

Preregistration:
The Relationship Between Personal Values, Personality, and Psychopathology in Middle Childhood

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1. Research Question/Hypothesis

The associations between personality traits and psychopathology in children are robust (e.g., De Bolle et al., 2012; Kushner, 2015). Yet, personal values, which are defined as guiding life principles that influence individuals' behaviors, decision-making, and perceptions of events (Parks & Guay, 2009), are another branch of individual differences that might shed light on important behavioral outcomes such as psychopathology. Limited work has investigated Schwartz's theory of personal values (Schwartz, 1992) in the context of psychopathology in adults (e.g., Hanel & Wolfradt, 2016) and found that certain personal values are associated with psychopathological constructs (e.g., achievement and power positively correlate with aggression and violence; Benish-Weisman, 2015, Knafo et al., 2008). However, these associations have not been examined explicitly in children. Furthermore, gender and racial/ethnic group membership has not been considered when examining the values-psychopathology association in adults, leaving to question if either gender or ethnic group membership influences the strength of the values-psychopathology association in children.

Given known associations between child personality and psychopathology, it is important to examine the extent to which personal values may increment the prediction of psychopathology (beyond personality traits). In addition, personality traits and values may interact in increasing either risk or resiliency for psychopathology in childhood. The current study is designed to inform these research questions.

In the present study using a cross-sectional sample of middle childhood-aged children, we aim to answer the following research questions:

1. What are the associations between child personal values and broad psychopathology domains (i.e., internalizing and externalizing problems) in children?
 - a. Do these correlational associations differ by gender and/or race/ethnicity?
2. Do children's personal values increment the prediction of psychopathology beyond the Five Factor Model personality traits?
3. Do children's personal values moderate the associations between child personality traits and psychopathology?

We conducted an extensive literature review to develop *a priori* hypotheses on the associations between personal values and internalizing and externalizing psychopathology. However, we found the literature and their findings on these associations to be too sparse and inconsistent to delineate strong hypotheses about the direction and/or size of these associations, and this was especially true for research with younger populations. For this reason, we elected to proceed with the following study with a descriptive and an exploratory approach. For a chart that delineates the previous literature on values-psychopathology associations, conducted and compiled prior to any data analysis, see our OSF page

(<https://mfr.osf.io/render?url=https://osf.io/67mqs/?direct%26mode=render%26action=download%26mode=render/>).

2. Sampling Plan (or specify existing/archival data; if so, report data collection period)

Data collection for this project has been completed. We will be using archival data from the Child Personality and Behavior Outcomes Study - Houston, which was conducted at the University of Houston from 2012 to 2015. The existing dataset is held within a password-protected server to which all authors have access.

3. Sample Characteristics

Participants from this study consist of a total of 350 children (52.86% female) and their caregivers. The ages for the participants ranged from 8-11 ($M_{age} = 9.81$, $SD = 0.66$). This sample was ethno-racially diverse; caregivers reported their child's racial/ethnic background as the following: 29.71% African American, 4.29% Asian American, 24.86% Hispanic/Latinx, 30% White, 10.57% multiple races, and 0.57% did not report racial/ethnic information. These participants were recruited from a large metropolitan area in the southwest United States. Recruitment efforts included the following:

- (a) contacting caregivers via the use of a database of mothers with children ages 6-10 years maintained at the University of Houston;
- (b) recruiting through Houston Independent School District directory information;
- (c) distributing flyers to families in the community.

The sample size for the current study was determined based on the existing archival data. Inclusion criteria at the time of data intake included children who were ages 8-11 years and their custodial caregivers, fluency in English for the child, and fluency in either English or Spanish for the caregiver. Children who were diagnosed with autism spectrum disorders, intellectual disability, or other significant neurodevelopmental disorders were excluded from the study. The following are reasons for missing data:

- (a) questionnaires that were not completed in the lab at the time of data collection were sent home for the caregiver to complete and return to the lab via mail; some questionnaires were never returned;
- (b) language barriers prevented some caregivers from completing the questionnaires; specifically, some Spanish-speaking caregivers could not complete the relevant questionnaires;
- (c) Two caregivers discontinued participation.

4. Previous exposure to data (variables or sample)

These data were originally collected between 2012 and 2015 as part of a larger lab-based study conducted at the University of Houston. As such, this dataset has been used to investigate various research questions. The references listed below have previously used this dataset. The authors of the current project have knowledge of the descriptive statistics of the participants, associations between the personal values measure (PVQ-C) and the personality inventory (ICID-S), and associations between the personality and psychopathology (CBCL) measures.

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5. Data Access

We currently have access to the data which are stored in a private server that is password protected. All data, measures, and materials are accessible by this server only by members of our lab.

6. List of Measures

- a) **Portrait Values Questionnaire-Child Version (PVQ-C; Schwartz, 2003).** The PVQ-C is a 21-item administered self-report questionnaire that assesses 10 personal values in children: Self-Direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition, Benevolence, and Universalism. The items on the survey are in the form of a vignette that describes a person (with the person's gender pronouns matching the participant's preferred gender pronouns), followed by the questions: "How much is this person like you?" Children were read the vignettes by research assistants and responded to each item on a 6-point Likert-type scale ranging from (1) *Very much like me* to (6) *Not at all like me*.
- b) **Child Behavior Checklist (CBCL; Achenbach & Rescorla, 2001).** The CBCL is a 120-item parent-report questionnaire that assesses child behavioral problems. The

presence of problems in children was assessed by caregivers on a 3-point Likert-type scale ranging from (0) *Not true (as far as you know)* to (2) *Very true or often true*.

- c) **Inventory of Children's Individual Differences – Short Version (ICID-S; Deal et al., 2007; Halverson et al., 2003).** The ICID-S is a 50-item parent-report questionnaire that assesses the higher-order five-factor model personality traits in children: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Ratings were made across a 7-points Likert-type scale ranging from (1) *Much less than the average child or not at all* to (7) *Much more than the average child*.

7. List of Variables

- a) **Personal values.** Personal values in children will be measured via the PVQ-C. For our analyses, we will use the 10 scales that correspond to the 10 universal values: Self-direction, Stimulation, Hedonism, Achievement, Power, Security, Conformity, Tradition, Benevolence, and Universalism. We all also use the four higher-order domains of personal values that consist of these 10 scales: Openness to Change, Self-enhancement, Conservation, and Self-transcendence. Item responses were reverse coded such that higher means reflect a higher endorsement of the value. To control for artificial response styles (e.g., acquiescence bias, scale use differences), we ipsatized all scores in line with the recommendations of Schwartz and colleagues (1997). To do this, we calculated the means for each personal value by averaging their items. Next, we calculated the mean of all 21 items from the PVQ-C; finally, we partialled out the personal value means by subtracting the 21-item mean from the personal value mean. This results in an ipsatized centered score for each participant.
- b) **Internalizing and Externalizing psychopathology.** Behavioral problems in children will be measured via the CBCL. Items on the CBCL assess for eight problem behavior scales. Five of these eight scales (Aggressive Behavior, Anxious-Depressed, Rule-breaking Behavior, Somatic Complaints, Withdrawn-Depressed) load onto two broader scales, Internalizing (INT) and Externalizing (EXT) Problems. We will use the INT and EXT scales for analyses. Scores for the INT/EXT scales were computed by using sum scores.
- c) **Personality traits.** Children's personality traits will be examined using the ICID-S. Specifically, we will examine the 5 higher-order traits that the ICID-S measures (i.e., Neuroticism, Extraversion, Openness to Experience, Agreeableness, Conscientiousness). We will score the ICID-S personality traits by averaging the items that index each personality trait.

8. Relevant Procedures

Data for the present study were collected from an intake visit of the research project. Ethics approval was obtained by the Institutional Review Board at the University of Houston. Caregivers and children were briefed together about the study and what it entails. Caregivers

were asked to give written consent, while the children were asked to give verbal assent. Consent forms, the ICID-S, and the CBCL questionnaires were given to the caregiver to complete. Children were administered the PVQ-C verbally by a research assistant, who recited the question to the child and recorded their response on the Likert scale. Questionnaires were returned at the end of the lab visit. Incomplete forms were sent home with the family to be completed and returned to the lab via post mail. Families received compensation for their participation in the study, including monetary compensation for the caregiver (gift card) and two small gifts for the child (puzzle, frisbee, and/or gift card).

9. Plans for Data Analysis

- a) Associations between PVQ-C personal values scales and the CBCL INT/EXT scales will be examined via Pearson correlation coefficients. We will also examine Pearson correlations between the PVQ-C personal values and the INT/EXT scales separately by gender and by race/ethnicity in children. We will use Fisher's r -to- z transformations and then z -tests to test whether significant values-psychopathology associations differ across gender or racial/ethnic groups.
 1. To interpret the Pearson correlations, we will use the effect size guidelines provided by Funder & Ozer (2019), where effect sizes are deemed as follows: $r = .05$ is a very small effect, $r = .10$ is a small effect, $r = .20$ is a medium effect, $r = .30$ is a large effect, $r = .40$ is a very large effect.
- b) Two sets of hierarchical regression models (one with INT as the dependent variable, one with EXT as the dependent variable) will be estimated to further examine the incremental contribution of personal values, above and beyond children's personality traits, to account for variance in INT/EXT psychopathology. At each step, incremental change will be examined via substantial additional variance accounted for via R^2 . Change in R^2 will be tested using an F -test.
 1. INT/EXT psychopathology will be entered as the DV, then models will be constructed in the following steps:
 - i. All 5 higher-order personality traits will be entered in Step 1.
 - ii. All 10 personal values from the PVQ-C will be entered in Step 2.
 1. We will conduct secondary analyses by estimating the above regression models controlling for EXT when INT is the dependent variable, and vice versa.
 2. For regression analyses, we will report standardized and unstandardized regression coefficients, standard errors, 95% confidence intervals, F statistics, and p -values.
 3. Given the lack of *a priori* hypotheses regarding associations for specific values and the number of values included in the model, interpretation will focus on the overall incremental variance the values explain as estimated by R^2 rather than on specific regression terms.
- c) Linear regression models with interaction terms will be estimated to test for the moderation effect of personal values. A total of 20 models will be estimated, with INT and EXT psychopathology being entered as the dependent variables. Personality

traits and the higher-order personal values domains will be entered as the independent variables. Given the large number of potential variables and the lack of previous research on these relationships, we sought to limit the overall number of tests as follows: personality traits entered in the models were chosen *a priori* based on the previous literature on the associations between children’s personality traits and psychopathology (e.g., Soto & Tackett, 2015). In other words, these analyses focus on whether child values moderate known personality-psychopathology associations. If a significant interaction term is detected, a simple slope post hoc approach (Holmbeck, 2002) will be used to better understand the direction of our findings. See below for a table of the regression equations with interaction terms.

1. For INT psychopathology, 8 models will be estimated with Neuroticism and Extraversion as the independent variables and each of the four values domains (i.e., Openness to Change, Self-Enhancement, Conservation, Self-Transcendence) entered in separate models. Next, an interaction term between the personality trait and the value domain will be entered (e.g., Neuroticism x Openness to Change). See the table below for the specific models.
2. For EXT psychopathology, 12 models will be estimated with Neuroticism, Agreeableness, and Conscientiousness as the independent variables along with the values domains. An interaction term between the personality trait and the value domain will be entered (e.g., Agreeableness x Self-enhancement).

Model	Internalizing Psychopathology	Model	Externalizing Psychopathology
1	$INT = b_0 + b_1*N + b_2*OTC + b_3*N*OTC + e$	1	$EXT = b_0 + b_1*N + b_2*OTC + b_3*N*OTC + e$
2	$INT = b_0 + b_1*N + b_2*SE + b_3*N*SE + e$	2	$EXT = b_0 + b_1*N + b_2*SE + b_3*N*SE + e$
3	$INT = b_0 + b_1*N + b_2*Cons + b_3*N*Cons + e$	3	$EXT = b_0 + b_1*N + b_2*Cons + b_3*N*Cons + e$
4	$INT = b_0 + b_1*N + b_2*ST + b_3*N*ST + e$	4	$EXT = b_0 + b_1*N + b_2*ST + b_3*N*ST + e$
5	$INT = b_0 + b_1*E + b_2*OTC + b_3*E*OTC + e$	5	$EXT = b_0 + b_1*A + b_2*OTC + b_3*A*OTC + e$
6	$INT = b_0 + b_1*E + b_2*SE + b_3*E*SE + e$	6	$EXT = b_0 + b_1*A + b_2*SE + b_3*A*SE + e$
7	$INT = b_0 + b_1*E + b_2*Cons + b_3*E*Cons + e$	7	$EXT = b_0 + b_1*A + b_2*Cons + b_3*A*Cons + e$
8	$INT = b_0 + b_1*E + b_2*ST + b_3*E*ST + e$	8	$EXT = b_0 + b_1*A + b_2*ST + b_3*A*ST + e$
		9	$EXT = b_0 + b_1*C + b_2*OTC + b_3*C*OTC + e$
		10	$EXT = b_0 + b_1*C + b_2*SE + b_3*C*SE + e$
		11	$EXT = b_0 + b_1*C + b_2*Cons + b_3*C*Cons + e$
		12	$EXT = b_0 + b_1*C + b_2*ST + b_3*C*ST + e$

Note: INT = CBCL Internalizing Psychopathology, EXT = Externalizing Psychopathology; N = ICID Neuroticism, E = ICID Extraversion, A = ICID Agreeableness, C = ICID Conscientiousness; OTC = PVQ-C Openness to Change, SE = PVQ-C Self-Enhancement, Cons = PVQ-C Conservation, ST = PVQ-C Self-Transcendence; *e* = residual term

10. Data Analysis Considerations

a) Internal Consistency

Internal consistency will be examined using Cronbach’s alpha for the PVQ-C scales, ICID-S scales, and the CBCL INT/EXT scales. The evaluation of Cronbach’s alpha for all scales will be based on the rules of thumbs provided by George and Mallery (2003): Excellent (>.9),

Good (>.8), Acceptable (>.7), Questionable (>.6), Poor (>.5), Unacceptable (<.5). Cronbach's alphas for the PVQ-C scales in this child sample will be similar to adult samples (e.g., Schwartz et al., 2002) and fall in the "poor" & "unacceptable" ranges due to the low item numbers that index each scale. However, the PVQ-C demonstrates convergent and discriminant validity with children's personality traits (as measured by the ICID-S; España et al., in prep), as it does in the adult literature (e.g., Fischer & Boer, 2015). Therefore, despite the limitations of the PVQ-C, we are confident that the PVQ-C is a suitable measure for personal values in children.

b) Integration with issues of sample size, power, expected effect size, etc.

Initial power analyses were conducted using the WebPower package in R. Power analyses for zero-order correlations indicate that a sample of $N = 350$ yields a power of 80.5% power to detect a small correlation ($r = .15$) and 96.6% power to detect a medium correlation ($r = .20$). Additionally, power analyses for regression models indicate that a sample of $N = 350$ yields a power of 99.9% to detect medium effect sizes when alpha is set at .05 with 3 predictors in the regression model. Thus, the sample size is adequate for the proposed analyses.

We plan to use the k-fold cross-validation (CV) method. This method is useful for minimizing the risk of overfitting (de Rooij & Weeda, 2020), a limitation to our regressions models delineated in section 9b. Additionally, k-fold CV can speak to the generalizability of our results because we maximize our out-of-sample prediction that personal values has on psychopathology. Therefore, using k-fold CV can more accurately speak to the predictive validity of personal values on psychopathology.

1. Using each of the regression models delineated in Section 9b, we plan to estimate a 5-fold CV with our sample of 350 participants, with 70 participants resampled within each fold. Using these new 5 subsamples, one subsample will be used as a calibration set (i.e., test set) while the other subsamples will be used as the validation sets (i.e., training sets). For each validation, we will use 200 repetitions and will plot the number of wins for each test set. Finally, we will use Root Mean Square Error of Prediction ($RMSE_p$) and will identify the best model using the lowest prediction error.

c) Ideal scenario – fully registered syntax/code

Upon completion of the manuscript of this project, we will upload the code for all analyses onto our OSF page.

d) How to deal with data exclusions? Outliers? Transforming variables?

We plan to evaluate variable skewness and kurtosis in our descriptive statistics. We do not plan to transform any variables to normality.

e) What is the plan for detecting and dealing with model/variable assumption violations (e.g., distributional assumptions, randomization doesn't go according to plan)?

We will evaluate skewness and kurtosis for all our variables of interest. However, we do not anticipate our variables to be highly skewed or kurtotic.

f) How do deal with missing data?

For reasons why there is missing data, see Section 3. To account for the missing data, we will use Full Information Maximum Likelihood (FIML), using the *lavaan* package in R. This method is useful because it estimates the value of the population parameters by determining the value that maximizes the likelihood based on all the observed variables for each case (Woods et al., 2021).

We conducted an initial review of the missing data for this dataset and found that:

- (a) 332 (94.86%) participants have complete data (i.e., no missing items) for the PVQ-C, meaning that 18 participants (5.14%) have at least one missing item from the PVQ-C.
 - i. Of the 18 participants with missing data, 3 participants (0.86%) have completely missing data from the PVQ-C.
- (b) 226 (64.57%) participants have complete data for the CBCL, meaning that 124 participants (35.43%) have at least one missing item from the CBCL.
 - ii. Of the 124 participants with missing data, 25 participants (7.14%) have completely missing data from the CBCL.
- (c) 274 participants (78.29%) have complete data for the ICID-S, meaning that 76 participants have at least one missing item from the ICID-S.
 - iii. Of the 76 participants with missing data, 43 participants (12.29%) have completely missing data from the ICID-S.

11. Follow-up analyses

Currently, we do not plan to run follow-up analyses with the current data. Should we decide to conduct additional exploratory analyses, those analyses will be labeled as such in the manuscript.

12. Statement regarding funding sources for data and other conflicts of interest

The authors declare no known conflicts of interest at the time of preregistration.

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