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Please cite this paper as:

Block, K., Gonzalez, A.M., Schmader, T., & Baron, A.S. (In Press). Early gender differences in core values predict anticipated family vs. career orientation. *Psychological Science*.

Data and Materials for this study are available at:

<https://osf.io/8fq5a/>

Early Gender Differences in Core Values Predict

Anticipated Family vs. Career Orientation

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We thank the Living Lab and Science World. This research was supported by SSHRC grants to A.S.B. (#435-2013-0286) and to T.S. (#895-2016-2011 and #895-2017-1025).

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Abstract

Communion and agency are often described as core human values. In adults, these values predict gendered role preferences. Yet little work has examined the extent to which young boys and girls explicitly endorse communal and agentic values and whether early gender differences in values predict boys' and girls' different role expectations. In a sample of 411 children aged 6 to 14, we find consistent gender differences in communal and agentic value endorsement. Across our age range, boys endorse communal values less and agentic values more than do girls. Moreover, gender differences in values partially account for boys' relatively lower family vs. career orientation, predicting their orientation over and above gender identification and parent reports of children's gender expression. These findings suggest that gender differences in core values emerge surprisingly early in development and predict children's expectations well before they make decisions about adopting adult roles in their own families.

Early Gender Differences in Core Values Predict Anticipated Family vs. Career Orientation

Two core values guide human behavior: communion (i.e., other-promotion) and agency (i.e., self-promotion; Bakan, 1966). Pursuing communion is especially predictive of psychological health (Le, Impett, Kogan, Webster, & Cheng, 2013). Yet men value communion relatively less than do women (Donnelly & Twenge, 2017), a difference mirrored by men's lower family-orientation and participation in communal careers (Croft, Schmader, & Block, 2015; Diekman, Steinberg, Belanger, Brown, & Clark, 2017). Because men's lower communal engagement might negatively affect men themselves, as well as their families (Croft et al., 2015), it is important to understand the early development of gender differences in communal values and future role expectations. The current study examined whether young boys explicitly devalue communion (and perhaps accentuate agency), in ways that relate to lower anticipated prioritization of family over career.

By age six, boys expect to prioritize career over family (Croft, Schmader, Block, & Baron, 2014). Cognitive development theory suggests that these gender differences in anticipated roles might arise because children conform to gendered behavioral scripts that align with their gender identity (e.g., Kohlberg, 1966; Martin & Ruble, 2009). However, theoretically, gender identification (i.e., as feminine or masculine) and gender expression (i.e., exhibiting stereotypically feminine or masculine preferences, APA, 2008) are related to, but distinct from more fundamental communal and agentic values (Spence & Buckner, 2000). Based on goal-congruity theory (Diekman et al., 2017), we expect that the internalization of values, more than gender identification or expression, predicts children's expectations of their future roles.

According to goal-congruity theory, people seek out roles that afford their values. Adults self-segregate into different occupations, not only to conform to gendered expectations, but

because of the different values men and women have internalized (Diekmann et al., 2017). If internalized early, these values could shape how children imagine their future. Whereas no research has directly examined children's endorsement of core values, children's preferences provide indirect evidence. Girls, more than boys, want to connect rather than compete in friendships (Ojanen, Grönroos, & Salmivalli, 2005), and value altruism rather than status in careers (Weisgram, Bigler, & Liben, 2010).

The current research examined gender differences in core values, and their relationship to family vs. career orientation, in a large sample of children. We hypothesized that boys endorse communal values less than do girls (H1a). We had no predictions for agentic values, given mixed evidence in adults (Diekmann et al., 2017; Croson & Gneezy, 2009). We also hypothesized that boys (relative to girls) anticipate less future family vs. career orientation (H1b). To the degree that values are distinct from gender identity and expression, but important for role preferences, they should explain unique variance in children's family vs. career orientation. We thus hypothesized that gender differences in communal (and perhaps agentic) values mediate boys' relatively lower family vs. career orientation, over and above explicit and implicit gender identification (H2a), and gender expression (H2b). Additionally, we explored the developmental trajectory of these relationships from childhood and early adolescence.

Method

Participants and Procedure

Our final sample included 411 children (216 boys, 195 girls), aged 6 - 14 ($M = 9.84$, $SD = 2.23$) recruited from a community science center. We excluded 41 participants because of experimenter error ($n = 12$), incomplete data ($n = 9$), or technical issues ($n = 20$). Based on the

feasibility of recruiting children from the science center, we aimed to recruit at least 25 usable participants per age (in years) and gender (target $n = 400$). Participants were predominantly Caucasian (54.5%) or East Asian (17.8%), but also included participants were identified as South Asian (6.6%), Aboriginal/Canadian First Nation (4.6%), Middle Eastern (1.5%), Mixed (10.5%), Black (0.5%), or identified outside of the categories provided (2.7%). Participants were tested individually in a sound-proof room, by one of four research assistants (1 male, 3 females; research assistant gender did not moderate results, see SOM) who read all instructions. Participants completed measures of implicit and explicit gender identification, their own values, and then answered open-ended questions about their occupational interests and made ratings of their family vs. career orientation. The open-ended responses to the question, “What do you want to be when you grow up?” (missing data for 85 children) were coded for gender stereotypicality and goal affordances. Because these coded variables were unrelated to other variables in the study (details in SOM), they are not discussed further. In addition, for 392 children, a parent completed other demographics and rated their child’s gender expression as masculine - feminine. A full list of measures can be found in the SOM.

Measures

Communal and agentic values. For the purposes of this study, we developed a child-friendly scale of communal and agentic value orientation by adapting items used in adult samples (Diekman et al., 2017; Trapnell & Paulhus, 2012). We first explained to children that “some things are important to some people but not at all important to other people. I want you to tell me how important these things are to YOU!”. Children were then asked to rate the personal importance of four communal values (“How important do YOU think it is to always help others, even if it takes effort?”; “How important do YOU think it is to do things together with others?”;

“How important do YOU think it is to be kind to others?”; “How important do YOU think it is to think about others’ feelings?”; $\alpha = .65$) and three agentic values (“How important do YOU think it is to be the one who gets to make decisions?”; “How important do YOU think it is to win?”; “How important do YOU think it is to be good at things?”; $\alpha = .68$) on a 5-point scale ranging from “Not very important” to “Super important”. A fourth agentic value: “doing things all by yourself,” was not highly related to other items (item-total correlation $< .25$) and was thus excluded from the measure. Submitting the remaining seven items into an exploratory maximum likelihood factor analyses with direct oblimin rotation revealed that communal and agentic items loaded on two distinct primary factors with minimal cross-loading (see analyses in SOM). Children’s reports of communal and agentic values were weakly but significantly negatively correlated, $r = -.18, p < .001$. An example item can be seen in Appendix 1.

Family vs. career orientation. To assess children’s expected family vs. career orientation for adulthood, children made ratings on two items taken from Croft et al., (2014). For each of the two items, children saw two individuals (matched to participant gender and similar to each other in the physical appearance of skin color, haircut and color, and facial features). These individuals were described as childhood friends who grew up to have different priorities as adults. For each of the two pairs, one target was described as family-oriented, and one was described as career-oriented. After being read each description, participants were asked “Someday you will also be all grown up. When you are grown up, who do you think you will be more like?”. Participants indicated who they thought they would be more similar to on a 5-point scale from 1 = a lot similar to [name of career-oriented exemplar] to 5 = a lot similar to [name of family-oriented exemplar], where options were represented as dots of different sizes. Responses

to these two items ($r = .34$, $p < .001$) were averaged to represent an index of children's family vs. career orientation. See SOM for a depiction of the measure.

Implicit gender identification. The extent to which children implicitly identified as female vs. male was measured with a child-friendly Implicit Association Test (IAT; Baron & Banaji, 2006). The implicit association test has been used and validated as a measure of implicit gender identity in children as young as age 6 (e.g., Cvencek, Meltzoff, & Greenwald, 2011). The IAT assesses the strength of associations between concepts by measuring participants' reaction times to categorize word and picture stimuli into congruent vs. incongruent categories (e.g. self + girl vs. self + boy). Initially, participants completed separate practice blocks to familiarize them with the identity stimuli delivered auditorily (self = I, me, my, myself vs. other = their, them, themselves, they; Dunham et al, 2007), and gender stimuli delivered visually (pictures of boy vs. girls; see SOM for all stimuli used). Each practice block consisted of twelve trials in which participants had to decide (using one of two large response buttons) whether a word they heard or picture they saw belonged to the category shown on the left or right.

After finishing two practice blocks, participants completed two critical test blocks ($N = 40$ trials each, order counterbalanced), requiring them to categorize stimuli from both self and gender categories simultaneously. In one block, category pairings congruent with female identity, i.e. "self" and "girl" (vs. "boy" and other) were mapped onto the same response button. In the other block, category pairings congruent with male identity, i.e. "self" and "boy" (vs. "girl" and "other") were mapped onto the same response button. Following scripts from Baron and Banaji (2006), d-scores were computed to represent strength of implicit female (vs. male) identification. This scoring allowed gender identification to positively correlate with other variables that were also coded so that high numbers equal more feminine or female. Based on

recent general recommendations (Nosek, Bar-Anan, Sriram, Axt, & Greenwald, 2014), analyses using this measure exclude participants with more than 10% of responses faster than 300ms, or with more than 30% errors on this task (19 participants, 4.6% of total sample).

Explicit gender identification. Four questions were designed to assess the extent to which children explicitly identified with other females vs. males. For each of these four questions, participants were presented with clip art depictions of one boy and one girl, matched to each other in ethnicity (e.g. “Sarah and David”) and then asked, “I want you to tell me who you are more like”. Participants made their ratings on a 5-point scale that was labeled for them as “Are you a lot more like X (1), a little more like x (2), in the middle between x and y (3), a little more like y (4), or a lot more like y (5)”. In two of the four pairs, the female character was presented on the right (corresponding to a rating of 5), and in the other two the male character was presented on the right. To approximate ethnic representation in the sample community, two boy-girl pairs appeared to be Caucasian, one pair appeared to be East Asian, and one pair appeared to be medium dark-skinned (meant to be interpretable as South Asian or Latino). Ethnicity was thus never confounded with target gender and a composite score of all four items was reliable ($\alpha = .89$).

However, to avoid contaminating scores with children’s ethnic identity, we followed the recommendation of an anonymous reviewer and operationalized gender identification as the responses made only to the items that matched the participant’s own parent-reported ethnicity (i.e., a Caucasian participant’s score is the average of two Caucasian items, an East Asian participant’s score is the rating of the East Asian item, a Black/Hispanic/South Asian participant’s score is their score on the medium dark-skinned item, and the full 4-item composite was used for children of mixed or non-reported ethnicity). This ethnicity-matched coding of

explicit female-identification correlated highly with the four-item composite, $r = .94, p < .001$, and results are the same with either measures (see SOM for these analyses and all stimuli). Scores are coded so that higher numbers represented greater identification with females (vs. males).

Parent-reported gender expression. To assess the extent to which children currently exhibited feminine vs. masculine gender expressions, parents completed a 12-item measure (Johnson et al., 2004) assessing the frequency with which their child shows in a number of gendered behaviors and preferences (e.g. “He/She plays with girl-type dolls, such as “Barbie”). Parents also completed two face-valid items rating how: 1) feminine and 2) masculine they perceived their child compared to other children of the same age. Because these latter two items were highly related to the 12-item questionnaire (item-total correlations $r > .74$), we standardized all 14 items and averaged the standardized responses into an overall index of *parent-reported gender expression*. Higher scores on this measure indicated more feminine vs. masculine gender expression. See Table 1 for means and correlations for all variables.

Table 1.

Bivariate Correlations and Means (SD) by Gender

	1	2	3	4	5	6	7	M _{boy} (SD)	M _{girl} (SD)
1. Age		-.15*	-.06	-.12	-.37*	.08	.12 [#]	9.98 ^a (2.29)	9.59 ^a (2.17)
2. Communal Values (1-5)	-.13 [#]		-.03	.15*	.19*	.03	.13 [#]	4.38 ^a (0.59)	4.52 ^b (0.48)
3. Agentic Values (1-5)	.08	-.27*		-.09	.07	-.01	.12	2.77 ^a (1.00)	2.48 ^b (0.99)
4. Family Orientation (1-5)	-.05	.18*	-.21*		.03	-.03	-.10	3.05 ^a (0.94)	3.38 ^b (0.87)
5. Gender expression (Z-Score)	.06	-.08	-.09	.12 [#]		.001	.12	-0.63 ^a (.33)	0.67 ^b (.38)
6. Implicit Female Identification	-.11	.08	.05	-.05	-.04		-.07	-.22 ^a (.39)	.27 ^b (.38)
7. Explicit Female Identification	-.19*	-.001	-.01	.04	.21*	.03		2.05 ^a (0.85)	4.01 ^b (0.67)

Notes. Correlations for boys below the diagonal, correlations for girls above the diagonal.
Means that do not share the same subscript differ significantly, $p < .05$.

* $p < .05$, # = $< .10$

Results

Gender and Age Differences

We first examined gender differences in our focal variables (communal values, agentic values, and family vs. career orientation; H1a, H1b). To control for age variation within our sample and explore the possible developmental trajectory of boys' and girls' value endorsement, we also included age as a moderator in these analyses. To examine gender and age effects, we entered children's gender (male = 0, female = 1) and age (standardized) as predictors on step 1, and their interaction on step 2 of a hierarchical linear regression model for each outcome.

Value orientation. On average, older children endorsed communal values less than did younger children, $\beta = -.14$, $SE = .03$, $t(406) = -2.85$, $p = .005$, whereas age did not predict agentic values, $\beta = .01$, $SE = .05$, $t(406) = 0.25$, $p = .803$. Over and above these effects of age, and as predicted, boys endorsed communal values significantly less than did girls, $\beta = .12$, $SE = .05$, $t(406) = 2.43$, $p = .015$. Boys also endorsed agentic values significantly more than did girls, $\beta = -.14$, $SE = .10$, $t(406) = -2.93$, $p = .004$. There were no significant interactions between gender and age predicting values, $\beta s < .10$, $p s > .16$, suggesting that the observed gender differences in values varied little within the age range of our sample. Thus, results revealed gender differences in children's core values that emerge by age six and parallel gender differences in valued careers in children (Weisgram et al., 2010). In addition, values reported by children resemble patterns of values in adults, with communal value endorsement being generally high but higher for women than for men (e.g. Diekmann et al., 2017).

Family vs. career orientation. We next examined gender differences in children's role orientation. In line with H1b, and replicating Croft et al. (2014), boys (as compared to girls) expected to be less family-oriented, $\beta = .18$, $SE = .09$, $t(394) = 3.53$, $p < .001$. Neither age, $\beta = -.08$, $SE = .05$, $t(394) = -1.61$, $p = .108$, nor the age by gender interaction, $\beta = -.04$, $SE = .09$, $t(393) = -0.58$, $p = .564$, predicted children's family vs. career orientation. These results suggest that by age six, we clearly observe gender differences in values as well as family vs. career orientation.

Do Gender Differences in Values Explain Expected Family vs. Career Orientation?

Having established an early gender difference in core values, we next tested these gender differences as mediators of gender differences in seeing one's future as more family- rather than career-oriented. To test this, we conducted mediational analyses with the PROCESS macro

(Hayes, 2013; 10000 resamples for bootstrapped confidence intervals), entering gender as a predictor, and communal and agentic values as simultaneous mediators, predicting children's family vs. careers orientation (all standardized; see Figure 1). As hypothesized, expecting a family- rather than a career-oriented future was predicted by both higher communal values, $\beta = .14$, $SE = .05$, $t(395) = 2.81$, $p = .005$, and lower agentic values, $\beta = -.13$, $SE = .05$, $t(395) = -2.56$, $p = .011$, even after controlling for gender. In addition, significant indirect effects are consistent with both boys' lower communal, $IE = .02$, $CI_{.95} (.003, .04)$, $p < .05$, and higher agentic values, $IE = .02$, $CI_{.95} (.003, .05)$, $p < .05$, accounting, at least in part, for their relatively low family vs. career orientation compared to girls. These indirect relationships suggest that gender differences in both communal and agentic values partly account for gender differences in family vs. career orientation. These results held when controlling for both participant age and research assistant gender, and paths were not moderated by age. For more information about these as well as mediation analyses on younger vs. older children, please refer to the SOM.

Note. 0 = boys, 1 = girls; Analyses include a sample of 399 children. Additional children were excluded for missing data.

Figure 1. Values as Mediators of Gender Differences in Family vs. Career Orientation

Alternative explanations. Next, we examined whether our results could simply be accounted for by the extent to which children are implicitly or explicitly identified as female (vs. male), or the extent to which children currently displayed feminine vs. masculine gender expression. Either might suggest that children's tendency toward identifying as, or outwardly expressing feminine or masculine behaviors and preferences, and not endorsement of communal values itself (constructs which are distinct, Spence & Buckner, 2000), better predict future role expectations.

First, to better understand these variables in our dataset, we tested for gender and age effects on all variables using linear regression analyses with children's gender (male = 0, female = 1) and age (standardized) as predictors on step 1, and their interaction on step 2 for each outcome. As expected from past research (Cvencek et al., 2011), girls implicitly identified more as girls than did boys, $\beta = .54$, $SE = .04$, $t(387) = 12.47$, $p < .001$, suggesting that implicit gender identification corresponded sensibly to children's binary gender identity. Neither age, $\beta = -.02$, $SE = .02$, $t(387) = -0.34$, $p = .733$, nor the age by gender interaction, $\beta = .11$, $SE = .04$, $t(386) = 1.87$, $p = .062$, significantly predicted implicit gender identification.

Similarly, results showed a large gender difference in explicit female identification, with girls explicitly identifying more strongly with females than did boys, $\beta = .78$, $SE = .08$, $t(406) = 25.47$, $p < .001$. Although we observed no main effect of age, $\beta = -.04$, $SE = .04$, $t(406) = -1.33$, $p = .184$, the main effect of gender was qualified by a significant gender by age interaction, $\beta = .13$, $SE = .06$, $t(405) = 3.23$, $p = .001$. Decomposing this interaction suggested that the tendency to explicitly identify with girls more than with boys did not significantly increase with age for girls, $\beta = .07$, $SE = .06$, $t(405) = 1.49$, $p = .137$, but significantly decreased with age among boys, $\beta = -.13$, $SE = .05$, $t(405) = -3.16$, $p = .002$.

We next examined how parents' reports of their children's gender expression differed between boys and girls. Results suggested that our sample showed substantial gender differences in gender expression, with boys' gender expression being rated as less feminine (more masculine) by their parents than were girls', $\beta = .87$, $SE = .04$, $t(379) = 35.79$, $p < .001$. Notably, gender and age interacted significantly when predicting parent-rated gender expression, $\beta = -.18$, $SE = .04$, $t(378) = -5.57$, $p < .001$. Decomposing this interaction suggested that, for girls, $\beta = -.23$, $SE = .03$, $t(378) = -6.53$, $p < .001$, but not for boys, $\beta = .04$, $SE = .02$, $t(378) = 1.13$, $p = .260$, increasing age was associated with less feminine (more masculine) gender expression, suggesting that girls express less uniquely feminine behaviors as they age, whereas boys tend to express relatively more masculine behavior at all ages examined.

Do values predict over and above identification and expression? Given the significant gender differences in gender identification and parents' reports of children's gender expression, it is possible that the relationship between values and family vs. careers orientation is simply a reflection of children's explicit or implicit gender identity (H2a), or gender expression (H2b). To rule out these alternative explanations, we repeated the above mediational analyses two times to test: 1) the extent to which children implicitly and explicitly identified as female (vs. male), and 2) the extent to which children showed a feminine vs. masculine gender expression, as control variables (Z-scored) in the relationship between values and orientation (b-path). These analyses were done separately for gender identification and gender expression variables to preserve degrees of freedom, since some children were excluded based on IAT error rates and a different subsample of children were excluded because their parents did not complete their questionnaire.

Results of analyses controlling for children's implicit and explicit gender identification (H2a) revealed neither explicit identification as female vs. male, $\beta = -.08$, $SE = .08$, $t(374) = -$

1.02, $p = .307$, nor implicit identification as female vs. male, $\beta = -.04$, $SE = .06$, $t(374) = -0.63$, $p = .527$, significantly predict children's family vs. career orientation (over and above dichotomous gender and values). Importantly, both communal, $\beta = .13$, $SE = .05$, $t(374) = 2.45$, $p = .015$, and agentic values, $\beta = -.11$, $SE = .05$, $t(374) = -2.24$, $p = .025$, remained significant predictors of family vs. career orientation when controlling for these two gender identification variables. Moreover, the indirect effects of child gender on family vs. career orientation through communal, $IE = .01$, $SE = .01$, $CI_{.95} (.002, .04)$, and agentic values, $IE = .02$, $SE = .01$, $CI_{.95} (.001, .05)$, also remained significant, though small.

Finally, results of parallel analyses controlling for gender expression (H2b) revealed that this measure did not significantly predict children's family vs. career orientation, $\beta = .14$, $SE = .11$, $t(367) = 1.30$, $p = .196$. Importantly, both communal, $\beta = .12$, $SE = .05$, $t(367) = 2.25$, $p = .025$, and agentic values, $\beta = -.12$, $SE = .05$, $t(367) = -2.30$, $p = .022$, remained significant predictors of future family vs. career orientation when adding gender expression into the model. Moreover, the indirect effects of gender on future family vs. career orientation through communal, $IE = .01$, $SE = .01$, $CI_{.95} (.001, .04)$, and through agentic values, $IE = .02$, $SE = .01$, $CI_{.95} (.001, .05)$, also remained significant. Thus, we find no evidence that either children's current identification as female (vs. male), or their current gender expression (as rated by their parents) were better explanations for their expected future selves than their own values were.

General Discussion

In adults, communal and agentic values are important predictors of gender roles. Little research has investigated these values in children. Our results indicate that, by age six, boys show lower communal and higher agentic values than do girls. Over and above children's gender-identification and expression, valuing communion less and agency more predicted boys'

relatively lower family vs. career orientation. Although effect sizes were modest, effects could have cumulatively meaningful consequences for children's aspirations over development.

Correlational designs preclude causal inference. However, this evidence is consistent with our hypothesis that values relate to children's orientation well before children confront the realities of balancing family and career.

There was no evidence that effects were moderated by age. Future research is needed to understand: 1) how, and how early, communal and agentic values are internalized, 2) assess their causal impact with prospective or experimental designs, and 3) identify effects on actual behavioral outcomes. Moreover, studies should examine effects alongside non-binary conceptions of gender identity (Martin et al., 2017). Societal gender disparities in childcare and housework are pressing issues (Croft et al., 2015). Our data underscore the importance of understanding the early development of core values and how they might set the stage for gendered expectations about career and family for adulthood.

Author Contributions:

All authors contributed to the development of questions and study design. K. Block supervised data collection, analyzed data, and prepared the manuscript under supervisions of A.S. Baron and T. Schmader. All authors provided critical feedback and edits to drafts and approved the final version.

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Appendix A

Visual Example of Value Question

SUPER Important

Not very Important

How important do YOU think it is to be kind to others?

Supplemental Materials

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Introduction

The following is a document containing supplementary documentation for the manuscript “*Early Gender Differences in Core Values Predict Anticipated Family vs. Career Orientation.*” The objective of the current work was to examine evidence for gender differences in children’s core values, and possible relationships of such gender differences to children’s anticipated future roles. Findings reported in the main manuscript suggest that boys tend to value communion less, and agency more, than do girls, and these gender differences in values partially explain their relatively lower family- (vs. career) orientation.

Section 1: Methods

Section 1 of these supplementary materials provides additional detail and concrete stimuli used in the measures reported in the main manuscript.

Full List of Measures in Order

Measures used in analyses indicated with *

Child measures in order.

- Implicit Gender Identity*
 - See items in next section
- Explicit Gender Identity (4 items)*
- Explicit Gender Identity Importance
- Explicit Communal (4 items)*
- Explicit Agentic Values (3/4 Items)*
- Is your primary teacher a man or a woman?
- What is your favorite thing to do?
- What is your favorite toy?
- What is your favorite TV show?
- When you grow up, what do you want to be?*
- Closeness to mom
- Closeness to dad
- Family vs. Career Orientation (2 items)*

Parent measures in order.

- What is your child's first name?
- What is your child's date of birth?*
- What is your child's gender?*
- Which of the following best describes your child's ethnicity?
- What is YOUR gender?
- Which of the following best describes YOUR ethnicity?
- What is your approximate annual household income? (in CAD)
- What is the highest level of education you have achieved as of today? Select which one of the following best represents your own highest level of educational achievement:
- What is your political orientation?
- Compared to other children that are the same AGE and GENDER as your child, how masculine is your child?*
- Compared to other children that are the same AGE and GENDER as your child, how feminine is your child?*
- parent-report measures of behavioral expression Johnson and colleagues (2004)*

- parent-report measures of gender dysphoria by Johnson and colleagues (2004)
- Which of the following options **most closely resembles** the parenting structure in your household?
- Who is the primary caregiver in your household?
- Who is the primary breadwinner in your household?
- How many siblings does your child have?
- What gender are the siblings?
- How many hours a week do you work?
- How many hours a week does your partner work? (if not applicable put: NA)

Stimuli used in Measures

Depiction of Explicit Gender Identification Measure.

Depiction of Values Measure.

SUPER Important

Not very Important

How important do YOU think it is to be the one who gets to make decisions?

SUPER Important

Not very Important

How important do YOU think it is to win?

SUPER Important

Not very Important

How important do YOU think it is to be good at things?

SUPER Important

Not very Important

How important do YOU think it is to do things all by yourself?

SUPER Important

Not very Important

How important do YOU think it is to always help others, even if it takes effort?

SUPER Important

Not very Important

How important do YOU think it is to think about others' feelings?

SUPER Important

Not very Important

How important do YOU think it is to be kind to others?

SUPER Important

Not very Important

How important do YOU think it is to do things together with others?

Factor Analyses on Value Measure

To explore whether our communal and agentic value items truly factored onto two distinguishable factors, we entered the items into an exploratory maximum likelihood factor analyses with direct oblimin rotation and no restriction of number of factors. Results suggested that items loaded onto only two factors that had an eigenvalue greater than 1. Factor 1, onto which mainly communal values loaded (see table S1), had an initial eigenvalue of 2.39 and accounted for 34.17% of variance in the data. Factor 2, onto which mainly agentic items loaded, had an eigenvalue 1.56 and accounted for 22.22% of the variance in the data. The factors were correlated at $r = .26$.

Table S1. *Pattern Structure of Communal and Agentic Value Items Rotated to the Oblimin Criterion*

Variable	Factor 1: Communal	Factor 2: Agentic
How important do you think it is ...		
... to always help others, even if it takes effort?	.71	
... to be kind to others?	.69	
... to think about others' feelings?	.53	
... to do things together with others?	.47	
... to win?		.77
... to be good at things?		.58
... to be the one who gets to make decisions?		.58

Note. Factor loadings $< .10$ are suppressed.

Stimuli for Implicit Gender Categories

Depiction of Family vs. Career Aspiration Measure

Here are **Clara** and **Carina**. When they were your age they were neighbours, so they saw each other a lot. Now they are all grown up. **Clara** has one child, who goes to daycare during the day so that she can go to her office job. **Carina** now has 2 children and stays at home to take care of them and the house.

One day you will also be all grown up!

When you are grown up, who do you think you will be more like?

Clara

Carina

Here are **Jessica** and **Jennifer**. When they were your age, they played a lot together. Now they are all grown up. Now, **Jessica** has job at a marketing company. She likes her job, although, she often has to stay there late and can't look after her kids. **Jennifer** used to work long hours too but now she only works 3 days a week so she can spend time with her family.

One day you will also be all grown up!

When you are grown up, who do you think you will be more like?

Jessica

Jennifer

Here are **Tom** and **Mike**. When they were your age, they played a lot together. Now they are all grown up. Now, **Tom** has job at a marketing company. He likes his job, although, he often has to stay there late and can't look after his kids. **Mike** used to work long hours too but now he only works 3 days a week so he can spend time with his family.

One day you will also be all grown up!

When you are grown up, who do you think you will be more like?

Tom

Mike

Here are **Luke and Kyle**. When they were your age they were neighbours, so they saw each other a lot. Now they are all grown up. **Luke** has one child, who goes to daycare during the day so that he can go to his office job. **Kyle** now has 2 children and stays at home to take care of them and the house.

One day you will also be all grown up!

When you are grown up, who do you think you will be more like?

Luke

Kyle

Section 2: **Additional Analyses**

Section 2 for these supplementary materials focuses on additional exploratory analyses probing the main findings reported in the paper more deeply. These include analyses split by age-group, controlling for age, and controlling for research assistant gender.

Table S1.

Correlations and Means of all Study Variables by Gender

	1.	2.	3.	4.	5	6	7	8	9	10	M _{boy} (SD)	M _{girl} (SD)
1. Age		-.15*	-.06	-.12	-.37*	.08	.12 [#]	-.24*	-.004	.21*	9.98 ^a (2.29)	9.59 ^a (2.17)
2. Communal Values (1-5)	-.13 [#]		-.03	.15*	.19*	.03	.13 [#]	.09	.13	-.20*	4.38 ^a (0.59)	4.52 ^b (0.48)
3. Agentic Values (1-5)	.08	-.27*		-.09	.07	-.01	.12	-.04	.06	-.03	2.77 ^a (1.00)	2.48 ^b (0.99)
4. Family Orientation (1-5)	-.05	.18*	-.21*		.03	-.03	-.10	.10	-.03	-.05	3.05 ^a (0.94)	3.38 ^b (0.87)
5. Parent-reported femininity (Z-Score)	.06	-.08	-.09	.12 [#]		.001	.12	.10	.01	-.04	-0.63 ^a (.33)	0.67 ^b (.38)
6. Implicit Female Identification	-.11	.08	.05	-.05	-.04		-.07	.03	.03	.03	-.22 ^a (.39)	.27 ^b (.38)
7. Explicit Female Identification	-.19*	-.001	-.01	.04	.21*	.03		-.03	.08	.000	2.05 ^a (0.85)	4.01 ^b (0.67)
8. Career femininity	.03	-.10	.04	.05	-.02	.10	-.03		.12	-.41*	1.30 ^a (0.57)	2.33 ^b (0.74)
9. Career communality	-.01	.04	-.03	-.10	-.09	.02	-.06	.38*		.01	1.50 ^a (0.71)	1.87 ^b (0.88)
10. Career agency	.16*	-.003	.05	-.17*	-.19*	.009	-.03	-.04	.04		2.11 ^a (0.63)	1.83 ^b (0.73)

Notes. Correlations for boys below the diagonal, correlations for girls above the diagonal. The ethnicity-matched measure of explicit female identification is reported here

* $p < .05$, [#] = $< .10$

Testing for Moderated Mediation by Age

The main manuscript reports a significant mediational model in which gender differences in family-orientation are mediated by gender differences in values. In these supplemental analyses, we examined whether any paths in this mediational model are moderated by age. These analyses were exploratory; we had no *a priori* hypotheses. We tested a moderated mediation model that allowed each path (a, b and c' path of the mediation model) to be moderated by age. As seen in Figure 2, these analyses suggest that age does not moderate gender differences in communal values, gender differences in agentic values, gender differences in family orientation, or the relationship of the two core values to family-orientation. Because we are underpowered to formally detect a moderated mediation, reporting indirect effects for children younger (-1SD in age) vs. older (+1SD) in age might still be informative to readers, even if the age does not formally moderate effects. As can be seen in Table 2, these analyses provide some suggestion that that the gender difference in family-orientation is mediated by core values for children who are at or above the mean age in the sample ($M = 9.84$ years). Mediational effects in younger children (- 1SD) were non-significant. These results suggest that the link between gendered values and aspirations could possibly be getting stronger with age. However, due to sample size constraints, we have inconsistent evidence that the mediational role of values in gender differences in family-orientation differs by age in our sample.

Figure 2. Mediation moderated by Age.

Table S3. Indirect effect sizes for Values mediating Gender Differences in Family Orientation by Age Group.

	Younger (- 1SD) (~ age 7)			Mean Age (~ age 9)			Older (+ 1 SD) (~ age 11)		
	IE	SE	CI. _{.95}	IE	SE	CI. _{.95}	IE	SE	CI. _{.95}
Communal	.006	.010	-.004, .04	.015	.009	.002, .037	.025	.017	.002, .068
Agentic	.008	.013	-.007, .051	.021	.012	.004, .051	.036	.023	.002, .094

Note. Results above display indirect effect sizes for mediational analyses modelling communal and agentic values as mediators of gender differences in family-orientation. Significant effects italicized.

Analyses Controlling for Non-Ethnicity matched explicit GID Measure

In our original analyses, we computed explicit gender identification as participants' responses to all four.

In response to the request from an anonymous reviewer, we recoded gender identification to only include the responses to items that matched the child's ethnicity (or to the 4-item composite for mixed ethnicity for unknown ethnicity children). Below are the results with the original 4-item composite measure used for all children in the sample.

Table S4.

Correlations and Means (SD) by Gender with Original 4-Item Composite Measure of Explicit Gender Identification Measure

	1.	2.	3.	4.	5	6	7	M _{boy} (SD)	M _{girl} (SD)
1. Age		-.15*	-.06	-.12	-.37*	.08	.19*	9.98 ^a (2.29)	9.59 ^a (2.17)
2. Communal Values (1-5)	-.13 [#]		-.03	.15*	.19*	.03	.11	4.38 ^a (0.59)	4.52 ^b (0.48)
3. Agentic Values (1-5)	.08	-.27*		-.09	.07	-.01	.11	2.77 ^a (1.00)	2.48 ^b (0.99)
4. Family Orientation (1-5)	-.05	.18*	-.21*		.03	-.03	-.04	3.05 ^a (0.94)	3.38 ^b (0.87)
5. Gender expression (Z-Score)	.06	-.08	-.09	.12 [#]		.001	.08	-0.63 ^a (.33)	0.67 ^b (.38)
6. Implicit Female Identification	-.11	.08	.05	-.05	-.04		-.05	-.22 ^a (.39)	.27 ^b (.38)
7. 4-item Explicit Female Identification	-.17*	.04	-.12 [#]	.04	.21*	.03		2.08 ^a (0.66)	3.92 ^b (0.51)

Notes. Correlations for boys below the diagonal, correlations for girls above the diagonal. Means that do not share the same subscript differ significantly, $p < .05$.

* $p < .05$, # = $< .10$

Results from linear regressions analyses testing gender, age and their interaction as predictors of the original explicit female identification measures showed a large gender difference in explicit female identification, with girls explicitly identifying more strongly with females than did boys, $\beta = .84$, $SE = .06$, $t(406) = 31.31$, $p < .001$. While we observed no main effect of age, $\beta = -.02$, $SE = .03$, $t(406) = -0.58$, $p = .566$, the main effect of gender was qualified by a significant gender by age interaction, $\beta = .13$, $SE = .06$, $t(405) = 3.62$, $p < .001$. Decomposing this interaction suggested that the tendency to explicitly identify with girls more than with boys increased with age among girls, $\beta = .09$, $SE = .04$, $t(405) = 2.29$, $p = .022$, and decreased with age among boys, $\beta = -.10$, $SE = .04$, $t(405) = 2.86$, $p = .004$.

Results of analyses controlling for children's implicit and original explicit gender identification (H2a) revealed neither explicit identification as female vs. male, $\beta = .02$, $SE = .09$, $t(374) = 0.21$, $p = .833$, nor implicit identification as female vs. male, $\beta = .04$, $SE = .06$, $t(374) = 0.62$, $p = .539$, significantly predict children's family vs. career orientation (over and above dichotomous gender and

values). Importantly, both communal, $\beta = .12$, $SE = .05$, $t(374) = 2.37$, $p = .018$, and agentic values, $\beta = -.11$, $SE = .05$, $t(374) = -2.22$, $p = .027$, remained significant predictors of family vs. career orientation when controlling for these two gender identification variables. Moreover, the indirect effects of child gender on family vs. career orientation through communal, $IE = .01$, $SE = .01$, $CI_{.95} (.002, .04)$, and agentic values, $IE = .02$, $SE = .01$, $CI_{.95} (.001, .05)$, also remained significant, though small.

Analyses Controlling for Age and Experimenter Gender.

We wanted to ensure that our key findings (gender differences in communion and agency that relate to gender differences in family-orientation) were not confounded with children's age or the gender of the research assistant that led them through the study. To test this, we conducted mediational analyses with the PROCESS macro (Hayes, 2013), entering participant gender as a predictor, and communal and agentic values as simultaneous mediators, predicting children's self-reported family- (vs. careers) orientation (all standardized) as before. In addition, we now added experimenter gender (0=male/1=female) and age (z-scored) as control variables for both the a and b-paths into this model. Results were unchanged by including these covariates (main model results included in parentheses for easier comparison): boys' in our data tended to endorse communal values less, $\beta = .11$, $SE = .05$, $t(393) = 2.23$, $p = .026$ (previous: $\beta = .12$, $SE = .05$, $t(406) = 2.43$, $p = .015$), and agentic values more, $\beta = -.15$, $SE = .05$, $t(393) = -2.94$, $p = .003$ (previous: $\beta = -.14$, $SE = .10$, $t(406) = -2.93$, $p = .004$), than did girls. Also as in previous analyses, anticipating a family- rather than a career-oriented future was predicted by both higher communal values, $\beta = .14$, $SE = .05$, $t(391) = 2.55$, $p = .011$ (previous: $\beta = .14$, $SE = .05$, $t(395) = 2.81$, $p = .005$), and lower agentic values, $\beta = -.13$, $SE = .05$, $t(391) = -2.64$, $p = .009$ (previous: $\beta = -.13$, $SE = .05$, $t(395) = -2.56$, $p = .011$). In addition, significant indirect effects consistent with both boys' lower communal, $IE = .01$, $CI_{.95} (.002, .004)$, $p < .05$, and higher agentic values, $IE = .02$, $CI_{.95} (.003, .05)$, $p < .05$, accounting for their relatively low family-orientation remained significant with these controls. Age itself predicted less endorsement of communal values on average, $\beta = -.15$, $SE = .05$, $t(393) = -3.20$, $p = .002$, but not agentic values or family-orientation, $\beta s < .05$, $ts < 0.95$, $ps > .34$. Experimenter gender

predicted none of these outcomes significantly, $\beta s < .12$, $ts < 0.93$, $ps > .35$. Additional analyses also tested whether RA gender moderated any of the mediational paths, using moderated mediational analyses with the PROCESS macro (Hayes, 2013; Model 58). Results from these analyses also suggested that researcher gender did *not* moderate the relationship between gender and communal values, the relationships between gender and agentic values, or the relationships between each type of value and family vs. career orientation, $\beta s < .08$, $ts < 1.63$, $ps > .104$. Together, these analyses suggest that our main effects are robust when controlling for child age and gender of the experimenter, although we caution that there was only a single male RA who ran only 62 children (15 % of sample).

Section 3: Understanding Children’s Open-ended Career Aspirations

Part 3 of our supplementary materials focuses on analyses of an additional measure of aspirations – children’s open-ended reports of what they want to be when they grow up. In addition to values predicting future family vs. career orientation, we initially thought it was possible that boys’ and girls’ values would also predict what kinds of specific careers they aspire to. We thus asked children to report what they “want to be when they grow up” and coded their responses for their gender stereotypicality (feminine vs. masculine career) and the extent to which they afforded communal goals, as well as the extent to which they afforded agentic goals. We predicted that boys’ (as compared to girls’) would nominate careers that would be rated as less feminine, less communal, but possibly more agentic by our blind coders. In addition, we expected that children’s own communal values (and possibly their agentic values) would predict more feminine, more communal, and possibly less agentic career nominations. Because the large amount of missing data on this variable precludes direct comparison to our other outcome measures, and does not relate to any other variables in our dataset, we decided to move these analyses into the supplementary section.

Method

Open-ended Measure. To assess children's aspired careers, we asked children "what do you want to be when you grow up?". Open ended responses were typed by the research assistant and coded for 3 characteristics by four coders blind to the gender of participants; two coders assessed: 1) *female vs. male stereotypicality* (using coding scheme from Croft et al., 2014; $ICC = .87$), and two separate coders assessed the degree to which each career would afford: 2) *communal goals* such as helping others ($ICC = .79$), and 3) *agentic goals* such as achieving personal success ($ICC = .73$). Each characteristic was scored on a scale of 1 to 3 (see word-for-word coding instructions for coders below). Missing data was observed for 85 children who gave made uncodable responses (e.g., "Crown", "retired") or gave no response, resulting in a substantially lower sample size for analyses including this variable.

Coding Schemes for Open Ended Responses

Coding scheme 1 – Femininity vs. Masculinity.

"Your task will be to read through each participant's answers and assign each answer a code. Note that both adults and kids are in this dataset, but that should not matter. The code will indicate the extent to which each of the following variables are more stereotypically male or stereotypically female in nature. Each of you will do so in their own excel document.

- Place the code in the column NEXT to the participants answer, with will be labeled like the variable + CODED. So, for example, there will be a column for "Fav_Thing" in which participants reported what their favorite activity is. Next to it, there will be a column called "Fav_ThingCODED" in which you will enter the numerical code.

- **If** a participant has *left an answer blank*, please leave the corresponding space in the "coded" column blank as well.

- **If** you come across an answer that is essentially "*uncodable*" for one reason or another, please put an X in the corresponding space in the "coded" column. Then, in a separate document, please keep a log/record of all the participant numbers and variable names you deemed "uncodable".

Variable Descriptions:

1) Label: fav_todo

Question: What is your favorite thing to do?

rating:

In our society, some **activities** are seen as stereotypical of girls (e.g. playing with dolls, playing dress-up) while others are seen as stereotypical of boys (e.g. playing with trucks, playing hockey). In addition, some activities are seen as more or less gender neutral. On the following scale, please rate whether the activity indicated by the child is more typically connected to males, to females or reflects a gender-neutral activity.

- 1 = Activity is more stereotypical of **males**
- 2 = Activity is gender neutral
- 3 = Activity is more stereotypical of **females**

Coding Scheme 2 – Communion vs. Agency.

“For each of the career aspirations our child participants listed, we would like you to think about how communal and how agentic the job is. For each job, ask yourself:

To what extent does this job allow people to fulfill communal goals, and to what extent does this job allow people to fulfill agentic goals.

Communal Goals:

Goals surrounding serving other's needs, helping other people, caring for others, making social connections

Agentic Goals:

Goals surrounding self-promotion, success, achievement, status, competence

So, for each answer a child provided you will give a score under two variables. Give scores as follows:

Communal_Jobs

- 1 = Not at all Communal/Somewhat un-communal*
- 2 = Neutral/Somewhere in between*
- 3 = Definitely Communal*

Agentic_Jobs

1 = Not at all Agentic/Somewhat un-agentic

2 = Neutral/Somewhere in between

3 = Definitely Agentic

IMPORTANT NOTES:

- *When the kid did not provide an answer, leave the variables blank*
- *If you feel the answer might not be codable (like sometimes kids will say “I want to be unicorn), please mark the column red and put “NA”*
- *Make sure you give the same value to the same job always. (e.g. Nurse always a 3 on communal, and Banker always a 3 on Agentic). Sorting the columns like I did should help with that.*
- *Make sure you don't resort the columns separately to avoid that subject numbers and answers don't match anymore.”*

Results

Age and Gender Differences. To first examine gender and age effects on children's aspired careers, we entered children's gender (male = 0, female = 1) and age (standardized) as predictors on step 1, and their interaction on step 2 of hierarchical linear regression models predicting coder-rated 1) femininity (vs. masculinity), 2) communality, and 3) agency of children's nominated careers. As expected, aspired careers nominated by boys were rated as less female-stereotypic, $\beta = .61$, $SE = .07$, $t(323) = 14.01$, $p < .001$, less communal, $\beta = .22$, $SE = .09$, $t(323) = 4.13$, $p < .001$, and more agentic, $\beta = -.19$, $SE = .07$, $t(323) = -3.54$, $p < .001$, than careers nominated by girls. After accounting for gender, older children's nominated careers were more agentic on average, $\beta = .19$, $SE = .04$, $t(323) = 3.50$, $p = .001$, and age and gender interacted in predicting the femininity of aspired careers, $\beta = -.12$, $SE = .07$, $t(322) = -2.04$, $p = .037$. Decomposing this interaction revealed that older girls reported less female-stereotypic aspired careers than did younger girls, $\beta = -.21$, $SE = .05$, $t(322) = -3.23$, $p = .001$. For boys, age did not predict the femininity of their aspired occupations or, $\beta = -.03$, $t(322) = -0.47$, $p = .637$. Age and age by gender interactions did not predict other characteristics of aspired careers.

Values and Characteristics of Aspired Careers? To test whether gender differences in value endorsement could also help explain gender differences in 1) femininity (vs. masculinity), 2) communal, or 3) agentic goal-affordance of the aspired careers a child nominated, we conducted mediational analyses with the PROCESS macro (Hayes, 2013), entering gender as a predictor, and communal and agentic values as simultaneous mediators, predicting each of these codings of children's aspired careers as outcomes. Note that our sample size for these analyses are much smaller because a number of children gave either no aspired career or gave answers that could not be coded as masculine or feminine.

Since a-path analyses (gender differences in values) are essentially the same as those reported in the main manuscript, we here concentrate on the novel test of the relationship between children's core values and characteristics of their aspired career. Results revealed communal values did not significantly predict femininity, $\beta = -.01$, $SE = .05$, $t(328) = -.17$, $p = .866$, communality, $\beta = .09$, $SE = .06$, $t(322) = 1.47$, $p = .142$, or agency-ratings of children's aspired careers, $\beta = -.10$, $SE = .06$, $t(322) = 1.65$, $p = .101$. Similarly, agentic values did not significantly predict femininity, $\beta = -.01$, $SE = .04$, $t(328) = -0.12$, $p = .904$, communality, $\beta = .03$, $SE = .06$, $t(322) = 0.56$, $p = .573$, or agency-ratings of children's aspired careers, $\beta = -.005$, $SE = .06$, $t(322) = -0.09$, $p = .930$. These results provide little evidence that gender differences in endorsement of communal and agentic values can account for gender differences in what kind of specific careers children aspire to in the age range our sample.

As we did with family vs. career-orientation as an outcome in the main manuscript, we also repeated analyses controlling for 1) implicit gender identification, 2) explicit gender identification and 3) parent-rated femininity in the relationship between children's values and the characteristics of their aspired careers (separate models for each control to preserve degrees of freedom). We might have expected, for example, that these gender-specific variables could be more predictive of gender-typical career aspirations than core values. However, results revealed that parent-reported femininity did not significantly predict more femininity ratings, $\beta = .09$, $SE = .10$, $t(302) = 0.96$, $p = .339$, communality ratings, $\beta = -.07$, $SE = .12$, $t(297) = -0.57$, $p = .566$, or agency ratings of children's' aspired careers, $\beta = -$

.21, $SE = .12$, $t(297) = -1.81$, $p = .072$. In addition, implicit female identification did also not significantly predict more feminine aspired careers, $\beta = .05$, $SE = .05$, $t(313) = 0.87$, $p = .383$, more communal aspired careers, $\beta = .02$, $SE = .06$, $t(309) = 0.24$, $p = .808$, or more agentic aspired careers, $\beta = .05$, $SE = .07$, $t(309) = 0.76$, $p = .447$. Similarly, explicit female identification did not significantly predict more feminine aspired careers, $\beta = -.03$, $SE = .08$, $t(327) = -0.34$, $p = .736$, more communal aspired careers, $\beta = .004$, $SE = .10$, $t(321) = 0.04$, $p = .971$, or more agentic aspired careers, $\beta = -.04$, $SE = .10$, $t(321) = -0.43$, $p = .669$. Importantly, regardless of whether we controlled for implicit gender identification, explicit gender identification, or parent-rated gender expression, communal values, $\beta s < .11$, $ps > .076$, and agentic values, $\beta s < .05$, $ps > .800$, remained non-significant predictors of the three characteristics of children's aspired careers.

Discussion

We expected that to the extent that boys and girls differ in their endorsement of communal and agentic values, they would nominate different types of aspired careers. Our data suggested that careers chosen by boys vs. girls differed both in their femininity and their value affordance; as expected, boys' nominated careers that were less feminine and communal, but more agentic, than did girls. This pattern is similar to patterns of career preferences seen in past research (Weisgram et al., 2010). However, while these results suggest gender-stereotypical preferences in aspired careers similar to research with adults (e.g., Evans & Diekmann, 2009), we found no evidence for a relationship between children's core values and specific career orientation. In fact, these career preferences were unrelated to any of our measured variables from parents or children.

Perhaps the most likely explanation for these null findings is that our measure of career orientation was not reliable and/or sensitive enough to detect effects. In the adult literature, career interest is measured with ratings to a large set of careers, leading to a more reliable scale (Evans & Diekmann, 2009). In comparison, children in our sample self-reported a single career.

A somewhat different possibility is that any kind of a career measure might be insensitive if children's concrete knowledge of careers is actually impoverished. Children's responses were rated by coders on a 3-point scale to assess goal affordance or stereotypicality. If children do not yet have to realistically think about what careers are actually viable options for them (as illustrated by answers like "unicorn"), then it is unlikely that children consider whether a career will match their goals in the same way adults might. Thus, children's beliefs about these careers might be relatively disconnected to how coders have rated them. If children's understanding of which goals certain careers afford has not fully developed by this age, we would not expect a significant relationship between children's more basic values and their stated career preferences.

Finally, data loss is still a real concern for detecting hypothesized relationships. Sensitivity analyses suggest that at the sample size of 325, the minimal effect size to be detected with 85% power is $r = .16$. The sample is not sufficiently powered to detect effects smaller than this, even if such effects were to exist. Hence, future studies are needed to address whether boys' and girls' core values predict how they evaluate very specific careers using an adequately sized sample size.