender identification	.017	.296	1.355	.22	.827	-.043	-.753	2.033	.37	.712		
Participant gender × age						-.030	-.050	.183	.27	.785		
Participant gender × gender identification						.081	1.924	2.740	.70	.484		
<i>Gender-strength stereotype: explicit questions</i>												
(Constant)		2.408	.072				2.402	.072			11.2	1.95 <sup>ns</sup>
Participant gender	.058	.081	.107	.76	.451	.046	.064	.107	.61	.546		
Age	-.196	-.020	.008	2.56	.011	-.335	-.034	.010	3.23	.002		
Gender identification	.263	.395	.116	3.41	.001	.286	.430	.162	2.66	.009		
Participant gender × age						.206	.030	.015	1.97	.050		
Participant gender × gender identification						-.039	-.084	.230	.37	.716		

**Table 4** Logistic regression coefficients for gender-strength stereotype: inferences about others

Variable	<i>B</i>	<i>SE</i>	<i>Wald</i>	<i>p</i>	OR	95% CI
(Constant)	-.064	.255				
Participant gender	1.457	.432	11.40	.001	4.30	(1.84, 10.01)
Age	.063	.037	2.88	.090	1.07	(.99, 1.14)
Gender identification	.095	.571	.03	.868	1.10	(.36, 3.37)
Participant gender × age	.018	.065	.07	.788	1.02	(.90, 1.16)
Participant gender × gender identification	.171	.898	.04	.849	1.19	(.20, 6.89)

of the importance of strength ( $r = 0.23, p = 0.008$ ) and belief in gender-strength stereotypes (inferences about others) ( $r = 0.27, p = 0.003$ ). Of particular note, consistent with self-socialization theories, belief in same gender-strength stereotypes (explicit questions) was positively correlated with

self-report of the importance of strength ( $r = 0.42, p < 0.001$ ) and the number of dumbbell lifts ( $r = 0.18, p = 0.024$ ). No other correlations were significant. We also provide zero-order correlations split by child gender in Table 2.

## Strength-Valuing Outcomes

### Preference for Strength-Related Occupations

Supporting our hypothesis, a regression revealed a main effect of gender for preferences toward strength-related occupations. Boys ( $M = 2.88$ ,  $SD = 0.92$ ) selected more outfits associated with strength-related occupations than girls ( $M = 1.76$ ,  $SD = 1.06$ ),  $\beta = 0.49$ ,  $B = 1.12$  (0.18),  $p < 0.001$ . This gender difference was consistent across age, as there was no significant interaction between child age and gender. Additionally, we expected stronger gender identification to predict greater preference for strength-related occupations among boys and less preference for strength-related occupations among girls. However, this was not supported as we found no significant main effect or interactions involving gender identification.

### Self-Report of the Importance of Strength

Consistent with our hypothesis, gender played a significant role in predicting how much importance children placed on physical strength in response to explicit self-report questions. Boys overall reported that it was more important to be strong compared to girls,  $\beta = 0.17$ ,  $B = 0.29$  (0.15),  $p = 0.046$ . On average, boys rated being strong to be between “a little” to “a lot” important ( $M = 2.49$ ,  $SD = 0.78$ ), whereas girls reported being strong to be closer to “a little” important ( $M = 2.24$ ,  $SD = 0.92$ ).

There was also a positive and main effect for gender identification. Children who more strongly identified with their gender were more likely to say that being strong was important compared to children with lower levels of gender identification,  $\beta = 0.19$ ,  $B = 0.34$  (0.15),  $p = 0.024$ . However, there was no significant child gender by gender identification interaction. These findings indicate that stronger gender identification was associated with greater importance of strength for both girls and boys.

### Number of Dumbbell Lifts

The regression revealed no significant main effect of gender, indicating that girls and boys did not significantly differ in their number of dumbbell lifts. However, age was positively associated with lifting the dumbbells, with older children performing more dumbbell lifts on average compared to younger children,  $\beta = 0.25$ ,  $B = 0.30$  (0.09),  $p = 0.001$ . There were also no significant effects of gender identification in predicting the number of dumbbell lifts.

## Gender-Strength Stereotype Outcomes

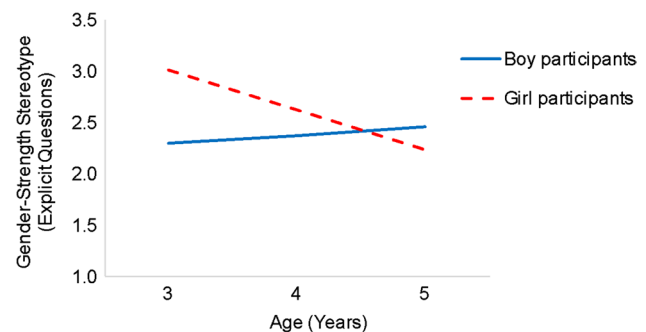
### Explicit Questions

The regression analysis revealed a child gender by age interaction,  $\beta = 0.21$ ,  $B = 0.03$  (0.02),  $p = 0.050$ . Follow-up simple slope analyses indicated that, for girls, age was negatively associated with affirming that girls need to be and are always strong,  $\beta = -0.34$ ,  $B = -0.03$  (0.01),  $p = 0.002$ . For boys, age was not significantly associated with affirming that boys need to be and are always strong,  $\beta = -0.03$ ,  $B = -0.00$  (0.01),  $p = 0.768$ . See Fig. 1.

We expected stronger gender identification to predict greater affirmation that one’s gender needs to be and is always strong among boys and lesser affirmation that one’s gender needs to be and is always strong among girls. However, data revealed that among both girls and boys, greater gender identification was positively associated with affirming that one’s own gender needed to be and was always strong, as there was a significant main effect of gender identification,  $\beta = 0.29$ ,  $B = 0.43$  (0.16),  $p = 0.009$ . The interaction between child gender and gender identification was not significant.

### Inferences About Others

A logistic regression revealed that participant boys were 4 times more likely than participant girls to select the target boy (“Bobby”) as the child who cared about being strong rather than the target girl (“Lisa”),  $B = 1.46$  (0.43),  $Wald = 11.40$ ,  $p = 0.001$ ,  $OR = 4.30$  (95% CI: 1.84, 9.64). For both girl and boy participants, age was positively associated with gender-stereotypic inferences about others, such that older versus younger children were more likely to select the target boy rather than the target girl as caring about being strong,  $B = 0.07$  (0.03),  $Wald = 5.14$ ,  $p = 0.023$ ,  $OR = 1.07$  (95% CI: 1.01, 1.14) (on the first step of the model). See Fig. 2. There were no significant effects for gender identification.



**Fig. 1** Predicted values of gender-strength stereotypes (explicit questions) by participant age and gender for children with average levels of gender identification. Possible values could range from 1 to 3. Higher values indicate equating strength with one’s own gender group

## Discussion

Caring about strength is a multifaceted value with historical and global implications. Our study aimed to understand whether there are early gender differences in how much children value strength, whether valuing strength is associated with age, and whether gender identity development can explain gender and age patterns in valuing strength. We used both behavioral and self-report measures in interviews with an ethnically diverse sample of young children.

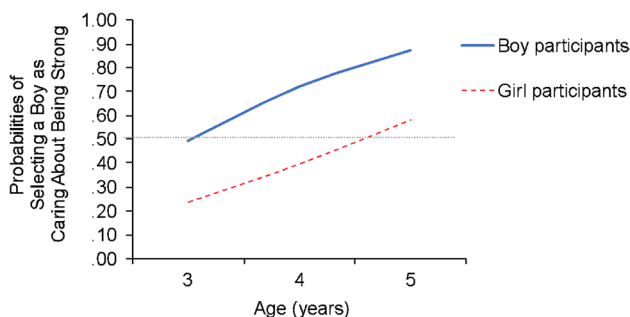
### Early Gender Differences in Valuing Strength

Studies with adolescent and adult samples suggest that adolescent boys and young men value physical strength to a greater degree than do their female counterparts (Grossbard et al., 2011; Klomsten et al., 2005). When do these gender differences begin? Two out of our three measures used to assess how much children value strength revealed that young boys valued strength more than young girls did, consistent with both our hypothesis and with gender differences found later in the lifespan (Grossbard et al., 2011; Klomsten et al., 2005). Among an array of male-typed occupations, boys preferred more strength-related occupations (e.g., firefighter, police officer) than did girls, on average. When asked directly whether they thought it was important to be strong, boys said that it was more important, on average, than did girls. Standardized regression coefficients suggest that these effect sizes were between small to medium. Girls and boys, however, did not significantly differ in how many times they lifted dumbbells for which they were told they would become stronger. This null finding might reflect a common disconnect between attitudes or values and behavior (Ajzen & Fishbein, 2000), whereby girls' and boys' attitudes regarding strength differ, but not necessarily their behaviors. Alternatively, we observed that many children found that lifting mini dumbbells was novel and fun, which may have added noise to our

measure. Altogether, our findings suggest that gender differences in valuing strength, at least reflected in attitudes, may begin quite early in life, possibly in early childhood.

Regarding children's knowledge of gender stereotypes concerning the valuing of strength, we found a similar gender difference when asking children to make an inference about others based on gender. When asked, "Who cares about being strong?" participant boys picked the boy figure more than participant girls. This finding aligns with some research which found that characteristics stereotypically associated with one's gender (e.g., boys are strong) are likely more salient than characteristics that are lacking (e.g., girls are not strong) (Ruble et al., 2007). It is notable, however, that before the probe, 37.9% of participant boys and 26.9% of participant girls said that both the boy and the girl figures cared about being strong. However, when asked about explicit connections between one's gender and the need to be strong, there was no gender difference. Girls affirmed that girls needed to be and were always strong, as boys affirmed that boys needed to be and were always strong. Thus, boys may value strength more than girls in early childhood, and there is tentative evidence that boys are also more aware of the male-strength stereotype connection, at least when making inferences about others.

Boys' patterns might reflect the pervasive message from the media and from people around them that boys and men should care about being strong and are strong. Indeed, in a systematic review across 29 countries, adolescents' attitudes surrounding masculinity were found to be centered on toughness, whereas femininity was predicated on weakness (Courtenay, 2000; Kågesten et al., 2016). As mentioned in the introduction, parents, siblings, and peers might reward boys for being strong and tease boys when they show "weakness," such as when they cry. Indeed, boys across multiple ethnic and age groups often report feeling great pressure to conform to gender stereotypes and to look and act strong at all costs (Corby et al., 2007; Vandello & Bosson, 2013; Way, 2013). The superhero movie genre, where men make up the majority of superheroes and characters, is a global phenomenon bringing in \$28 billion worldwide in the last two decades (Wong, 2020), and although the movies are targeted toward teens and adults, much superhero merchandise is directed at children. Books and television shows also depict male characters solving problems, protecting others, and showing perseverance (Aubrey & Harrison, 2004), such as *Thomas the Train* and *PJ Masks*. Children still glean from modern Disney fairytales that the men should come to the rescue (Golden & Jacoby, 2017). In our interviews, many young boys would mention Maui, a supersized demigod in one Disney's most recent blockbusters, *Moana* (Ito, 2016; Streiff & Dundes, 2017). Our data suggest that young boys are internalizing the message that they need to be strong as they are first forming gender identities. Indeed, during our interviews some boys would spontaneously flex their muscles for interviewers and lift their chairs to show their physical strength. A 3-year-old



**Fig. 2** The probability of selecting a boy versus a girl in response to, "Who cares about being strong?" (gender-strength stereotype: inferences about others) by participant age and gender for children with mean levels of gender identification



multi-ethnic boy said, “[You] can’t fight a bad guy if [you’re] not strong.” Another boy said, “If someone wants me to move [a] boulder for them, I would.”

### Age-Related Patterns

We also explored whether age would be positively associated with valuing strength and being aware of gender-strength stereotypes among boys, but would be negatively associated with valuing strength and being aware of gender-strength stereotypes among girls, as children become more exposed to cultural gender norms. Our hypotheses were partially supported. Results for both stereotyping measures suggest that very young girls (around age 3) strongly associate strength with being a girl, but this association is weakened at older ages (around age 5). When asked explicitly whether one’s gender needed to be strong and was always strong, girls vigorously endorsed this sentiment at younger ages (“*Yes, a lot*” around age 3) but were more tempered in their responses at older ages (“*Yes, a little*” around age 5) (Fig. 1). Across ages 3 through 5, boys moderately endorsed this sentiment (predicted means between “*Yes, a little*” to “*Yes, a lot*”) with no significant correlation with age. When asked to make an inference about whether a girl or boy figure cares about being strong, 3-year-old girls had an 82.8% probability of picking the girl figure (Fig. 2). In contrast, 5-year-old girls had only a 28.6% probability of picking the girl figure. Boys showed a positive trend with age—3-year-old boys were at about chance levels in terms of picking the girl or boy figure, but 5-year-old boys had a probability of 88.3% of picking the boy figure. No gender by age interaction was indicated, suggesting similar slopes with age for both genders.

Younger girls’ responses may reflect both strong ingroup favoritism (Martin & Ruble, 2010) and also a lack of exposure or comprehension about societal dictates of who is strong and who should care about being strong. For example, when asked if girls are always strong, one 4-year-old Latina responded yes, “Very, very, very!” Boys’ increased likelihood of inferring that the boy figure cared about being strong also likely reflects greater exposure to and knowledge of the male-strength stereotype, consistent with past research showing increases in general gender stereotype knowledge with age during early childhood (Signorella et al., 1993). Whereas past research has found greater knowledge of gender stereotypes, which usually is composed of a battery of various stereotypes that might include strength, our findings make a contribution in that we specifically asked about valuing strength (e.g., *who cares about being strong* versus *who is strong*).

Surprisingly, we found no significant age by participant gender interactions for any of the valuing strength measures that we assessed (preference for strength-related occupations,

self-report of the importance of strength, dumbbell lift). However, coefficients for simple main effects were sometimes in the expected direction (a positive age coefficient for boys’ preference for strength-related occupations, a negative age coefficient for girls’ self-report of how important strength was) although not significant. If linear trends continued, we speculate that perhaps a widening of values regarding strength would be more apparent in middle childhood. Perhaps the development of valuing strength occurs gradually with age, as children are exposed to gender stereotypes regarding the link between masculinity and strength, as well as the link between femininity and weakness. Alternatively, given the prevalence of “tomboys” and gender flexibility among girls in middle childhood (Halim et al., 2011; Katz & Ksanskak, 1994) and the potential impact of pubertal maturation in strengthening gender roles (Hill & Lynch, 1983), perhaps a greater divergence between girls and boys in valuing strength would be seen in adolescence.

### Gender Identification and Strength

In line with predictions from cognitive theories of gender development, we also tested whether greater gender identification was associated with valuing strength and being aware of gender-strength stereotypes. As young children are trying on newfound gender identities, they tend to rigidly adhere to gender norms (Halim, 2016; Martin & Ruble, 2004), such as that boys should care about being strong. More specifically, we hypothesized that greater gender identification would be positively associated with valuing strength and being aware of gender-strength stereotypes among boys, but would be negatively associated with valuing strength and being aware of gender-strength stereotypes among girls. We found partial support for this hypothesis in regard to our prediction for boys. Boys who more strongly identified with being a boy (1) reported that it was more important to be strong, and (2) equated strength with being a boy, more so than did boys who more weakly identified with being a boy. Intriguingly, girls also showed the same pattern. Girls who more strongly identified with being a girl (1) reported that it was more important to be strong, and (2) equated strength with being a girl, more so than did girls who more weakly identified with being a girl. Effect sizes were between small to medium. In addition, although not an explicit research question, we found positive zero-order correlations between some stereotyping measures (equating strength with one’s own gender) with two of the three strength valuation measures (self-report of the importance, dumbbell lifts), lending partial support to self-socialization theories and cognitive balance theories (Martin et al., 2002; Tobin et al., 2010).

Girls’ similar pattern of increased gender identification being correlated with increased importance of strength via self-report and increased equating of one’s gender with being a girl was unexpected. It is notable that strength is

generally considered a positive attribute. Even though there is a strong and pervasive gender stereotype that girls and women are weak (Kite et al., 2008), it is understandable that even young girls would hesitate to reject strength explicitly. As we mentioned earlier, positivity and favoritism for one's own gender group is robust during early childhood as well (Martin & Ruble, 2010). Thus, girls who strongly identify with being a girl might explicitly endorse strength to a greater degree than girls who more weakly identify with being a girl, as strength is a positive trait. In addition, there may be a cultural shift in recent years where parents, recognizing the widespread and long-held stereotype that girls are weak, have been making conscious efforts to praise their daughters for being strong and to tell them they are, and need to be, strong (Davis, 2020; Parker, 2017). Interestingly, research has documented that African American mothers often socialize their daughters to be strong to prepare them to be pillars of their own families and communities (Hill, 2001, 2002). Perhaps this message is gaining ground in other cultural communities as well.

There may also be competing messages about strength—it is also important to recognize the overall context of children recognizing that older adults and older children (“big kids”) tend to be stronger than young children. Being strong is likely one of the first traits that children learn about and understand that they can apply to others and themselves. As they are learning their first words they might often hear, “You’re so strong!” as they accomplish new physical feats, such as carrying heavier objects or running longer distances at faster speeds. When caregivers encourage children to eat their food, they might often teach children, “If you eat your chicken, you’ll get stronger and bigger.” Thus, although strength is multifaceted, to young children strength may overwhelmingly be a positive trait of which to aspire and may symbolize power (Bernard et al., 2016; Pietraszewski & Shaw, 2015; Terrizzi et al., 2018). Perhaps girls frequently receive age-related encouragement to value strength, whereas boys receive both age- and gender-related encouragement to value strength.

### Limitations and Future Directions

While our study found interesting patterns in studying the development of children’s valuing of strength using multiple measures and an ethnically diverse sample, there are a few limitations to note. We accompany these limitations with suggestions for future directions of research. First, strength can have many meanings. Likely most salient to young children is the concept of physical strength, as it is the simplest and most basic. For example, they might hear the word “strong” when they maneuver a heavy object a heavy object or when they read about a train carrying a heavy load up a mountain. Because physical strength might be most salient to children

and the quality most tied to masculinity, both of our behavioral measures—the occupation preference measure and the dumbbell lifts—tapped into physical strength. However, for our interview questions, we left the term ambiguous, simply asking about being “strong.” We did not want to confine children to only think about the physical aspect of being strong, but at the same time, it is possible that different children interpreted the questions differently. It would be fascinating for future research to interview children to understand what they consider strength to be and whether there are unique developmental trajectories for valuing physical strength versus, for example, mental or emotional strength and when these qualities might be tied to masculinity. To further understand gender differences in strength, future work should also ask children how strong they believe they are, as this may illuminate an important link between self-perceptions and values.

A second limitation is that in examining developmental trends with age we used a cross-sectional design. We also proposed that links between age and knowledge of gender-strength stereotypes were due to greater exposure to cultural norms. Future studies could use a longitudinal design from early childhood through adolescence and assess initial exposure levels to media in general and superhero or fairytale media in particular. Including older age ranges might highlight interesting patterns to understand when strength valuation, stereotype knowledge, and stereotype flexibility are associated. Researchers could also observe family interactions and code for activities and talk related to strength (e.g., “Look how strong Daddy is!”).

We were also limited in our modest sample size, which perhaps made it more difficult to detect smaller effects, such as gender by age interactions. However, as we noted in the method section, post hoc power analyses suggested the study generally had adequate power. Because of our inclusion of three-year-olds, we were also limited in how many measures and items we could administer given their more limited attention spans. Inter-item consistency estimated with Cronbach’s alpha for the Gender Identification scale was  $< 0.60$ , which indicates either item heterogeneity or measurement error. Because this scale is well-established and has been used extensively in the past (Ruble et al., 2007) and because the scale predicted meaningful associations with other variables, we felt confident that there was still significant signal to noise. Future work could also include more trials, such as for the stereotyping measures. Thus, caution is needed to interpret nonsignificant results and future replication is recommended.

Finally, we hope this study will open up new avenues of inquiry. For example, it could be interesting to vary targets’ ages in the stereotyping measure looking at inferences about others to investigate children’s beliefs about who values strength based on age. It would also be interesting to include other measures of gender identification, such as how

gender-typical children feel, to understand the links between different dimensions of gender identity with valuing strength.

## Implications and Conclusion

Our findings suggest two broad themes. First, there is evidence that the pervasive stereotype that strength is a male quality and that boys and men should care about being strong can be seen even in early childhood. At the eve of adopting a gender identity, young boys know well that they should care about being strong and be strong. As this message starts so young, it may explain why it often feels intractable to change conceptions that to be a man, one needs to be tough. On the one hand, this encouragement to be strong could have positive implications promoting qualities such as good health, leadership, resilience, and perseverance in the face of difficulty. Strength can be used to protect others and forge the way for positive change. On the other hand, if children come to understand strength as using violence and aggression, they might later be more prone to hurting or taking advantage of others. Indeed, historically and globally, men more than women are overwhelmingly perpetrators of physical and sexual violence (Tjaden & Thoennes, 2006). Some boys may also think that strength requires pushing away intimate social relationships and assistance from others even when in need (Way, 2013). Thus, boys may later suffer in their psychological well-being by rejecting social support and avoiding help (Vogel et al., 2011).

Although we observed some early gender differences, our data also suggest another important theme—that valuing strength as something tied only to masculinity is not inevitable. Strength can be considered feminine. One only has to look to three-year-old girls' responses to see this. Three-year-old girls largely said that they thought it was important to be strong, that girls are always strong and need to be strong, and inferred that the girl figure would care about being strong. Perhaps before a certain amount of exposure to cultural norms, three-year-old girls are relatively unaware of society's messages about girls being weak and needing help. They might already recognize their own personal strength with pride in learning how to walk, run, jump, and dance. In addition, our findings showed that greater identification with being a girl was positively related to finding strength to be important and equating strength with girlhood. Sustaining an investment in the positive aspects of strength could also perhaps benefit girls' physical health given their decline in sports participation in adolescence (Staurowsky et al., 2015). Promoting strength among girls could also contribute to more diversity in strength-related occupations such as on police and firefighter forces, in the military, and on athletic fields. Strength is a complex, but captivating trait in our myths, tales, and stories. Our study takes a first step in understanding how valuing strength develops and is associated with gender.

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**Authors' Contributions** Halim conceptualized the paper, conducted formal data analysis, developed the methodology, provided resources, supervised the project, and wrote, reviewed, and edited the original draft. Sakamoto and Tawa conducted the research (investigation), administered the project, supervised the project, curated the data, and wrote, reviewed, and edited the original draft. Russo and Portillo helped conceptualize the paper, developed the methodology, and wrote, reviewed and edited the original draft. Echave conducted the research (investigation), curated the data, administered the project, and wrote, reviewed and edited the original draft.

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## Declarations

**Ethical Approval** The protocol was approved by the Institutional Review Board at California State University, Long Beach.

**Conflicts of interest** Not applicable.

**Availability of Data and Material** Data and materials are available by request to the corresponding author.

**Code Availability** Not applicable.

## References

- Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. *European Review of Social Psychology*, *11*(1), 1–33. <https://doi.org/10.1080/14792779943000116>
- Aubrey, J. S., & Harrison, K. (2004). The gender-role content of children's favorite television programs and its links to their gender-related perceptions. *Media Psychology*, *6*, 111–146. [https://doi.org/10.1207/s1532785xmep0602\\_1](https://doi.org/10.1207/s1532785xmep0602_1)
- Baker, K., & Raney, A. A. (2007). Equally super?: Gender-role stereotyping of superheroes in children's animated programs. *Mass Communication & Society*, *10*, 25–41. <https://doi.org/10.1080/15205430701229626>

- Bernard, S., Castelain, T., Mercier, H., Kaufmann, L., Van der Henst, J.-B., & Clément, F. (2016). The boss is always right: Preschoolers endorse the testimony of a dominant over that of a subordinate. *Journal of Experimental Child Psychology*, *152*, 307–317. <https://doi.org/10.1016/j.jecp.2016.08.00>
- Bigler, R. S., Jones, L. C., & Lobliner, D. B. (1997). Social categorization and the formation of intergroup attitudes in children. *Child Development*, *68*, 530–543. <https://doi.org/10.2307/1131676>
- Brown, M. B., Lamb, S., & Tappan, M. (2009). *Packaging boyhood: Saving our sons from superheroes, slackers, and other media stereotypes*. St. Martin's Press.
- Cherney, I. D., & London, K. (2006). Gender-linked differences in the toys, television shows, computer games, and outdoor activities of 5- to 13-year-old children. *Sex Roles*, *54*(9), 717–726. <https://doi.org/10.1007/s11199-006-9037-8>
- Connor, R. A., Glick, P., & Fiske, S. T. (2017). Ambivalent sexism in the twenty-first century. In C. G. Sibley & F. K. Barlow (Eds.), *The Cambridge handbook of the psychology of prejudice* (pp. 295–320). Cambridge University Press.
- Corby, B. C., Hodges, E. V. E., & Perry, D. G. (2007). Gender identity and adjustment in Black, Hispanic, and White preadolescents. *Developmental Psychology*, *43*, 261–266. <https://doi.org/10.1037/0012-1649.43.1.261>
- Courtenay, W. H. (2000). Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science & Medicine*, *50*(10), 1385–1401. [https://doi.org/10.1016/S0277-9536\(99\)00390-1](https://doi.org/10.1016/S0277-9536(99)00390-1)
- Coyne, S. M., Linder, J. R., Rasmussen, E. E., Nelson, D. A., & Collier, K. M. (2014). It's a bird! It's a plane! It's a gender stereotype! Longitudinal associations between superhero viewing and gender stereotyped play. *Sex Roles*, *70*(9–10), 416–430. <https://doi.org/10.1007/s11199-014-0374-8>
- Crocker, J. (2002). Contingencies of self-worth: Implications for self-regulation and psychological vulnerability. *Self and Identity*, *1*, 143–149. <https://doi.org/10.1080/152988602317319320>
- Crouter, A. C., Manke, B. A., & McHale, S. M. (1995). The family context of gender intensification in early adolescence. *Child Development*, *66*(2), 317–329. <https://doi.org/10.2307/1131580>
- Davis, L. S. (2020). *Tomboy: The surprising history and future of girls who dare to be different*. Hatchette Go.
- DeLoache, J. S., Simcock, G., & Macari, S. (2007). Planes, trains, automobiles—and tea sets: Extremely intense interests in very young children. *Developmental Psychology*, *43*(6), 1579–1586. <https://doi.org/10.1037/0012-1649.43.6.1579>
- Dinella, L. M. (2017). Halloween costume choices: Reflections of gender development in early childhood. *Journal of Genetic Psychology*, *178*(3), 165–178. <https://doi.org/10.1080/00221325.2017.1295223>
- Dinella, L. M., Claps, J. M., & Lewandowski, G. W. (2017). Princesses, princes, and superheroes: Children's gender cognitions and fictional characters. *Journal of Genetic Psychology*, *178*(5), 262–280. <https://doi.org/10.1080/00221325.2017.1351417>
- Do Rozario, R. A. C. (2004). The princess and the magic kingdom: Beyond nostalgia, the function of the Disney princess. *Women's Studies in Communication*, *27*(1), 34–59. <https://doi.org/10.1080/07491409.2004.10162465>
- Drummond, M., & Drummond, C. (2015). It's all about the six-pack: Boys' bodies in contemporary Western culture. *Journal of Child Health Care*, *19*(4), 423–431. <https://doi.org/10.1177/1367493514538128>
- Egan, S. K., & Perry, D. G. (2001). Gender identity: A multidimensional analysis with implications for psychosocial adjustment. *Developmental Psychology*, *37*(4), 451–463. <https://doi.org/10.1037/0012-1649.37.4.451>
- Eisenberg, M. E., Wall, M., & Neumark-Sztainer, D. (2012). Muscle-enhancing behaviors among adolescent girls and boys. *Pediatrics*, *130*(6), 1019–1026. <https://doi.org/10.1542/peds.2012-0095>
- England, D. E., Descartes, L., & Collier-Meek, M. A. (2011). Gender role portrayal and the Disney princesses. *Sex Roles*, *64*(7–8), 555–567. <https://doi.org/10.1007/s11199-011-9930-7>
- Fitzpatrick, M. J., & McPherson, B. J. (2009). Coloring within the lines: Gender stereotypes in contemporary coloring books. *Sex Roles*, *62*(1–2), 127–137. <https://doi.org/10.1007/s11199-009-9703-8>
- Geller, A. I., Shehab, N., Weidle, N. J., Lovegrove, M. C., Wolpert, B. J., Timbo, B. B., Mozersky, R. P., & Budnitz, D. S. (2015). Emergency department visits for adverse events related to dietary supplements. *New England Journal of Medicine*, *373*(16), 1531–1540. <https://doi.org/10.1056/nejmsa1504267>
- Golden, J. C., & Jacoby, J. W. (2017). Playing princess: Preschool girls' interpretations of gender stereotypes in Disney princess media. *Sex Roles*, *79*(5–6), 299–313. <https://doi.org/10.1007/s11199-017-0773-8>
- Grand View Research. (2020). *Protein supplements market size, share & trends analysis report by source (animal-based, plant-based), by product (protein powder, protein bars), by application, by distribution channel, by region, and segment forecasts, 2021–2030*. <https://www.grandviewresearch.com/industry-analysis/protein-supplements-market>.
- Granger, K. L., Hanish, L. D., Kornienko, O., & Bradley, R. H. (2017). Preschool teachers' facilitation of gender-typed and gender-neutral activities during free play. *Sex Roles*, *76*(7–8), 498–510. <https://doi.org/10.1007/s11199-016-0675-1>
- Granié, M. (2010). Gender stereotype conformity and age as determinants of preschoolers' injury-risk behaviors. *Accident Analysis & Prevention*, *42*(2), 726–733. <https://doi.org/10.1016/j.aap.2009.10.022>
- Grossbard, J. R., Neighbors, C., & Larimer, M. E. (2011). Perceived norms for thinness and muscularity among college students: What do men and women really want? *Eating Behaviors*, *12*(3), 192–199. <https://doi.org/10.1016/j.eatbeh.2011.04.005>
- Gutierrez, B. C., Halim, M. L., Martinez, M. A., & Arredondo, M. (2019). The heroes and the helpless: The development of benevolent sexism in children. *Sex Roles*, *82*(9–10), 558–569. <https://doi.org/10.1007/s11199-019-01074-4>
- Halim, M. L. (2016). Princesses and superheroes: Social-cognitive influences on early gender rigidity. *Child Development Perspectives*, *10*(3), 155–160. <https://doi.org/10.1111/cdep.12176>
- Halim, M. L., Ruble, D. N., & Amodio, D. M. (2011). From pink frilly dresses to 'one of the boys': A social-cognitive analysis of gender identity development and gender bias. *Social and Personality Psychology Compass*, *5*(11), 933–949. <https://doi.org/10.1111/j.1751-9004.2011.00399.x>
- Halim, M. L., Ruble, D. N., Tamis-Lemonda, C. S., Shrout, P. E., & Amodio, D. M. (2017). Gender attitudes in early childhood: Behavioral consequences and cognitive antecedents. *Child Development*, *88*(3), 882–899. <https://doi.org/10.1111/cdev.12642>
- Halim, M. L., Ruble, D. N., Tamis-Lemonda, C. S., Zosuls, K. M., Lurye, L. E., & Greulich, F. K. (2014). Pink frilly dresses and the avoidance of all things “girly”: Children's appearance rigidity and cognitive theories of gender development. *Developmental Psychology*, *50*(4), 1091–1101. <https://doi.org/10.1037/a0034906>
- Hammond, M. D., & Cimpian, A. (2021). “Wonderful but weak”: Children's ambivalent attitudes toward women. *Sex Roles*, *84*, 76–90. <https://doi.org/10.1007/s11199-020-01150-0>
- Hill, J. A. (2011). Endangered childhoods: How consumerism is impacting child and youth identity. *Media, Culture & Society*, *33*(3), 347–362. <https://doi.org/10.1177/0163443710393387>
- Hill, J. P., & Lynch, M. E. (1983). The intensification of gender-related role expectations during early adolescence. In J. Brooks-Gunn &

- A. C. Peterson (Eds.), *Girls at puberty: Biological and psychosocial perspectives* (pp. 201–228). Plenum.
- Hill, S. A. (2001). Class, race, and gender dimensions of child rearing in African American families. *Journal of Black Studies*, 31(4), 494–508. <https://doi.org/10.1177/002193470103100407>
- Hill, S. A. (2002). Teaching and doing gender in African American families. *Sex Roles*, 47(11), 493–506. <https://doi.org/10.1023/A:1022026303937>
- Ito, R. (2016, November 15). How (and why) Maui got so big in ‘Moana’. *The New York Times*. Retrieved from <http://www.nytimes.com/2016/11/20/movies/moana-and-how-maui-got-so-big.html>
- Kågesten, A., Gibbs, S., Blum, R. W., Moreau, C., Chandra-Mouli, V., Herbert, A., & Amin, A. (2016). Understanding factors that shape gender attitudes in early adolescence globally: A mixed-methods systematic review. *PLoS ONE*, 11(6). <https://doi.org/10.1371/journal.pone.0157805>
- Katz, P. A., & Ksanskak, K. R. (1994). Developmental aspects of gender role flexibility and traditionality in middle childhood and adolescence. *Developmental Psychology*, 30, 272–282. <https://doi.org/10.1037/0012-1649.30.2.272>
- Kite, M. E., Deaux, K., & Haines, E. L. (2008). Gender stereotypes. In F. L. Denmark & M. A. Paludi (Eds.), *Psychology of women: A handbook of issues and theories* (pp. 205–236). Praeger Publishers/Greenwood Publishing Group.
- Klomsten, A. T., Marsh, H. W., & Skaalvik, E. M. (2005). Adolescents’ perceptions of masculine and feminine values in sport and physical education: A study of gender differences. *Sex Roles*, 52(9), 625–636. <https://doi.org/10.1007/s11199-005-3730-x>
- Knafo, A., & Spinath, F. M. (2011). Genetic and environmental influences on girls’ and boys’ gender-typed and gender-neutral values. *Developmental Psychology*, 47(3), 726–731. <https://doi.org/10.1037/a0021910>
- Koenig, A. M., Eagly, A. H., Mitchell, A. A., & Ristikari, T. (2011). Are leader stereotypes masculine? A meta-analysis of three research paradigms. *Psychological Bulletin*, 137(4), 616–642. <https://doi.org/10.1037/a0023557>
- Kohlberg, L. A. (1966). A cognitive-developmental analysis of children’s sex role concepts and attitudes. In E. E. Maccoby (Ed.), *The development of sex differences* (pp. 82–173). Stanford University Press.
- Kulis, S., Marsiglia, F. F., & Nagoshi, J. L. (2010). Gender roles, externalizing behaviors, and substance use among Mexican-American adolescents. *Journal of Social Work Practice in the Addictions*, 10(3), 283–307. <https://doi.org/10.1080/1533256X.2010.497033>
- Leaper, C., Breed, L., Hoffman, L., & Perlman, C. A. (2002). Variations in the gender-stereotyped content of children’s television cartoons across genres. *Journal of Applied Social Psychology*, 32(8), 1653–1662. <https://doi.org/10.1111/j.1559-1816.2002.tb02767.x>
- Liben, L. S., & Bigler, R. S. (2002). The developmental course of gender differentiation: Conceptualizing, measuring, and evaluating constructs and pathways. *Monographs of the Society for Research in Child Development*, 67(2), vii–147. <https://doi.org/10.1111/1540-5834.t01-1-00187>
- Maccoby, E. E. (1988). Gender as a social category. *Developmental Psychology*, 24(6), 755–765. <https://doi.org/10.1037/0012-1649.24.6.755>
- Martin, C. L., Andrews, N. C. Z., England, D., Zosuls, K. M., & Ruble, D. N. (2017). A dual identity approach for conceptualizing and measuring children’s gender identity. *Child Development*, 88, 167–182. <https://doi.org/10.1111/cdev.12568>
- Martin, C. L., & Ruble, D. (2004). Children’s search for gender cues: Cognitive perspectives on gender development. *Current Directions in Psychological Science*, 13(2), 67–70. <https://doi.org/10.1111/j.0963-7214.2004.00276.x>
- Martin, C. L., & Ruble, D. (2010). Patterns of gender development. *Annual Review of Psychology*, 61, 353–381. <https://doi.org/10.1146/annurev.psych.093008.100511>
- Martin, C. L., Ruble, D. N., & Szkrybalo, J. (2002). Cognitive theories of early gender development. *Psychological Bulletin*, 128(6), 903–933. <https://doi.org/10.1037/0033-2909.128.6.903>
- Or, F., Kim, Y., Simms, J., & Austin, S. B. (2019). Taking stock of dietary supplements’ harmful effects on children, adolescents, and young adults. *Journal of Adolescent Health*, 65(4), 455–461. <https://doi.org/10.1016/j.jadohealth.2019.03.005>
- Padilla-Walker, L. M., Coyne, S. M., Fraser, A. M., & Stockdale, L. A. (2013). Is Disney the nicest place on Earth? A content analysis of prosocial behavior in animated Disney films. *Journal of Communication*, 63(2), 393–412. <https://doi.org/10.1111/jcom.12022>
- Paley, V. G. (1986). *Boys and girls: Superheroes in the doll corner*. University of Chicago Press.
- Parker, K. T. (2017). *Strong is the new pretty: A celebration of girls being themselves*. Workman Publishing Company.
- Paterson, K. (2014). “It’s harder to catch a boy because they’re tougher”: Using fairytales in the classroom to explore children’s understandings of gender. *Alberta Journal of Educational Research*, 60(3), 474–490.
- Pietraszewski, D., & Shaw, A. (2015). Not by strength alone: Children’s conflict expectations follow the logic of the asymmetric war of attrition. *Human Nature*, 26, 44–72. <https://doi.org/10.1007/s12110-015-9220-0>
- Powlishta, K. K., Sen, M. G., Serbin, L. A., Poulin-Dubois, D., & Eichstedt, J. A. (2001). From infancy through middle childhood: The role of cognitive and social factors in becoming gendered. In R. K. Unger & R. K. Unger (Eds.), *Handbook of the psychology of women and gender* (pp. 116–132). John Wiley & Sons Inc.
- Prentice, D. A., & Carranza, E. (2002). What women should be, shouldn’t be, are allowed to be, and don’t have to be: The contents of prescriptive gender stereotypes. *Psychology of Women Quarterly*, 26(4), 269–281. <https://doi.org/10.1111/1471-6402.t01-1-00066>
- Reidy, D. E., Smith-Darden, J. P., Cortina, K. S., Kernsmith, R. M., & Kernsmith, P. D. (2015). Masculine discrepancy stress, teen dating violence, and sexual violence perpetration among adolescent boys. *Journal of Adolescent Health*, 56(6), 619–624. <https://doi.org/10.1016/j.jadohealth.2015.02.009>
- Ricciardelli, L. A., & McCabe, M. P. A. (2003). Longitudinal analysis of the role of biopsychosocial factors in predicting body change strategies among adolescent boys. *Sex Roles*, 48, 349–359. <https://doi.org/10.1023/A:1022942614727>
- Ruble, D. N., Taylor, L. J., Cyphers, L., Greulich, F. K., Lurye, L. E., & Shrout, P. E. (2007). The role of gender constancy in early gender development. *Child Development*, 78(4), 1121–1136. <https://doi.org/10.1111/j.1467-8624.2007.01056.x>
- Rudman, L. A., Moss-Racusin, C. A., Phelan, J. E., & Nauts, S. (2012). Status incongruity and backlash effects: Defending the gender hierarchy motivates prejudice against female leaders. *Journal of Experimental Social Psychology*, 48(1), 165–179. <https://doi.org/10.1016/j.jesp.2011.10.008>
- Sani, F., Bennett, M., Mullally, S., & Macpherson, J. (2003). On the assumption of fixity in children’s stereotypes: A reappraisal. *British Journal of Developmental Psychology*, 21(1), 113–124. <https://doi.org/10.1348/026151003321164654>
- Schwartz, S. H. (2006). Basic human values: Theory, measurement, and applications. *Revue Française de Sociologie*, 47(4), 249–288. <https://doi.org/10.3917/rfs.474.0929>
- Settembre, J. (2018). *This is the insane amount millennials are spending on fitness*. Retrieved from MarketWatch website: <https://www.marketwatch.com/story/this-is-the-insane-amount-millennials-are-spending-on-fitness-2018-01-21>

- Signorella, M. L., Bigler, R. S., & Liben, L. S. (1993). Developmental differences in children's gender schemata about others: A meta-analytic review. *Developmental Review, 13*(2), 147–183. <https://doi.org/10.1006/drev.1993.1007>
- Staurowsky, E. J., DeSousa, M. J., Miller, K. E., Sabo, D., Shakib, S., Theberge, N., Veliz, P., Weaver, A., & Williams, N. et al. (2015). *Her life depends on it III: Sport, physical activity, and the health and well-being of American girls and women*. Women's Sports Foundation.
- Streiff, M., & Dundes, L. (2017). From Shapeshifter to Lava Monster: Gender stereotypes in Disney's *Moana*. *Social Sciences, 6*(3), 91. <https://doi.org/10.3390/socsci6030091>
- Terrizzi, B. F., Brey, E., Shutts, K., & Beier, J. S. (2018). Children's developing judgments about the physical manifestations of power. *Developmental Psychology, 55*(4), 793–808. <https://doi.org/10.1037/dev0000657>
- Tjaden, P., & Thoennes, N. (2006). Extent, nature, and consequences of rape victimization: Findings from the National Violence Against Women Survey. *PsycEXTRA Dataset*. <https://doi.org/10.1037/e513832006-001>
- Tobin, D. D., Menon, M., Menon, M., Spatta, B. C., Hodges, E. V. E., & Perry, D. G. (2010). The intrapsychics of gender: A model of self-socialization. *Psychological Review, 117*, 601–622. <https://doi.org/10.1037/a0018936>
- Vandello, J. A., & Bosson, J. K. (2013). Hard won and easily lost: A review and synthesis of theory and research on precarious manhood. *Psychology of Men & Masculinity, 14*(2), 101–113. <https://doi.org/10.1037/a0029826>
- Vogel, D. L., Heimerdinger-Edwards, S. R., Hammer, J. H., & Hubbard, A. (2011). "Boys don't cry": Examination of the links between endorsement of masculine norms, self-stigma, and help-seeking attitudes for men from diverse backgrounds. *Journal of Counseling Psychology, 58*, 368–382. <https://doi.org/10.1037/a0023688>
- Ward, Z. J., Rodriguez, P., Wright, D. R., Austin, B., & Long, M. W. (2019). Estimation of eating disorders prevalence by age and associations with mortality in a simulated nationally representative US cohort. *JAMA Network Open, 2*, e1912925. <https://doi.org/10.1001/jamanetworkopen.2019.12925>
- Way, N. (2013). Boys' friendships during adolescence: Intimacy, desire, and loss. *Journal of Research on Adolescence, 23*, 201–213. <https://doi.org/10.1111/jora.12047>
- Wilson, K. M., Klein, J. D., Sesselberg, T. S., Yussman, S. M., Markow, D. B., Green, A. E., West, J. C., & Gray, N. J. (2006). Use of complementary medicine and dietary supplements among U.S. adolescents. *Journal of Adolescent Health, 38*(4), 385–394. <https://doi.org/10.1016/j.jadohealth.2005.01.010>
- Wong, M. (2020) *Breaking down the \$28 billion Kevin Feige films have raked in*. Hypebeast. <https://hypebeast.com/2020/3/kevin-feige-marvel-studios-cinematic-universe-films-28-billion-breakdown-avengers-infinity-war-end-game>

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