




# The Development of Shyness from Late Childhood to Adolescence: A Longitudinal Study of Mexican-Origin Youth

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Katherine M. Lawson<sup>1</sup> , Brenna L. Barrett<sup>1\*</sup>, Ryan J. Cerny<sup>1\*</sup>,  
Kaitlyn E. Enrici<sup>1\*</sup>, Juan Eduardo Garcia-Cardenas<sup>1\*</sup>, Catherine E. Gonzales<sup>1\*</sup>,  
Isidro D. Hernandez<sup>1\*</sup>, Carrina P. Iacobacci<sup>1\*</sup>, Tiffanie Lin<sup>1\*</sup>, Nancy Y. Martinez  
Urieta<sup>1\*</sup>, Patricia Moreno<sup>1\*</sup>, Marissa G. Rivera<sup>1\*</sup>, Devin J. Teichrow<sup>1\*</sup>,  
Anabel Vizcarra<sup>1\*</sup> , Camelia E. Hostinar<sup>1</sup>, and Richard W. Robins<sup>1</sup>

## Abstract

Shyness, the tendency to be inhibited and uncomfortable in novel social situations, is a consequential personality trait, especially during adolescence. The present study examined the development of shyness from late childhood (age 10) through adolescence (age 16) using data from a large, longitudinal study of Mexican-origin youth ( $N = 674$ ). Using both self- and mother-reports of shyness assessed via the *Early Adolescent Temperament Questionnaire-Revised*, we found moderate to high rank-order stabilities across 2-year intervals and a mean-level decrease in shyness from age 10 to 16. Anxiety and depression were associated with higher initial levels of shyness, and anxiety was associated with greater decreases in shyness from age 10 to 16. Contrary to predictions, neither nativity (country of birth) nor language proficiency (English, Spanish) was associated with the development of shyness across adolescence. Thus, youth generally decline in shyness during adolescence, although there is substantial individual variability in shyness trajectories.

## Keywords

shyness, longitudinal methodology, development, acculturation, anxiety, depression

Imagine a child walking into class on the first day of fifth grade. They see various faces—some old, others new—and are assigned to sit next to a student they have never met before. How does the child react as they approach their new desk-mate? Would this same child react differently if it were their first day of seventh, ninth, or 11th grade? It is likely that their reaction will depend, in part, on their temperament, or individual differences in reactivity and self-regulation that are present from an early age and relatively enduring (Rothbart, 2007, 2011; Rothbart et al., 2000). One domain of temperament, shyness, which involves inhibition and discomfort in novel social situations, may be especially important in this social context. Although there is a robust literature on shyness and related constructs, few longitudinal studies have examined the development of shyness during adolescence, and even fewer have done so with a sample of ethnic minority youth. Addressing this gap is important, as there is substantial research linking shyness to clinical outcomes that increase in prevalence during adolescence, such as social anxiety disorder (Chavira et al., 2002; Clauss & Blackford, 2012). In the present study, we examine the development of shyness from late childhood

(age 10) through adolescence (age 16) using data from a large, longitudinal study of Mexican-origin youth ( $N = 674$ ). In addition, we examine whether symptoms of psychopathology (i.e., anxiety and depression) and cultural factors (i.e., English/Spanish language proficiency and nativity) at age 10 are correlated with shyness trajectories across adolescence.

## Shyness

Shyness is a complex trait that can be understood using multiple frameworks of personality/temperament.<sup>1</sup> From a Big Five perspective, shyness is an interstitial trait involving low Extraversion and Openness and high Neuroticism

<sup>1</sup>University of California, Davis, USA

\*Authors with an \* are listed in alphabetical order.

### Corresponding Author:

Katherine M. Lawson, Department of Psychology, University of California, Davis, One Shields Ave., Davis, CA 95616, USA.  
Email: kmlawson@ucdavis.edu

(Baardstu et al., 2020; Kwiatkowska & Rogoza, 2019). Shiner and Caspi (2003) conceptualize shyness as a “multi-dimensional trait combining elements of low approach, high negative emotionality, and high behavioral avoidance” (p. 5). Furthermore, according to Rothbart’s model of temperament, shyness involves a slow or inhibited approach and discomfort in novel social situations (Rothbart et al., 2000). In the present study, we conceptualize shyness using Rothbart’s definition. The vast majority of research on the development of shyness has focused either exclusively on childhood or has tracked changes in shyness across decades of life, but using only a few assessments (e.g., Schmidt et al., 2017; Tang et al., 2017, 2020). Consequently, little is known about the more fine-grained development of shyness during the adolescent years.

### *Stability and Change in Shyness During Adolescence*

The handful of longitudinal studies of shyness during adolescence have quantified stability and change in two ways: rank-order stability and mean-level change. Rank-order stability reflects the degree to which the relative ordering of individuals on shyness is maintained over time, whereas mean-level change refers to changes in the average level of shyness in a population. Previous studies examining the rank-order stability of shyness have found moderate to high levels of stability across adolescence (test–retest correlations of .56–.67 for 4–5 years) when shyness was assessed using parent-reports (Brandes et al., 2020; Karevold et al., 2012; Laceulle et al., 2012). Youth self-reported shyness tends to show lower, but still moderate, rank-order stability, such as 1-year test–retest correlations of .58 to .62 and a 2-year correlation of .52 from age 10 to 12 (Hassan et al., 2021). Overall, shyness tends to show moderately high rank-order stability during the adolescent years, with higher stabilities observed for parent- (vs. self-) reports.

Research on mean-level change in shyness across childhood and adolescence is much less consistent, with some finding increases (Karevold et al., 2012; Strickhouser & Sutin, 2020), some finding decreases (Barzeva et al., 2019; Laceulle et al., 2012; Zohar et al., 2019), and others finding no mean-level change (Brandes et al., 2020). These inconsistencies may be due, in part, to differences in assessment methods, specifically the use of self-reports (e.g., Zohar et al., 2019) versus parent-reports (Brandes et al., 2020; Laceulle et al., 2012). Although empirical evidence is mixed, some theoretical considerations suggest that shyness should increase during the adolescent years, given normative increases in self-consciousness and social anxiety disorder, sensitivity to social rejection, and the importance of peer and romantic relationships (Andrews et al., 2021; Cheek et al., 1986; Hassan et al., 2021; Poole et al., 2020; Tang et al., 2017; Wright et al., 2020), as well as the many puberty-related hormonal and socioemotional changes that might heighten distress in social interactions.

The vast majority of studies examining stability and change in shyness have used samples of predominantly European-background participants, which limits the generalizability of the findings because cultural factors may influence shyness development during adolescence. For example, cultures that are more individualistic (e.g., American and Australian) may promote assertiveness and independence over shyness, whereas more group-oriented cultures (e.g., Asian and Hispanic) may view shyness more positively (Chen, 2019). Indeed, empirical research has found that shyness is more common in Japanese participants, compared with American and Chilean participants (Aizawa & Whatley, 2006). Given the dearth of longitudinal studies of shyness using diverse samples, questions remain about the generalizability of previous research.

### *Gender Differences*

Across many cultures, girls tend to report higher levels of shyness than boys, which may be due to greater social acceptance of shyness for girls than boys (Doey et al., 2014). Similarly, there was low convergence between self- and parent-reports of shyness in boys, but higher convergence in girls (Putnam et al., 2001), which may reflect a tendency for some boys to underreport their shyness. However, previous longitudinal studies have not found evidence for gender differences in rank-order stability or mean-level change in shyness across adolescence (Brandes et al., 2020; Karevold et al., 2012; Laceulle et al., 2012).

### *Shyness and Anxiety/Depression*

Shyness is related both concurrently and longitudinally to generalized anxiety and social anxiety, and less robustly to depression, from toddlerhood through adulthood (Grose & Coplan, 2015; Masi et al., 2003; Oldehinkel et al., 2004; Poole & Schmidt, 2019; Tsui et al., 2017). Conversely, children higher in sociability (i.e., low in shyness) tend to experience less anxiety and depression (Letcher et al., 2012; Lewis & Olsson, 2011). Longitudinal studies have shown that shyness is prospectively associated with later anxiety and depression (Karevold et al., 2012; Murberg, 2009; Prior et al., 2000). However, less is known about the reciprocal association; that is, the association of anxiety and depression with subsequent shyness. Anxious youth may be fearful of negative social evaluation and depressed youth may have difficulty forging positive connections with peers, both of which could contribute to social isolation and increases in shyness (Hassan et al., 2021; Sherdell et al., 2012).

### *Shyness and Acculturation*

Acculturation, or the extent to which individuals have adapted to new cultural norms, may relate to the development of shyness across adolescence for Mexican-origin youth (Gudiño & Lau, 2010; Xu & Krieg, 2014). Youth in

the United States with lower English language proficiency may communicate less effectively with peers, leading them to have a harder time forming social connections and, in turn, experience higher levels of shyness. Similarly, youth born in the United States (vs. youth who immigrated) may behave more consistently with American social norms, leading them to have an easier time socializing with peers and experience less shyness. Prior research found that shy youth have worse second language competence and slower language development among immigrant preschoolers in Switzerland (Keller et al., 2013) and Chinese-Canadian adolescents in Canada (Chen & Tse, 2010). In the United States, shyness was associated with decreased language proficiency in both English- and Spanish-speaking children attending Head Start (Strand et al., 2011). In addition, Mexican-origin adolescents with more social anxiety had worse English proficiency and were more likely to be born in Mexico than in the United States (Polo & López, 2009). Thus, despite limited research, language proficiency and nativity (country of birth) may relate to the development of shyness across adolescence in Mexican-origin youth.

## The Present Study

The present study examined four research questions. These questions, hypotheses, and a data analysis plan were posted on the Open Science Framework before any analyses were conducted: <https://osf.io/ft45r/>.<sup>2</sup>

**Research Question 1:** What is the rank-order stability of shyness from age 10 to 16?

- (a) Does the rank-order stability differ for boys versus girls or for self- versus parent-reports of shyness?

**Research Question 2:** What is the mean-level trajectory of shyness from age 10 to 16?

- (a) Does the trajectory differ for boys versus girls or for self- versus parent-reports of shyness?

**Research Question 3:** Are symptoms of anxiety and depression at age 10 correlated with the trajectory of shyness from age 10 to 16?

**Research Question 4:** Are cultural factors (English/Spanish language proficiency, nativity) at age 10 correlated with the trajectory of shyness from age 10 to 16?

We did not have hypotheses for Research Question 1; thus, these analyses are exploratory. For Research Question 2, we expected to find mean-level increases in shyness (i.e., a positive slope) from age 10 to 16, with substantial individual differences in the trajectory (Hypothesis 1); we did not have any predictions about whether the trajectory would vary by gender or self- versus parent-report. For Research Question 3, we expected that youth with more anxiety and depression symptoms at age 10 would have higher initial levels of shyness (Hypothesis 2.1) and show greater increases in shyness across adolescence

(Hypotheses 2.2). For Research Question 4, we expected to find that youth born in Mexico (vs. the United States) would have higher initial levels of shyness (Hypothesis 3.1), and youth with lower proficiency in English would show higher initial levels of shyness (Hypothesis 3.2) and greater increases in shyness across adolescence (Hypothesis 3.3).

The present study extends past research in several ways. First, we used four waves of longitudinal data spanning 7 years, which allowed us to test multiple patterns of mean-level change (no growth, linear growth, and latent basis) and provide a more fine-grained depiction of developmental trajectories than studies using two time points (e.g., Laceulle et al., 2012). Second, we used both self- and parent-reports of shyness, which reduces the likelihood that findings are based on shared method variance and allows us to test whether findings replicate across informants. Third, we examined whether anxiety and depression were prospectively associated with the development of shyness across adolescence, which extends previous cross-sectional research. Fourth, we examined the development of shyness in a historically understudied ethnic minority group—Mexican-origin youth. We contribute to the limited knowledge on the role of acculturation factors, including nativity (i.e., born in the United States vs. Mexico) and English/Spanish language proficiency, in shyness.

## Method

### Participants

This study used data from the California Families Project, an ongoing longitudinal study of Mexican-origin youth ( $N = 674$ ) and their parents.<sup>3</sup> Children were drawn at random from rosters of students from the Sacramento and Woodland, CA school districts. To participate in the study, the focal child had to be in fifth grade, of Mexican origin, and living with his or her biological mother. Approximately 72.6% of eligible families agreed to participate in the study, which was granted approval by the University of California, Davis Institutional Review Board (Protocol # 217484-21). The children (50% female) were assessed annually from fifth grade to 3 years post-high school. The present study used data from when the children were in fifth grade ( $M_{age} = 10.86$ ,  $SD = 0.50$ ), seventh grade ( $M_{age} = 12.81$ ,  $SD = 0.49$ ), ninth grade ( $M_{age} = 14.75$ ,  $SD = 0.49$ ), and 11th grade ( $M_{age} = 16.80$ ,  $SD = 0.51$ ). Retention rates compared with the original sample are as follows: 86% (seventh grade), 90% (ninth grade), and 89% (11th grade).

Participants were interviewed in their homes in Spanish or English, depending on their preference. Interviewers were all bilingual and most were of Mexican heritage. The median education level was ninth grade for both mothers and fathers; median total annual household income was US\$32,500; and 83.6% of mothers and 89.4% of fathers

**Table 1** Descriptive Statistics for Shyness

Shyness variable	<i>M</i>	<i>SD</i>	$\alpha$	<i>N</i>
Child–mom composite				
Age 10	2.44	0.58	.67	672
Age 12	2.23	0.57	.71	579
Age 14	2.14	0.57	.75	609
Age 16	2.06	0.54	.75	607
Child self-report				
Age 10	2.49	0.75	.61	668
Age 12	2.14	0.70	.72	578
Age 14	2.03	0.68	.75	604
Age 16	2.02	0.64	.77	600
Mom report of child				
Age 10	2.41	0.77	.77	656
Age 12	2.33	0.73	.72	573
Age 14	2.25	0.73	.74	598
Age 16	2.10	0.70	.74	586

Note. *M* = mean. *SD* = standard deviation.  $\alpha$  = alpha reliability. *N* = sample size.

were first-generation immigrants. We used data for all available participants (no exclusions were applied) and report all analyses conducted to address our research questions.

## Measures

**Shyness.** Shyness was measured via self-reports and mother-reports when the youth were 10, 12, 14, and 16 years old using the short form of the *Early Adolescent Temperament Questionnaire–Revised* (Ellis & Rothbart, 2001). The four shyness items are as follows: “You [your child] feel[s] shy about meeting new people,” “You [your child] are [is] shy,” “You [your child] feel[s] shy with kids of the opposite sex,” and “You [your child] are [is] not shy” (reverse-scored). Ratings were made on a 4-point scale ranging from 1 (*not at all true of you/your child*) to 4 (*very true of you/your child*). We computed latent variables using three parcels that combined both self- and mother-reports of shyness because parcels produce more reliable latent variables than individual items. To address Research Questions (1a) and (2a), we created separate latent variables for self- and mother-reported shyness. Descriptive statistics for the shyness measures are shown in Table 1. The reliabilities of child self-reports were lowest at age 10 and highest at age 16, consistent with previous studies (e.g., Göllner et al., 2017).

**Anxiety and Depression.** Anxiety and depression symptoms were assessed at age 10 using the Anxiety (12 items) and Depression (22 items) modules of the National Institute of Mental Health (NIMH) Diagnostic Interview Schedule for Children–IV (*DISC-IV*). The *DISC-IV* is a comprehensive psychiatric interview that assesses mental health problems for children and adolescents using *Diagnostic and Statistical Manual of Mental Disorders* (4th ed) criteria; it is the most widely used mental health interview that has

**Table 2** Descriptive Statistics for Covariates

Covariate	<i>M</i>	<i>SD</i>	Range	<i>N</i>
Anxiety	3.81	2.19	0–11	644
Depression	5.50	4.12	0–21	643
English proficiency	3.35	0.51	2–4	668
Spanish proficiency	2.88	0.79	1–4	668

Note. *M* = mean. *SD* = standard deviation. *N* = sample size.

been tested in both clinical and community populations and validated in English and Spanish (Bravo et al., 1993; Costello et al., 1985; Schwab-Stone et al., 1996). Responses were recorded dichotomously (0 = *no*, 1 = *yes*) as the symptom being present or not in the past year. The Anxiety module inquired about general worry and concern (e.g., tenseness) and physical symptoms (e.g., frequent stomachaches). The Depression module included questions about feeling sad (e.g., very upset, depressed) and physical symptoms (e.g., sleeping more than usual).<sup>4</sup> We computed separate symptom count variables for anxiety and depression by summing the responses for each symptom (present vs. absent; Table 2).

**Language Proficiency.** Participants completed the 20-item *Hazuda Acculturation and Assimilation Scale* (Hazuda et al., 1988), which is based on a theoretical model that views acculturation as a multidimensional process involving language, cultural values, and the integration of minority group members into the social structure of the majority group. To assess language proficiency, we averaged three items related to English proficiency (e.g., “How well do you speak English?”) and three items corresponding to Spanish proficiency (e.g., “How well do you speak Spanish?”). For these items, response options ranged from 1 (*not at all*) to 4 (*very well*; Table 2). Correlations among all study variables are shown in Table S1.

**Nativity.** We created a dichotomous nativity variable comparing youth born in Mexico (29%) to youth born in the United States (71%).

**Gender.** At age 10, adolescents reported their gender (1 = *girl*, 2 = *boy*).

## Procedures for the Statistical Analyses

All data cleaning and analyses were conducted in *R* (R Core Team, 2019) via RStudio version 1.2.1335 using robust maximum likelihood estimation and full information maximum likelihood (FIML) to address missing data (Allison, 2003; Schafer & Graham, 2002).<sup>5</sup> The alpha level was set to .05 (two-tailed). We computed latent variables using parcels including both self- and mother-reports of

shyness (Little et al., 2002), and indicators based on the same items were allowed to correlate across waves.

Model fit was assessed via comparative fit index (CFI) and root mean square error of approximation (RMSEA). We interpret good fit as values  $\geq .95$  for CFI and  $\leq .06$  for RMSEA (Hu & Bentler, 1999). We assessed differences in model fit via change in CFI  $\leq .01$  (Chen, 2007) and change in chi-square and degrees of freedom (Cheung & Rensvold, 2002; Meade et al., 2006).

**Measurement Invariance.** We examined the evidence for longitudinal measurement invariance of shyness by comparing configural, weak, strong, and strict invariance models. Because we did not find evidence for strong invariance (see Supplementary Table S2), we tested for partial strong invariance by constraining two of the three parcel means across assessments. We retained partial strong invariance for all analyses.

**Research Question 1 (Rank-Order Stability).** To examine rank-order stability, we calculated Pearson correlations between observed shyness scores at ages 10, 12, 14, and 16. We examined 2-year rank-order stabilities as well as rank-order stability across the entire time span. In addition, we examined the stability of the latent shyness variables using a single-variable autoregressive model (Kenny, 2013). To examine gender differences in rank-order stability, we compared multiple group models that constrained the autoregressive effects (e.g., age 10–12) to be equal for girls and boys to a multiple group model that allows the autoregressive effects to be freely estimated across gender. If the constrained model did not fit significantly worse than the freely estimated model, we concluded that the rank-order stability is the same across gender. To examine differences in informant-type, we calculated rank-order stabilities separately for self- and mother-reported shyness.

**Research Question 2 (Developmental Trajectory).** To examine mean-level change in shyness, we ran univariate latent growth curve (LGC) models with four time points (age 10, 12, 14, and 16). To select a growth trajectory, we conducted a series of LGC model comparisons and evaluated changes in fit indices. Specifically, we compared three models: (1) no growth model, where the slope is fixed to zero; (2) linear growth model, where the slope increases linearly over time; and (3) latent basis model, where the first and last time points of the slopes are fixed to zero and six, respectively, and the middle time points are freely estimated to detect nonlinearities in the trajectory. We considered model fit, as well as parsimony, when selecting a growth curve model. To examine gender differences in the trajectory of shyness, we compared a multiple group model that constrained the means and variances of the intercepts and slopes to be equal for girls and boys to a multiple group model that

**Table 3** Rank-Order Stabilities of Shyness

Ages	Child–mom composite	Child self-report	Mom-report of child
Age 10–12	.53* (.66*)	.39* (.52*)	.61* (.81*)
Age 12–14	.55* (.66*)	.37* (.52*)	.60* (.84*)
Age 14–16	.69* (.81*)	.58* (.73*)	.65* (.85*)
Age 10–16	.39* (.39*)	.18* (.23*)	.49* (.60*)

Note. Values are for observed (latent) variables. Latent variable values are standardized regression coefficients (obtained using Std.all in lavaan).

\* $p < .05$ .

allowed these parameters to be freely estimated across gender. If the constrained model did not fit significantly worse than the freely estimated model, we concluded that the developmental trajectory was the same for girls and boys. To examine differences in informant, we calculated mean-level change separately for self- and mother-reported shyness.

**Research Questions 3 (Anxiety and Depression) and 4 (Language Proficiency and Nativity).** To examine the influence of continuous correlates (anxiety, depression, and language proficiency) measured at age 10 on the development of shyness, we regressed the level and slope of the retained shyness LGC model on each correlate at age 10. To examine nativity differences, we ran multiple group models comparing U.S.-born versus Mexico-born participants.

## Results

### Rank-Order Stability of Shyness

The rank-order stabilities of the observed and latent shyness scores are shown in Table 3. Rank-order stability tended to be higher for older (vs. younger) youth, for mother- (vs. self-) report, for latent (vs. observed) variables, and across shorter (2-year) versus longer (6-year) time intervals. We found no evidence for gender differences in rank-order stability from age 10 to 12 ( $r_{\text{boys}} = .65$ ,  $r_{\text{girls}} = .63$ ), 12 to 14 ( $r_{\text{boys}} = .64$ ,  $r_{\text{girls}} = .68$ ), or 14 to 16 ( $r_{\text{boys}} = .81$ ,  $r_{\text{girls}} = .81$ ).

### Mean-Level Change of Shyness

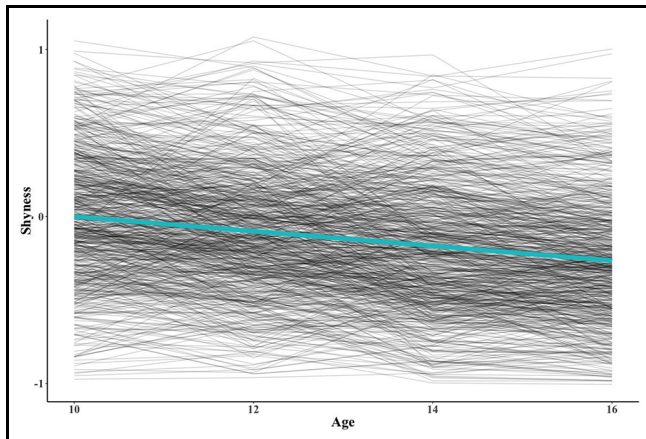
We examined mean-level change in shyness by comparing three growth models (Table 4). We retained the linear model, which fits the data well and is more parsimonious than the latent basis model. On average, shyness decreased linearly from age 10 to 16 and there were significant individual differences in both the level and the slope (Figure 1). When we examined the linear model separately for self- and mother-reports of shyness, we found no evidence that the trajectory differs by informant (Supplementary Table S3). In addition, we found no evidence for gender

**Table 4** Model Statistics for Best-Fitting Second-Order Latent Growth Curve Models for Shyness

Model Parameter	No growth	Linear growth	Latent basis
<b>Slope</b>			
$\beta_1$	0	<b>0</b>	0
$\beta_2$	0	<b>2</b>	2.42
$\beta_3$	0	<b>4</b>	4.94
$\beta_4$	0	<b>6</b>	6
<b>Means</b>			
Level	.00	<b>.00</b>	.00
Slope	—	<b>-.04*</b>	-.04*
<b>Variances</b>			
Level	.12*	<b>.14*</b>	.15*
Slope	—	<b>.004*</b>	.003*
Covariance <sub>Level, Slope</sub>	—	<b>-.01*</b>	-.01*
<b>Goodness-of-Fit</b>			
$\chi^2(df)$	283.43 (47)	<b>48.99 (44)</b>	39.46 (42)
RMSEA [90% CI]	.09 [.08, .10]	<b>.01 [.00, .03]</b>	.00 [.00, .02]
CFI	.93	<b>1.00</b>	1.00
Fit changes, $\Delta\chi^2/\Delta df$	—	<b>234.44/3</b>	9.53/2

Note. Values are unstandardized coefficients for the models. The linear growth model (bolded) was retained.  $\chi^2$  = chi-square;  $df$  = degrees of freedom; RMSEA = root mean square error of approximation; CI = 90% confidence interval; CFI = comparative fit index.

\* $p < .05$ .



**Figure 1** Individual and Average Shyness Trajectories From Age 10 to 16  
 Note. The thin black lines depict each individual's shyness trajectory from age 10 to 16. The thick green line depicts the average shyness trajectory from age 10 to 16. See the online article for the color version of this figure.

differences in the trajectory of shyness (Supplementary Table S4).

### Correlates of the Shyness Trajectory

Finally, we examined whether anxiety, depression, or acculturation factors were correlated with the level and slope of the shyness trajectories from age 10 to 16. These associations are best depicted visually (see figures in Appendix A). Anxiety symptoms were related to the level ( $\beta = .19$ ,

$p < .001$ ) and slope ( $\beta = -.15$ ,  $p = .006$ ), suggesting that youth with higher levels of anxiety at age 10 were more shy at age 10 and experienced larger decreases in shyness from age 10 to 16 (Figure A1). Depression symptoms were related to the level ( $\beta = .11$ ,  $p = .021$ ) but not the slope ( $\beta = -.02$ ,  $p = .680$ ), suggesting that youth with higher levels of depression at age 10 were more shy at age 10 but did not show any differences in their shyness development from age 10 to 16 (Figure A2). None of the acculturation factors were related to the development of shyness. In particular, neither English nor Spanish proficiency were related to the level ( $\beta_{English} = -.06$ ,  $p = .185$ ;  $\beta_{Spanish} = -.00$ ,  $p = .926$ ) or slope of shyness ( $\beta_{English} = .09$ ,  $p = .110$ ;  $\beta_{Spanish} = .00$ ,  $p = .999$ ; Figures A3 and A4), and there were no differences in the trajectory for youth born in the United States versus Mexico (Supplementary Table S4).

### Discussion

The present study examined stability and change in shyness from age 10 to 16 and tested correlates of shyness trajectories across adolescence.

#### Rank-Order Stability

We found moderate to high rank-order stability of shyness from age 10 to 16, which is comparable with past longitudinal research examining rank-order stabilities in self-reported (Hassan et al., 2021; Zohar et al., 2019) and mother-reported shyness (Brandes et al., 2020; Karevold et al., 2012; Lacey et al., 2012). For all time intervals, child self-reports were less stable than mother-reports. This pattern cannot simply reflect differences in the reliability of child versus adult reports given that the stabilities in the latent variable models, which correct for measurement error, were also lower for child self-reports. Instead, a substantive difference may drive this finding. Specifically, children may have a more dynamic perspective on their shyness based on observing themselves across multiple contexts (e.g., with teachers, teammates, peers, and romantic partners) and comparing themselves to broader and more transient reference groups. In contrast, parents view their child in a limited range of contexts (primarily at home), have a limited comparison group (e.g., siblings) for gauging their child's shyness, and may be generally inclined to form a stable impression of their child as a shy (or sociable) kid. Finally, we found no evidence that boys and girls differ in their rank-order stability of shyness, which is consistent with previous research (Brandes et al., 2020; Karevold et al., 2012; Lacey et al., 2012).

#### Mean-Level Change

Contrary to Hypothesis 1, we found that, on average, shyness decreased from age 10 to 16, although we did find the

predicted significant individual differences in shyness trajectories. The observed decrease in shyness is not consistent with research and theory on adolescence that highlights increases in self-consciousness and heightened sensitivity to peer evaluation, both of which seem likely to increase shyness (Cheek et al., 1986; Hassan et al., 2021). However, our findings are consistent with a few previous studies that have found mean-level decreases in shyness across adolescence (Barzeva et al., 2019; Laceulle et al., 2012; Zohar et al., 2019). Notably, the mean-level decrease in shyness held for both self- and mother-reports, suggesting that these different informant types cannot explain inconsistencies in findings observed in previous studies. Instead, the replication across two different reporters enhances our confidence that the decrease in shyness is a true developmental trend and not simply an artifact of a particular informant's unique perspective. Normative increases in motivation to interact with peers and potential romantic partners during adolescence (Andrews et al., 2021) may be contributing to the decline in shyness. Furthermore, spending more time in school and with peers entails increased frequency of social experiences with nonfamily members, which may reduce the novelty of social situations and the corresponding discomfort of social interaction. Biologically, the increased production of reproductive hormones, such as testosterone, during puberty may contribute to decreases in shyness because testosterone, which is produced endogenously in both males and females, can reduce social avoidance behavior (Kaldewaij et al., 2016) and promote status-seeking behavior (Eisenegger et al., 2011). Finally, consistent with prior research (Brandes et al., 2020; Karevold et al., 2012; Laceulle et al., 2012), we did not find gender differences in the shyness trajectory, suggesting that girls and boys show similar decreases in shyness from age 10 to 16.

### *Correlates of Shyness Trajectory*

Consistent with Hypothesis 2.1 and prior research (e.g., Oldehinkel et al., 2004; Tsui et al., 2017), youth experiencing more symptoms of anxiety and depression at age 10 had higher initial levels of shyness. Moreover, youth with more anxiety (but not depression) symptoms tended to show greater decreases in shyness from age 10 to 16. Because anxious youth tended to begin more shy but decrease more quickly, they ended their trajectory at age 16 closer to (but still higher than) their peers with fewer anxiety symptoms. This suggests that anxiety might be a risk factor for high levels of shyness early in life, but that this association fades as they progress through adolescence.

Contrary to Hypothesis 3.1 and to previous work on Mexican-origin adolescents living in the United States (Polo & López, 2009), we did not find that the average shyness trajectory differed for youth born in the United States versus Mexico. The lack of a nativity effect is consistent with prior research examining shyness in a sample of Chinese-Canadian adolescents (Chen & Tse, 2010), but

more research is needed to better understand the conditions under which nativity influences the development of shyness.

Contrary to Hypotheses 3.2 and 3.3, we found no association between English proficiency at age 10 and shyness development from age 10 to 16. This finding is not consistent with previous research on shyness and language proficiency (Chen & Tse, 2010; Keller et al., 2013; Polo & López, 2009; Strand et al., 2011) or with the theory that proficiency in the dominant language of a country (in this case, English) facilitates smoother and less stressful social interactions, contributing to lower levels of shyness. This may be due to a ceiling effect where youth were, overall, quite proficient at English ( $Mean = 3.35/4.00$ ), so small variations in English proficiency were not impacting whether youth could communicate effectively with others. Finally, we did not find associations between Spanish language proficiency and either the level or the slope of shyness, which is not consistent with the finding that Chinese-Canadian children who are more proficient in Chinese tend to be more shy than those who are less proficient (Chen & Tse, 2010). Although there was more variability in Spanish (vs. English) proficiency in our sample, it is still the case that all youth were living in the United States and attending English-speaking schools, so lower Spanish proficiency may not have been a significant barrier to social interaction.

### **Limitations and Conclusion**

The present study has several limitations. First, our shyness measure only included 4 items and asked broadly about shyness (e.g., "I am shy") rather than specific behaviors (e.g., social awkwardness, difficulty talking to strangers; Cheek & Buss, 1981). Therefore, our findings may reflect lay people's perceptions of shyness rather than the construct of shyness as conceptualized in psychology. Second, our sample consists exclusively of Mexican-origin youth and the present findings may not generalize to other groups of adolescents. Third, although we found that various factors (i.e., anxiety, depression) were associated with the level and slope of the shyness trajectory, the passive longitudinal design precludes causal inference because we cannot rule out the possibility of third-variable confounds or reciprocal causation.

Despite these limitations, this study is novel and informative in revealing a decline in shyness across adolescence among Mexican-origin youth. In conclusion, our findings suggest that the student approaching their new desk-mate on the first day of fifth grade would be similarly shy relative to their peers on the first day of seventh, ninth, or 11th grade, but gradually decline in their absolute level of shyness from fifth to 11th grade.

### **Authors' Note**

All materials, scripts, and output files for this project are available on the Open Science Framework (OSF): <https://osf.io/ft45r/>. We



are not legally or ethically allowed to publicly post data for this project because the participants in the study have not given informed consent to have their personal data publicly shared, and we do not have IRB approval to post data publicly. Researchers interested in replicating findings can contact the corresponding author to gain access to individual-level data.



### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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### ORCID iDs

Katherine M. Lawson  <https://orcid.org/0000-0002-4083-9797>  
Anabel Vizcarra  <https://orcid.org/0000-0002-8648-0353>

### Supplemental Material

Supplemental material for this article is available online.

### Notes

1. Researchers studying adolescence sometimes distinguish between “temperament” and “personality” traits, although there is no clear conceptual or empirical distinction between the two (Clark & Watson, 2008; Shiner & DeYoung, 2013; Soto & Tackett, 2015).
2. This link also contains all materials and analysis scripts.
3. Previous published work has used California Families Project (CFP) data to examine shyness (Lawson, Atherton, & Robins, 2021; Lawson, Kellerman, et al., 2021; Robins et al., 2010). However, no previous CFP publications have examined stability or change in shyness or correlates of shyness trajectories. For a complete list of CFP publications, see: <https://www.californiafamiliesproject.org/publications.html>.
4. Two anxiety symptoms overlap somewhat with shyness (“Have you often worried . . . that you made a fool out of yourself in front of other people in the past year?” and “. . . about whether other people liked you in the past year?”). No depression symptoms include shyness content. The anxiety results held when overlapping items were removed.
5. Separate latent variables for self- and mother- reports of shyness had three parcels, two of which included only a single item. Given that single-item parcels are better conceptualized as ordinal (vs. continuous) data, we used Weighted Least Square Mean and Variance Adjusted (WLSMV) estimation in all analyses of self- or mother-reports.

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## Appendix A

### Individual and Average Shyness Trajectories Separated by Level of Covariates at Age 10

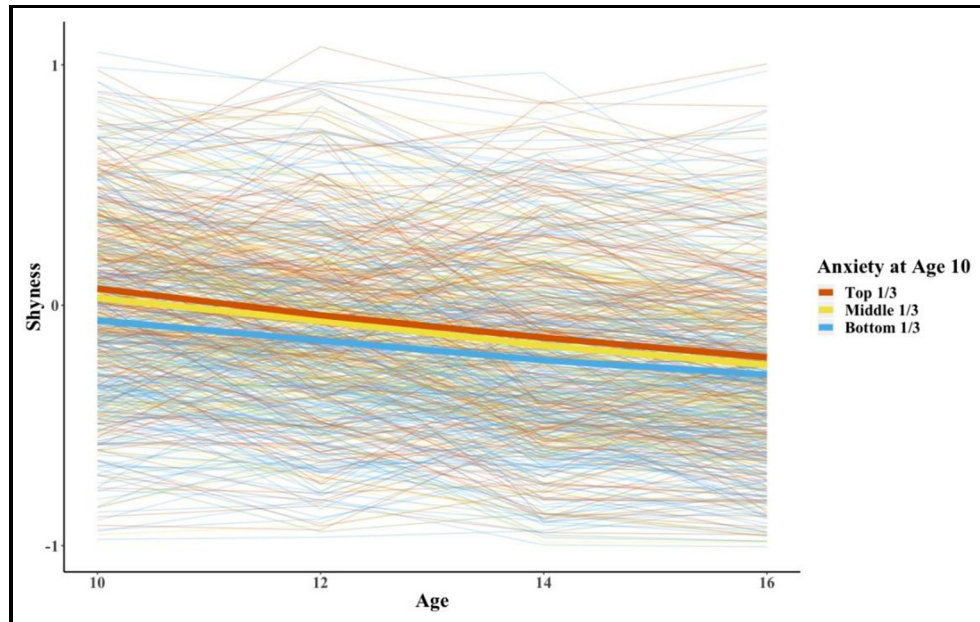


Figure A1 Anxiety as a Covariate

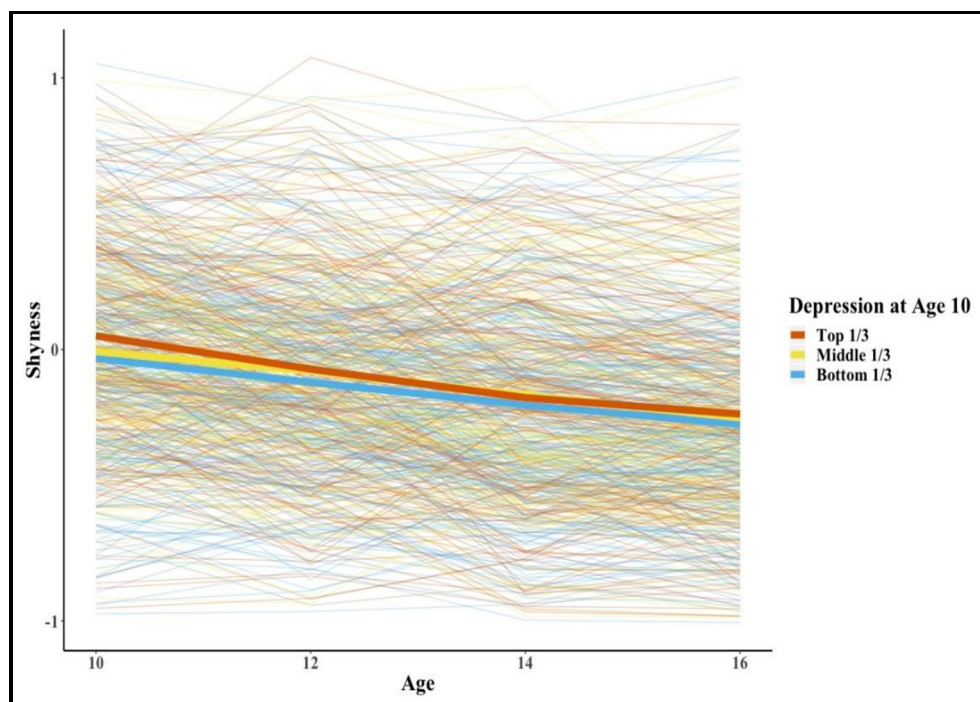


Figure A2 Depression as a Covariate

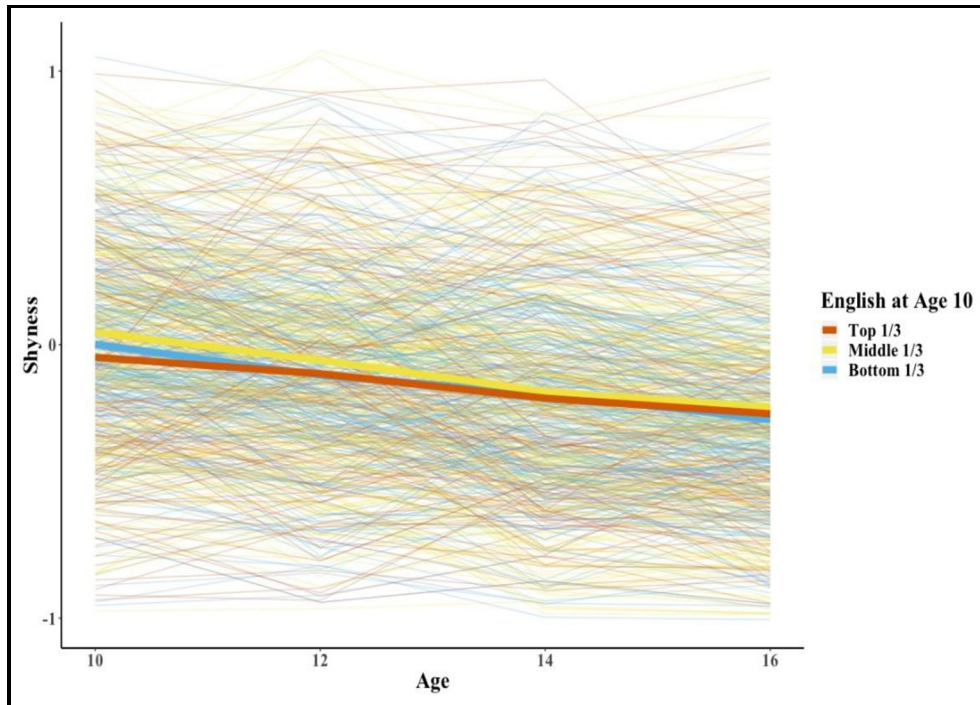


Figure A3 English Proficiency as a Covariate

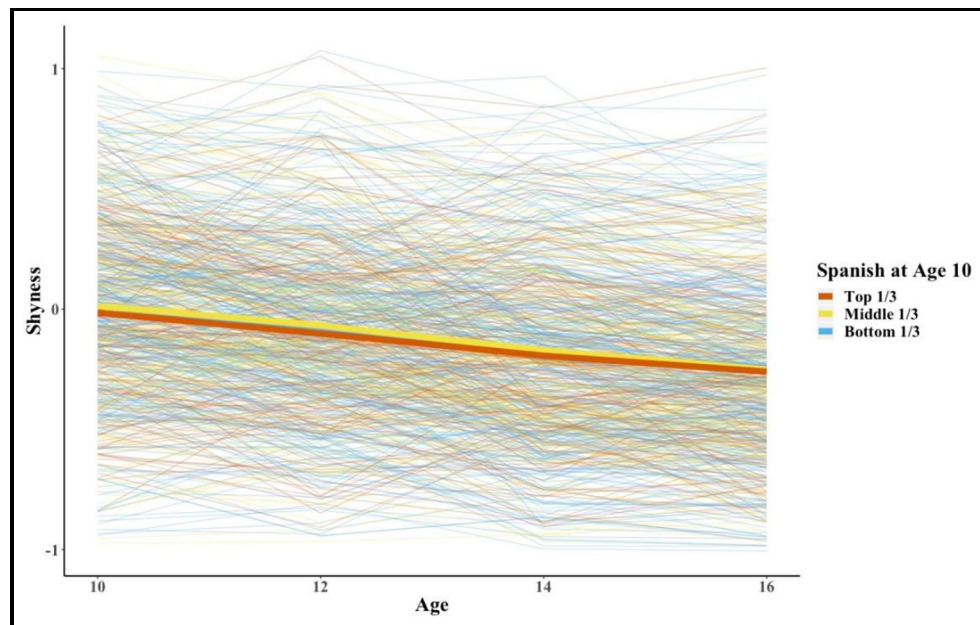


Figure A4 Spanish Proficiency as a Covariate

## Author Biographies

**Katherine M. Lawson** is a Ph.D. candidate in the Department of Psychology at the University of California, Davis. Her research focuses on the nature, development, and assessment of personality traits across the lifespan and associations with psychological adjustment.

**Brenna L. Barrett** recently graduated from the University of California, Davis, where she was working under the supervision of Richard W. Robins. She is passionate about supporting and promoting healthy development and habits through a psychosocial lens.

**Ryan J. Cerny** graduated from the University of California, Los Angeles. He is working under the supervision of Richard W. Robins at the University of California, Davis and he is interested in positive psychology and personality.

**Kaitlyn E. Enrici** is an undergraduate student at the University of California, Davis, working under the supervision of Richard W. Robins. She is interested in clinical psychology and pediatric development.

**Juan Eduardo Garcia-Cardenas** recently graduated from the University of California, Davis, where he was working under the supervision of Richard W. Robins. Juan is interested in the intersection between personality development and psychopathology.

**Catherine E. Gonzales** is an undergraduate student at the University of California, Davis, working under the supervision of Richard W. Robins. She is interested in ethnic minority youth development and autism spectrum disorder.

**Isidro D. Hernandez** is an undergraduate student at the University of California, Davis, working under the supervision of Richard W. Robins. He is interested in how cultural settings influence the development of children and adolescents.

**Carrina P. Iacobacci** is an undergraduate student at the University of California, Davis, working under the supervision of Richard W. Robins. She is interested in personality and psychopathology.

**Tiffanie Lin** recently graduated from the University of California, Davis, where she was working under the supervision of Richard W. Robins. She is interested in intimate relationships, psychosocial adjustment, and psychopathology.

**Nancy Y. Martinez Urieta** recently graduated from the University of California, Davis, where they were working under the supervision of Richard W. Robins. Nancy is interested in ethnic minority youth development.

**Patricia Moreno** is an undergraduate student at the University of California, Davis, working under the supervision of Richard W. Robins. She is interested in psychopathology and ethnic minority youth development.

**Marissa G. Rivera** recently graduated from the University of California, Davis, where she was working under the supervision of Richard W. Robins. She is interested in psychopathology and shyness.

**Devin J. Teichrow** is an undergraduate student at the University of California, Davis, working under the supervision of Richard W. Robins and Camelia E. Hostinar. He is interested in how environmental factors such as pollutants impact individual differences in personality and cognition.

**Anabel Vizcarra** is working under the supervision of Richard W. Robins. Her research interests include personality and positive youth development.

**Camelia E. Hostinar**, Ph.D. is an Assistant Professor in the Department of Psychology at UC Davis. Dr. Hostinar studies how the social environment shapes health, with a focus on the activity of the stress-reponse and immune systems.

**Richard W. Robins** is a Professor in the Department of Psychology at the University of California, Davis. His research focuses on the nature, development, and consequences of personality; self-esteem processes and development; and the development of Mexican-origin youth.

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