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Sex Categorization Among Preschool Children: Increasing Utilization of Sexually Dimorphic Cues

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Two studies examined how children between ages 4 and 6 use body shape (i.e., the waist-to-hip-ratio [WHR]) for sex categorization. In Study 1 (*N* = 73), 5- and 6-year-olds, but not 4-year-olds, selected bodies with increasingly discrepant WHRs to be ‘‘most like a man’’ and ‘‘most like a woman.’’ Similarly, sex category judgments made by 5- and 6-year-olds, but not 4-year-olds, varied with WHR. In Study 2 (*N* = 41), eye movements indicated the functional use of waist and hips in sex categorization. Visual scanning behavior predicted the degree of association between WHR and judgment. Collectively, these results suggest that the ability to exploit sexual dimorphism to compel categorization develops between the ages of 4 and 6. Implications for theories of gender development and psychological essentialism are discussed.

Snips and snails, and puppy dogs' tails
That's what little boys are made of!. . .
Sugar and spice and all things nice
That's what little girls are made of!

In the popular rhyme, Mother Goose provided an endearing image about the makeup of little boys and girls. The rhyme's appeal rests, in part, on its vivid analogies for the distinction between boys and girls. Although the content is indisputably false, two aspects of this rhyme are telling. First, the notion that boys and girls, and by extension men and women, embody distinct visual markers to their sex category rings true. Second, the description of social categories that are important, enduring, and meaningful—sex categories—is compelling. Indeed, sex categorization begins early in life, and it relies heavily on visual cues. Moreover, sex categorization exerts considerable influence over subsequent evaluative judgments, leading sociologists to describe sex category as a *master status* (see, e.g., Hughes, 1945). Surprisingly, the basis of children's sex categorizations is not well understood, and most research has focused exclusively on face perception. Here, we examine how preschool children's categorical sex judgments incorporate another cue that reliably distinguishes men from women—body shape.

Men and women differ on a variety of observable attributes. Young children appreciate such cues exhibiting some form of gender knowledge prior to their ability to verbalize it. Before they reach 9 months, infants distinguish faces according to social categories (i.e., sex, Leinbach & Fagot, 1993; Quinn, Yahr, Kuhn, Slater, & Pascalis, 2002; and race, Kelly et al., 2007). By 12 months, children reliably integrate gendered cues originating in different modalities (i.e., faces and voices; Poulin-Dubois, Serbin, Kenyon, & Derbyshire, 1994; Walker-Andrews, Bahrick, Raglioni, & Diaz, 1991). In infancy, sex categories are discernable at a perceptual, if not a conceptual, level.

Young children's ability to label men and women emerges during the 2nd year (Zosuls, et al., 2009). Preschool children rely heavily on superficial cues (i.e., hair and makeup) for sex categorization

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(Thompson & Bentler, 1971), even though internal face structure is more reliable (Burton, Bruce, & Dench, 1993). In fact, children are unable to judge the sex of faces devoid of superficial cues until age 7 (Wild et al., 2000). Thus, although young children exploit aspects of appearance that covary with sex to make categorical judgments, they do not utilize sexually dimorphic cues that reliably discriminate men from women. Undoubtedly, children's use of sexual dimorphism for categorization increases throughout development. Yet this process is poorly understood, in part because a preponderance of research focused on face perception.

The importance of the face for person perception is indisputable. In daily life, however, faces are perceived in the context of another sexually dimorphic cue, the body. Furthermore, person perception often occurs from a distance, or visual vantage, that prohibits face processing—forcing perceptions to rely on body cues, many of which are diagnostic of social categories. Both body shape and motion, for example, are sexually dimorphic (Johnson, 2004; Johnson & Tassinary, 2007b; Kerrigan, Todd, & Della Croce, 1998), and adults exploit these differences when making sex categorizations (Lippa, 1983; Pollick, Kay, Heim, & Stringer, 2005). Recent evidence suggests that the body's shape can even be more compelling than its motion for sex judgments (Johnson & Tassinary, 2005).

In children, body knowledge increases with age, first reflecting an understanding of body structure and later revealing a more sophisticated understanding of primary and secondary sex characteristics. Children notice violations of the body's canonical structure quite early (i.e., 15 months; Slaughter & Heron, 2004; Slaughter, Heron, & Sim, 2002; Slaughter, Stone, & Reed, 2004), demonstrating an understanding of the spatial relations among the head, limbs, and torso. By age 3, this knowledge extends to sex-specific structure. Specifically, some children recognize that primary sex characteristics define a target's sex, and can use them for sex categorization even when they are no longer visible and when a target wears cross-sex-typed clothing (Bem, 1989). Under some circumstances, however, superficial cues (e.g., hair) carry more weight in gender labeling. In one study (Thompson & Bentler, 1971), preschool children dressed and labeled dolls as either ''Mommy'' or ''Daddy.'' These judgments were most heavily influenced by hair length, followed by body anatomy (i.e., secondary sex characteristics), and finally genitals. By age 10, secondary sex characteristics (i.e., body shape) rise in importance and influence more evaluative judgments, such as attractiveness (Connolly, Slaughter, & Mealey, 2004). Thus, young children exhibit increasing knowledge concerning the body's structure, if not an explicit understanding of sexual dimorphism.

In spite of this increase in body knowledge, it is difficult to identify when children notice and use sexually dimorphic cues in social perception. Although some research suggests that young children *can* use primary sex characteristics to inform sex categorization (Bem, 1989), genitals are rarely revealed to others. Instead, observers rely on secondary sex characteristics or adornment cues for sex categorization. To our knowledge, only one study has examined how secondary sex characteristics—the most reliable visual cues under most circumstances—affect sex-typed judgments among children (Thompson & Bentler, 1971), and none has explicitly examined how such cues affect children's sex categorization. Thus, precisely when such cues influence children's judgments remains unclear.

Here we examine whether 4–6-year-old children use body shape, the waist-to-hip ratio (WHR), for sex categorization. This age range reflects a period of rapid changes in children's gender development (Ruble, Martin, & Berenbaum, 2006; Ruble et al., 2007) and increased sensitivity to anatomical sex differences (Thompson & Bentler, 1971). In Study 1, participants completed two tasks—one in which children identified the body that was ''most like'' a man or woman, and another in which children categorized bodies by sex. In Study 2, we recorded participants' eye movements as they categorized bodies, and we examined visual behavior to discern how children did this.

Study 1

Method

Participants. A total of 73 children (36 boys, 37 girls) between 3.48 and 6.29 years were recruited from an urban community using a commercial database maintained by the department. Four-year-olds ranged from 3.48 to 4.40 years ($M = 4.11$, $SD = 0.21$), 5-year-olds ranged from 4.56 to 5.38 years ($M = 4.97$, $SD = 0.22$), and 6-year-olds ranged from 5.63 to 6.29 years ($M = 6.05$, $SD = 0.17$). Sex distribution was comparable across age group (4-year-olds: 12 boys, 14 girls; 5-year-olds: 10 boys, 9 girls; 6-year-olds: 14 boys, 14 girls). Participants were predominantly Caucasian and came primarily from upper-middle-class backgrounds.

Materials. Stimuli depicted nine computer-generated human bodies that varied in WHR from 0.5 to 0.9 (see Figure 1). Stimuli were rendered in Poser 5™ (Smith Micro Software, Aliso Viejo, CA) using the parameters described in Higa (1999) and Johnson and Tassinary (2007a, 2007b). Bodies were sexually dimorphic in shape but excluded other secondary and tertiary cues to sex (e.g., facial features, body hair, hairstyle, and clothing). These images, and others like them, have been used in research to examine adults' perception of sex categories (Johnson & Tassinary, 2007a, 2007b), attractiveness (Johnson & Tassinary, 2007a, 2007b), and sexual orientation (Johnson, Gill, Reichman, & Tassinary, 2007). These studies found that adult participants perceive the boundary between ''female'' and ''male'' bodies to be a WHR of 0.7 (Johnson, 2004; Johnson & Tassinary, 2009). Each image was mounted (separately) on card stock and laminated for durability.

Procedures. Participants were tested individually. We familiarized participants with all stimuli by showing all cards simultaneously, increasing in WHR. We asked participants to identify how the images differed. After the participant indicated that the images differed in body shape (most frequently by pointing to the waist and hips region) participants completed two tasks, in counterbalanced order.

In an identification task, all targets were presented simultaneously. Cards were mounted on a wall, increasing in WHR. Participants stood 2 ft away from the stimuli, and the experimenter drew the participant's attention to the full range by gesturing. Then participants identified which body was ''most like a man'' and ''most like a woman'' by placing a sticker on the chosen body. We recorded the corresponding WHR for each selection, which served as the dependent variable in our analysis of these data.

In a categorization task, participants categorized each target's sex by sorting cards into boxes depicting the face of either a man or a woman (left or right placement of boxes was counterbalanced across participants). Participants practiced the procedure by sorting cartoon images (four *Peanuts* characters: Charlie Brown, Linus, Lucy, and Sally) by sex. Then, participants categorized each of the nine targets twice, in two randomized sets.

Results and Discussion

We analyzed data using a generalized equation estimation technique (GEE; Diggle, Liang, & Zeger, 1994; Fitzmaurice, Laird, & Ware, 2004). This permitted us to estimate within-subject parameters for both binary and continuous dependent variables for a fully within-subject factorial design. We use a standard regression vernacular, however, to describe our results. We centered age in years around its mean (i.e., 5.06), and participant sex, and WHR (in integers) at zero. We coded judged sex numerically (0 = *male*, 1 = *female*). We report parameter estimates as unstandardized regression coefficients for all significant effects in Table 1. Task order was initially included as a factor in analyses. It did not affect any dependent variable, and will receive no further mention.

Identification task. We examined whether the bodies identified to be ''most like a man'' and ''most like a woman'' varied as a function of age and sex. Thus, the selected WHR was our dependent variable. We regressed WHR onto judgment (i.e., most like man or most like a woman), participant age, participant sex, and all interactions. As predicted, bodies judged to be most like a man had larger WHRs (i.e., .11 units) than bodies identified to be most like a woman, and this varied by age (see Table 1).

We followed up the judgment by age interaction by testing the simple slopes of judgments centered (separately) at each age (see Figure 2 and Table 1). Among 4-year-olds, judgments did not vary significantly with WHR. Among 5- and 6-year-olds, the

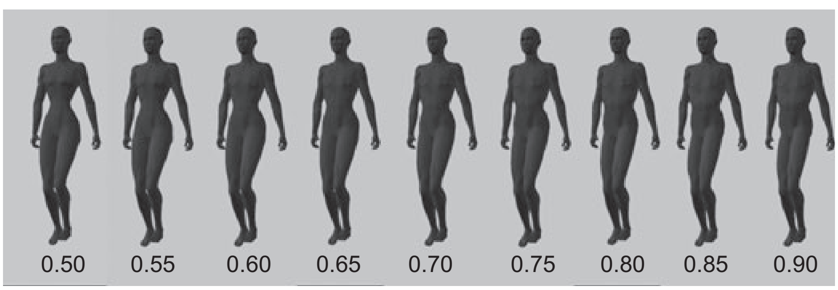

Figure 1. Stimuli depicted nine computer-generated bodies that varied in waist-to-hip ratio from 0.5 to 0.9.

Table 1
Summary of Generalized Equation Estimates (GEE) Predicting Judgments in the Identification and Categorization Tasks of Study 1

Effect	*B*	*SE*	*z*	*p*	Odds ratio
Identification task					
Man/woman	−0.1137	0.021	−5.48	****	N.A.
Interaction (Age × Man/Woman)	−0.0768	0.0219	−3.51	***	N.A.
Simple slope at age 4	−0.0321	0.0289	−1.11	*ns*	N.A.
Simple slope at age 5	−0.1088	0.0206	−5.29	****	N.A.
Simple slope at age 6	−0.1856	0.0311	−5.96	****	N.A.
Categorization task					
WHR	−0.0947	0.0218	−4.33	****	2.35
Interaction (Age × WHR)	−0.0908	0.0252	−3.61	***	—
Simple slope at age 4	0.0019	0.0320	0.06	*ns*	1.02
Simple slope at age 5	−0.0890	0.0217	−4.10	****	2.23
Simple slope at age 6	−0.1798	0.0344	−5.23	****	5.04
Sex of participant	0.5077	0.2045	2.48	**	1.66

Note. *B* values are unstandardized coefficients from GEE. Odds ratio was computed based on the change in judgments of the full range of waist-to-hip ratio (WHR) stimuli (i.e., 0.5–0.9). Nonsignificant main effects and interactions are omitted.
$^{**}p \leq .01$. $^{***}p < .001$. $^{****}p < .0001$.

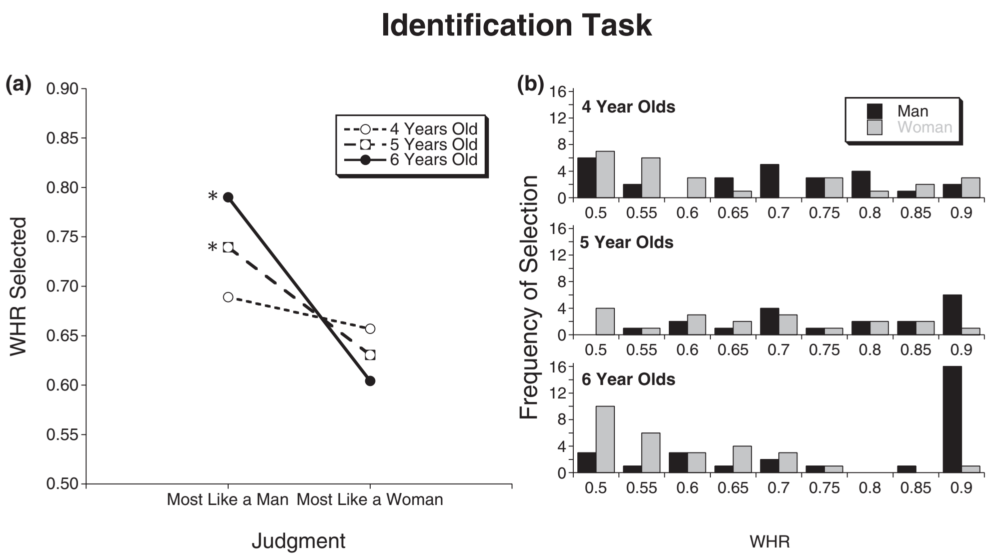

Figure 2. Waist-to-hip ratio (WHR) selected to be ''most like a man'' and ''most like a woman'' as a function of age for the identification task. (a) Plots reflect predicted WHR selected for each judgment centered separately around 4, 5, and 6 years of age. (b) Raw frequency that each WHR was selected.

WHR identified to be most like a man was significantly larger than the WHR identified to be most like a woman, simple. Other effects were nonsignificant, all *z*s < 0.91, *ns*.

Categorization task. First, we examined the accuracy of sex categorizations during the practice phase. No errors occurred at any age. Because participants sorted cards twice, we initially included this as a factor in all analyses. No main effects or interactions involving set approached significance (all *B*s < 0.09, all *p*s > .34), and it was therefore dropped from the analyses.

To examine whether sex categorizations varied with age and WHR, we regressed perceived sex onto WHR, participant age, participant sex, and all interactions. As predicted, as the WHR increased, targets were more likely to be categorized as men, and this varied by age (see Table 1).

We followed up the WHR × Age interaction by testing the simple slopes of judgment centered

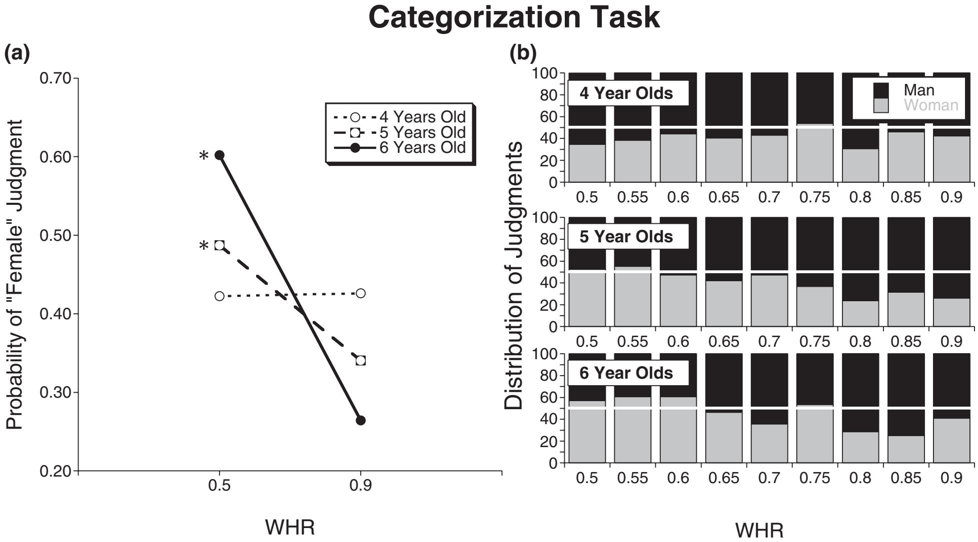

Figure 3. Probability that a target is judged to be female as a function of waist-to-hip ratio (WHR) and age for the categorization task. (a) WHR was treated as a continuous variable in this analysis, and plots reflect predicted probability when the WHR was 0.5 and 0.9, centered separately around 4, 5, and 6 years of age. (b) Raw frequency of male and female categorizations for each WHR.

(separately) at each age (see Figure 3 and Table 1). Among 4-year-olds, judgments did not vary with WHR. Among 5-year-olds, each increase in WHR corresponded to 8.9% more ''man'' categorizations; among 6-year-olds, each increase in WHR corresponded to 17.98% more ''man'' categorizations.

Compared with girls, boys were more likely to categorize targets to be men and vice versa (see Table 1). No other effects reached significance, all $zs < 1.25$, *ns*.

These results suggest that between 4 and 6 years, children increasingly exploit sexual dimorphism for sex categorization. This pattern could occur for many reasons. One possibility is that our tasks were too difficult for 4-year-olds. This seems unlikely. First, 4-year-olds easily and accurately categorized each practice stimulus. Although the demands of each task differed (e.g., relative judgments in the identification task, sorting in the categorization task), the results from both were convergent, suggesting that task difficulty is unlikely to be the explanation. Instead, we propose that 4-year-olds' failure to utilize WHR reflects a lack of knowledge about sexual dimorphism. This could contribute to their failure to utilize the WHR in their judgments in two ways. First, they may not attend to the waist and hips because they do not perceive the region as relevant for sex categorization. Second, they may attend to differences in WHR but fail to relate those differences systematically to sex categorization. These issues concerning younger children's ability to identify and utilize a sexually dimorphic cue cannot be resolved in Study 1. In Study 2, we address these issues by observing children's visual behavior as they categorized our stimuli.

The utilization of the WHR for sex category judgments corresponds to telltale visual behaviors. Using similar stimuli, Johnson and Tassinary (2005) recorded adult participants' eye movements as they visually scanned bodies prior to making social judgments. When participants were required to make sex category judgments, they concentrated visual scanning in the waist and hips, recognizing the region's relevance for the task. In contrast, when the targets' sex was prespecified, thus removing the need to categorize, participants no longer concentrated scanning within the waist and hips. Such measures are also likely to be informative for understanding how children come to use sexual dimorphism for sex categorization. We reasoned that observing children's visual behavior would allow us to determine not only whether children recognize differences across the stimuli but also whether they recognize the region's relevance for their judgments.

Study 2

In Study 2, we tracked children's eye movements as they made sex category judgments. First, we calculated visual scanning within the waist and hips as an index of children's attention toward the relevant cue and examined whether this differed by age. Then we examined whether attention toward this area predicts its use for sex categorization. We predicted that children who look toward the waist and hips would be more likely to show a strong relation between WHR and sex category judgments.

Method

Participants. Participants were forty-one 4- and 6-year-old children (20 boys and 21 girls). The 4-year-olds ranged from 3.73 to 4.25 years (M = 3.95, SD = 0.12); the 6-year-olds ranged from 5.67 to 6.52 years (M = 6.05, SD = 0.17). Participants were recruited as described previously. Sex distribution was comparable across age groups (4-year-olds: 10 boys and 10 girls; 6-year-olds: 10 boys and 11 girls).

Procedures. As before, we familiarized participants with the range of stimuli by showing all targets simultaneously, increasing in WHR. After indicating that they perceived differences between the targets, participants completed a computerized categorization task.

Participants were seated approximately 120 cm away from a 43 cm Tobii 1750 (Falls Church, VA) corneal reflection eye-tracker. ClearView software (Tobii Software, Falls Church, VA) presented stimuli and recorded eye movements at 30 Hz, with a spatial resolution within .5° visual angle. Participants were calibrated individually by registering five known fixation points, and confirming their reliability before proceeding.

Stimuli included digitized versions of those used in Study 1 (see Figure 4), and the task was conceptually similar, albeit with virtual rather than real boxes. In this task, the ‘‘boxes’’ appeared as photographs of a man and woman, counterbalanced in order, in the upper corners of the screen. The task was described using an identical script. That is, we instructed participants to determine which box each stimulus belonged in. We familiarized participants with the task—first verbally, then with a practice phase as in Study 1. Then, participants categorized the nine targets twice, in one of two random orders.

Results and Discussion

Preliminary analysis. No participant reported any confusion about the task, and no participant made an error in categorizing the practice stimuli. We confirmed that the basic pattern of judgments replicated using the same analyses described in Study 1. Sex category judgments varied, albeit marginally, as a function of age and WHR, interaction $B = -0.0830$, $SE = 0.0475$, $z = -1.75$, $p = .08$. Among 4-year-olds, judgments did not vary with WHR, simple $B = 0.2600$, $SE = 0.2284$, $z = 1.14$, *ns*. Among 6-year-olds, sex category judgments did vary with WHR, $B = -0.5949$, $SE = 0.2689$, $z = -2.21$, $p = .0269$, odds ratio (OR) = 5.04 (predicted means for WHR of 0.5 = 65% female judgments, and for WHR of .9 = 21% female judgments).

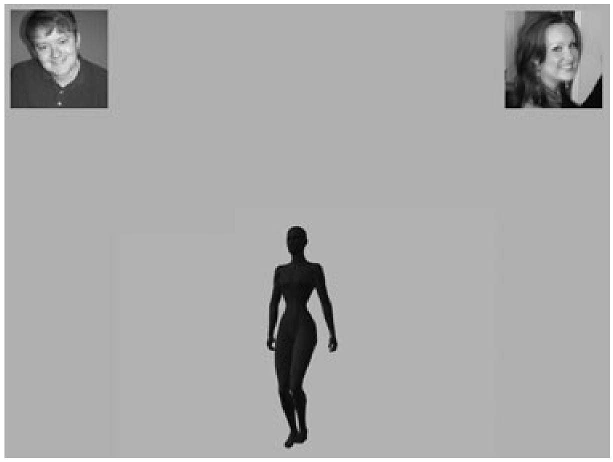

Figure 4. Sample stimulus from Study 2.
Note. The stimulus was centered in the lower portion of the screen; the ‘‘male box’’ and the ‘‘female box’’ appeared in the upper corners (their location was counterbalanced across participants).

Attention to WHR. First, we computed the proportion of body scanning directed toward the waist and hips (hereafter, *Dwell*). Adults tend to increase scanning within the waist/hip when they categorize bodies by sex (Johnson & Tassinary, 2005), but not when the sex of a target is already known. We predicted that a similar difference in scanning would emerge when comparing the scan patterns of children who recognize the relevance of body shape for sex categorization to those who do not. Thus, we suspected that scanning this region might differ with age. Indeed, older children, relative to younger children, looked significantly more to the waist and hips of each body, $B = 0.0368$, $SE = 0.0191$, $z = 1.93$, $p = .05$ (Ms = 15% and 23%). Importantly, we found no age differences in scanning of the head, chest, or legs (all Bs < 0.033, all zs < 1.5, *ns*). This pattern, combined with the age differences observed in the effect of WHR for categorization, is consistent with our hypothesis that younger children do not fully recognize the relevance of this region as a cue to sex category membership.

Next, we tested this more directly by examining whether visual scanning of the waist and hips predicted children’s use of the WHR for their judgments. We used hierarchical linear modeling for this analysis (HLM; Raudenbush, Bryk, & Congdon, 2007). Parameter estimates are shown in Table 2. At Level 1, the analysis modeled the average relation between WHR and judgment. Overall, the two were significantly related. This replicated the overall effect of WHR on judgments that we found in Studies 1 and 2. At Level 2, this analysis examined whether Dwell predicted the strength of the Level 1 relation between WHR and judgments. Not surprisingly, Dwell did not predict judgment directly, but it did moderate the relation between WHR and judgment. As seen in Figure 5, when scanning within the waist and hips was low, the relation between WHR and judgment was negligible. When scanning within the waist and hips was high, in contrast, the relation between WHR and judgment was strong. Importantly, this effect did not differ by participant age when it was included as a Level 2 variable, and scanning within other body regions did not predict the relation between WHR and judgments (all *t*s < 1.81, *ns*).

These results indicate that, as in adults (Johnson & Tassinary, 2005), children's visual scanning of a sexually dimorphic region of the body is functional. Doing so informs sex categorization. Children with elevated visual scanning within the waist and hips showed a strong relation between WHR and judgment; children with no elevated scanning in this area did not. Importantly, this basic effect was not moderated by age. This suggests that younger children's lesser scanning of a sexually dimorphic region of the body occurs because they are less likely to recognize its relevance as a cue for the task at hand—sex categorization—not because they fail to appreciate the differences in the first place. This is important in two ways. First, these findings suggest that the age cohort effects in Study 1 likely reflected a difference in utilization, rather than a wholesale failure of younger children to notice differences between stimuli. Second, this suggests that the use of sexual dimorphism for categorization occurs between ages 4 and 6.

Table 2
Summary of Hierarchical Linear Modeling (HLM) Estimates Predicting Judgments in Study 2

Effect	*B*	*SE*	*t* (*df*)	*p*
Level 1				
WHR	−3.72	1.21	−3.08 (39)	**
Level 2				
Dwell within waist and hips	−1.12	0.79	−1.41 (39)	*ns*
Interaction (Dwell × WHR)	−20.31	8.99	−2.26 (39)	*

Note. *B* values are unstandardized coefficients from hierarchical linear modeling (Raudenbush et al., 2007). WHR = waist-to-hip ratio.
**p* < .05. ***p* < .01.

General Discussion

These findings begin to fill a gap in the literature that has received minimal attention—how children utilize sexually dimorphic cues in social categorization. In Study 1, we found that between the ages of 4 and 6, children's sex category judgments increasingly covaried with a sexually dimorphic cue, the WHR. Among 5- and 6-year-olds, but not 4-year-olds, targets were more likely to be categorized *male* as the WHR increased. Additionally, across this age range, the WHRs of bodies identified to be most like a man and most like a woman became increasingly divergent, reaching significance by age 5. In Study 2, we demonstrated that increased scanning of this region predicted stronger associations between WHR and judgments. Collectively, these findings highlight a developmental shift between the ages of 4 and 6 in which children become adept at exploiting morphological differences to disambiguate sex category membership.

Because our stimuli were computer generated, we should remain mindful of two things. First, in day-to-day social perception, children's judgments are likely to be informed by multiple visual cues, some of which may take priority over perception of the body. Second, our findings may reveal more about children's judgments of representational media than the actual perception of others. In spite of this, other research suggests that media portrayals of men and women are routinely incorporated into judgments, at times biasing perceptions and preferences (see, e.g., Aubrey & Harrison, 2004; Yu & Shepard, 1998). Therefore, any effects that emerged as a result of the representational nature of our stimuli are likely to be incorporated into perceptions of others as well.

Assuming that our results indicate something general about how children perceive others, the age at which children begin to use sexual dimorphism for sex categorization occurs at a point of rapid transitions in gender development. The increasing awareness that certain visual cues are reliable indicators to a target's sex may demarcate a transition of functional significance—a period during which children shed the notion that one's sex is mutable. Indeed, between 4 and 6 years, young children come to understand the permanence of their own

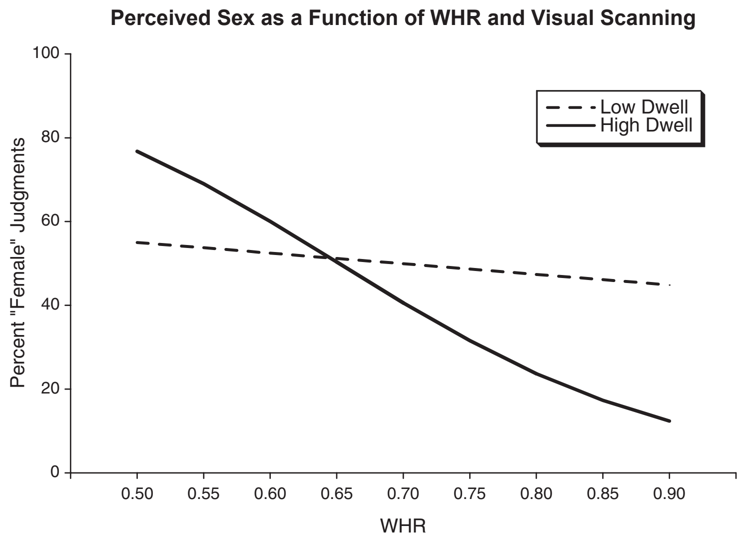

Figure 5. Probability that a target is judged to be female as a function of waist-to-hip ratio (WHR) and visual scanning behavior. *Note.* Plots reflect predicted probability at each WHR, centered separately around low and high Dwell.

sex (gender constancy), a phenomenon researchers have linked to increases in gender stereotype knowledge (Martin, Ruble, & Szkrybalo, 2002; Ruble et al., 2006). An increased reliance on cues that are biologically diagnostic of a target's sex, as opposed to those that are merely correlated with sex, for sex categorization may undergird gender constancy.

Importantly, others have described a functional relation between body knowledge and gender constancy, albeit at a much younger age. Bem (1989) notably found that children who used genitals as the criterion for sex categorization also exhibited some forms of gender constancy by age 3. These findings underscore a minimal age at which children *can* exhibit rudimentary forms of gender constancy, but such effects are likely to be constrained in the real world. In social interactions, for example, genitals are rarely displayed to compel unquestionable categorizations. Instead preschool children are prone to use superficial cues to appearance for categorization (Thompson & Bentler, 1971), and their judgments tend to fluctuate with shifting evidence (e.g., when a boy dons a dress). Malleable sex categorization may be particularly likely when (a) studies use stimuli depicting prepubescent children who are devoid of secondary sex characteristics, and/or (b) children are not equipped to incorporate the dimorphic cues that are visible in stimuli depicting adults. In both cases, children's judgments are more probabilistic than definitively categorical. As children develop an appreciation that sexually dimorphic body cues are visible for fully clothed targets, however, their judgments may shift from reflecting malleable and probabilistic social perceptions to reveal stable categorizations that are less influenced by superficial changes in appearance.

The coincidence of age at which children utilize sexually dimorphic body shape for categorization and at which gender constancy emerges dovetails nicely with research in essentialism. Essentialism refers to the perception that visible cues reveal underlying essential differences between categories (see, e.g., Gelman, 2003). Much of the research in gender essentialism has focused on the perception that stereotyped behaviors emerge from biological rather than social origins, yet the development of such beliefs is informative herein as well. Specifically, we examined young children's ability to infer categories from visual cues (see, e.g., Gelman, Collman, & Maccoby, 1986). From this perspective, children's emerging ability to use sexual dimorphism for sex categorization may reveal a growing awareness of biological differences between men and women and an appreciation that some cues reliably differentiate the two. This reasoning predicts children's increased reliance on sexually dimorphic cues and an emphasis on those cues over superficial aspects of appearance for sex category judgments. Indeed, we found an increased reliance on sexual dimorphism for sex categorization by age 5. The reliance on sexually dimorphic body shape precedes the age at which children's categorization of faces favors sexual dimorphism over superficial cues such as hairstyle (i.e., 5 vs. 7 years). This difference could be because we were seeking the age when children recognize the relevance of sexual dimorphism, whereas prior research in the categorization of faces sought to establish at what age children favor sexually dimorphic cues over superficial appearance cues (Wild et al., 2000). In addition to the research in face perception and gender constancy, our findings provide convergent evidence for the development of essential concepts of men and women in early childhood.

Conclusion

The question of how observers categorize others according to social categories has been an enduring interest of both artists and scientists alike. Although our article opened with an artistic portrayal of the essential characteristics that distinguish boys from girls, our empirical work was decidedly more focused on the perception of a cue that is inherently sexually dimorphic. As such, our findings represent a next step in understanding the development of social categorization—by specifying the age at which children's sex category judgments reflect sensitivity to sexually dimorphic body shape.

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