

# The reciprocal relations between well-being and maternal and peer warmth in adolescents involved in the juvenile justice system

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## Abstract

**Introduction:** Although justice system involvement increases the risk of negative outcomes for adolescents, many justice-involved youth desist from crime as adults (Sampson & Laub, 2005). There are few studies examining predictors of positive development in justice-involved adolescents. In the current study, we assess the influence of maternal and peer warmth on the development of well-being in adolescents involved in the US justice system over the course of 5 years.

**Methods:** Participants included 1216 adolescent males who experienced their first arrest. Interviews were given every year for 5 years. Well-being was measured using the EPOCH questionnaire (Kern et al., 2016) and relationship warmth was measured using a scale adapted from Conger et al. (1994). Hypotheses were tested using latent curve models with structured residuals.

**Results:** Baseline levels of well-being were associated with maternal ( $\beta = 0.49, p < .001$ ) and peer warmth,  $\beta = 0.52, p < .001$ . When an individual's maternal warmth was higher than predicted given their maternal warmth trajectory, their subsequent well-being was higher than expected given their well-being trajectory,  $b = 0.07, p < .001$ . When an individual's peer warmth was higher than predicted, their subsequent well-being was higher than expected,  $b = 0.06, p < .001$ . These relations were reciprocal, such that well-being also predicted increased maternal and peer warmth.

**Conclusions:** These findings suggest that increasing maternal or peer warmth may have cascading effects on the well-being of justice-involved adolescents. Interventions for justice-involved youth may benefit from targeting factors that increase positive development for these youth.

## KEYWORDS

delinquency, justice system, latent-curve-model with structured residuals, well-being

## 1 | INTRODUCTION

In the United States, state governments have become increasingly interested in reforming the juvenile justice system (JJS; Durnan et al., 2018). The rate of arrest for US youth under 18 has been steadily decreasing for decades, yet nearly 700,000 adolescents were arrested in 2019 (Puzzanchera, 2021). Most youth involved with the US JJS are male (70%), and minority groups are disproportionately impacted. For example, 34% of adolescents arrested in 2019 were Black, whereas only 13.4% of the overall adolescent population identified as Black. These youth are also more likely to come from backgrounds marked by poverty and adverse life experiences (Baglivio et al., 2014), and to have mental health problems (Gottesman & Schwarz, 2011; Shufelt & Coccozza, 2006; Teplin et al., 2002). Despite these challenges to development, many individuals who are involved in the JJS as adolescents desist from crime as adults (Sampson & Laub, 2005).

Prior research has demonstrated that justice-involved adolescents are at risk for negative outcomes including recidivism (Katsiyannis & Archwamety, 1999), poor mental (Corneau & Lanctôt, 2004), and physical health (Vazsonyi et al., 2001), and

academic difficulties (Patterson et al., 1990). There are few studies reporting positive outcomes, such as the well-being of adolescents in the JJS. However, well-being is a construct that has the potential to attenuate the negative effects of justice system involvement. Greater well-being is associated with better mental and physical health (Hernandez et al., 2018; Wood & Joseph, 2010), and academic achievement (Bücker et al., 2018). By gaining a more comprehensive understanding of outcomes such as well-being, researchers will be better equipped to uncover the mechanisms that result in the multifinality of outcomes observed in youth in the JJS. To promote psychological well-being among youth in the JJS, we must first determine protective mechanisms that are associated with developing psychological well-being despite the risks conferred by justice-system involvement (Rutter, 1987).

Studies of justice-involved adolescents that include measures of positive development are limited in three major ways. First, positive constructs are often defined by a lack of negative outcomes (i.e., delinquency) rather than the presence of positive outcomes (e.g., Born et al., 1997). Although preventing negative outcomes is a relevant goal, promoting positive outcomes is a separate issue that involves identifying the presence of positive factors in an individual's life (e.g., accomplishments, life satisfaction). Second, when appropriate measures of positive development are used, they are typically examined only as a predictor of re-arrest (e.g., Fougere et al., 2015). Therefore, there is little data on predictors of positive development in the JJS population. Third, variables that are considered "positive" in the general population may not serve the same role for youth in the JJS. For instance, psychological well-being is often considered a positive developmental outcome, but it may not be if an adolescent experiences high levels of psychological well-being while committing crimes. It is necessary to identify measures of psychological well-being that are also associated with desistance from crime.

The biopsychosocial model, used to explain the development of conduct problems in adolescence (Dodge & Pettit, 2003), has the potential to be adapted to explain the development of well-being in justice-involved adolescents. According to this model, parents, peers, and social institutions mediate the risk of antisocial behavior due to biological factors and sociocultural influences (Dodge & Pettit, 2003). Further, the biopsychosocial model accounts for the reciprocal nature of the relationships between an adolescent and their parents and peers. In addition to attenuating the risk of conduct problems, relationships with parents and peers may increase the likelihood that adolescents will develop a sense of well-being.

Adolescents are focused on defining and asserting their individuality but still rely on their parents for support and guidance (Maccoby & Martin, 1983; McGrellis et al., 2000). Many of the thoughts and behaviors of adolescents are reinforced or discouraged by parents. Parents who display more warmth to their children may create an environment more conducive to children using their parents as a "safe base" from which they can be supported in their development (Dodge & Pettit, 2003). Indeed, maternal warmth has been associated with positive outcomes such as fewer symptoms of anxiety and depression (Butterfield et al., 2021), more prosocial behavior (Beckmeyer et al., 2020), and more problem-focused coping (Moran et al., 2018).

During adolescence, individuals spend more time with their peers (Lam et al., 2014). These peer relationships are dynamic (Ryan & Deci, 2000) and exist within a social network that influences the dyadic relationship. High-quality peer relationships are associated with higher levels of school satisfaction and well-being (Bukowski et al., 2009). However, the influence of high-quality friends is not always beneficial, as they may lead to co-rumination, which is associated with anxiety and depression (Rose et al., 2007). Additionally, engaging with delinquent peers is a strong predictor of becoming involved in the JJS (Agnew, 2003; Patterson et al., 1990; Perez et al., 2018).

Just as parents and peers influence an individual, that individual influences their parents and peers. For instance, peer rejection is associated with an increase in depressive symptoms, which, in turn, is associated with increased peer rejection (Platt et al., 2013). Generally, adolescents with internalizing, externalizing, and conduct problems will experience negative responses from parents and peers, which may then exacerbate the initial problems. Similarly, it can be expected that engaged, optimistic, connected, and happy adolescents will elicit positive responses from those around them, which will, in turn, have positive implications for their well-being.

## 1.1 | The present study

The present study assesses the development of well-being in youth involved in the US JJS by extending the biopsychosocial model proposed by Dodge and Pettit (2003). We examined the effects of maternal and peer warmth on the development of well-being over 5 years, and whether these constructs had reciprocal relations. An additional goal of the present study was to determine whether well-being could be a target for justice-system interventions. Therefore, we disentangled between- and within-person changes in well-being. Between-person effects allowed us to test whether maternal and peer warmth were related to well-being overall; within-person effects allowed us to test whether the level of maternal or peer warmth an individual experienced at one time point directly related to their well-being at the next time point.

To address our aims, we used data from the Crossroads study, a longitudinal, multi-site study of adolescent male first-time offenders (see <https://sites.uci.edu/crossroadsinfo/> for more detail). There have been several publications from this data set that assess factors that predict offending behavior (e.g., Beardslee et al., 2019; Cauffman et al., 2021; Cavanagh &

Cauffman, 2017; Matlasz et al., 2020; Robertson et al., 2021), including the influence of parental warmth on offending behavior (Vaughan et al., 2021), or that assess factors associated with the mental health of youth involved with the JJS (e.g., Shulman et al., 2021; Thomas et al., 2018). In 2021, Vaughan and colleagues examined the effect of maternal warmth on prosocial behavior. Our study will expand upon this work in a novel way by examining both maternal and peer warmth on psychological well-being and by incorporating bidirectional effects into the model. Our hypotheses are preregistered with the Center for Open Science (see: [osf.io/gb2rz](https://osf.io/gb2rz)).

## 1.2 | Hypotheses

(H1a) At baseline, higher levels of maternal warmth will be associated with higher levels of well-being.

(H1b) When individuals have higher maternal warmth than would be expected from the maternal warmth trajectory they follow, they will experience a subsequent increase in well-being.

(H2a) At baseline, higher levels of peer warmth will be associated with higher levels of well-being.

(H2b) When individuals have higher peer warmth than would be expected from the peer warmth trajectory they follow, they will experience a subsequent increase in well-being.

## 2 | METHOD

### 2.1 | Participants

Participants were 1216 male first-time offenders aged 13–17 at baseline. The largest proportion of participants were 16 years of age at baseline (25.5%), followed by 15 years of age (24.7%), 17 years of age (21.3%), and 14 years of age (17.3%), and 13 years of age (11.2%). At the last measurement, participants ranged in age from 18 to 22. Participants were arrested for the first time in Orange County, California (CA;  $n = 532$ ), Philadelphia, Pennsylvania (PA;  $n = 533$ ), or Jefferson Parish (New Orleans), Louisiana (LA,  $n = 151$ ). Most participants arrested in CA were Hispanic (78.4%). In PA and LA, the majority of those arrested were Black (65.3% in PA, 63.6% in LA). Overall, the largest proportion of participants was Hispanic (45.8%), followed by Black (36.9%), White (14.8%), Other Race/Ethnicity or nondisclosed (2.1%), and Native American (0.3%). Most offenses were nonviolent (81.8%), with nearly half being arrested for property crimes (48.4%) and nearly a quarter being arrested for drug crimes (22.5%).

#### 2.1.1 | Recruitment

A research associate was notified about adolescents with pending intake hearings via court personnel at each site and determined whether they were eligible to participate. Males aged 13–17 with no prior offenses and current charges with a .35–.65 probability of formal versus informal processing fit the inclusion criteria. After the disposition had been imposed, eligible adolescents were asked to participate, and informed consent was obtained from a parent/guardian for the adolescents' participation. Participants and their parents were informed that participation was entirely voluntary, would not influence the youth's treatment by the JJS, and that they were able to withdraw from the study at any time without penalty. The youth and parents were also informed that the research project had obtained a Privacy Certificate from the Department of Justice, which protected their data from being subpoenaed and used in legal proceedings.

#### 2.1.2 | Attrition

On average, 96.73% of participants remained in the study from one time point to the next, with the lowest retention rate being 93.97% between Time 4 and Time 5. Overall, 84.62% of participants remained in the study over the 5-year study period.  $\chi^2$  Tests of Independence indicated that attrition was not associated with race, study site, age at baseline, or offense category. Full information maximum likelihood was used to address missing data, so the analytic sample remained at 1216 participants.

Overall, 81.4% of the data was complete. Patterns of missing data were analyzed for all study variables. The study site was associated with missing data for baseline measurements of well-being. Participants in PA were more likely to be given an interview version that did not include the well-being measure at baseline.

## 2.2 | Procedure

### 2.2.1 | Interviews

Baseline interviews were conducted after the disposition. Follow-up interviews were conducted 6, 12, 18, 24, 30, 36, 48, and 60 months after baseline. In the current study, we used data obtained at baseline, 12, 24, 36, 48, and 60 months. At the baseline interview, participants were compensated \$50. For each successive interview, compensation increased by \$15. Interviews were conducted in a secure community location (e.g., at participants' homes) or in secure residences. Laptops were used for data entry, which allowed for anonymous keypad entry during sensitive sections of the interview. During each interview, participants were asked to complete several measures assessing personal, familial, and contextual factors. The full codebook for the Crossroads Study can be found at: <https://sites.uci.edu/crossroadsinfo/codebook/constructs/>.

## 2.3 | Measures

### 2.3.1 | Well-being

Well-being was measured using the 20-item EPOCH questionnaire (Kern et al., 2016). The EPOCH questionnaire utilizes the PERMA framework of well-being (Seligman, 2018) but is adjusted to be appropriate for adolescent participants. This measure consists of five subscales of well-being: Engagement (e.g., "When I do an activity, I enjoy it so much I lose track of time"), Perseverance (e.g., "I finish whatever I begin"), Optimism (e.g., "I am optimistic about my future"), Connectedness (e.g., "There are people in my life who really care about me"), and Happiness (e.g., "I feel happy"). Participants use a Likert scale to indicate how much each statement describes them, ranging from (1) "Almost Never" to (5) "Almost Always." Higher scores indicate a higher level of well-being. The scores for each subscale are averaged to compose an overall well-being score. Kern et al. (2016) examined the psychometric properties of the EPOCH in a variety of samples, including a subset of the Crossroads study. They found that higher scores on the EPOCH predicted fewer arrests, better school performance, higher self-esteem, stronger motivation to succeed, fewer symptoms of depression and anxiety, and better relationships with teachers (Kern et al., 2016). McDonald's  $\omega$  was calculated using the OMEGA macro in SPSS (Hayes & Coutts, 2020). The smallest McDonald's  $\omega$  was 0.91 (baseline) and the largest was 0.94 (48-month follow-up). McDonald's  $\omega$  for well-being and every other measure at each time point is displayed in Table 1.

### 2.3.2 | Relationship warmth

Relationship Warmth and hostility between the youth and their mother and peers were measured using a 21-item questionnaire, adapted from Conger et al. (1994), that assesses the affective tones of the participants' relationships. Of these, 10 items assess relationship warmth with mothers (e.g., "How often does mom help you do something that was important to you") and peers (e.g., "How often do friends carefully listen to your point of view") Responses range from (1) "Always" to (4) "Never." Relationship warmth variables were reverse coded so that in the current study, higher scores on the relationship warmth subscale indicate higher levels of warmth. The smallest McDonald's  $\omega$  for maternal warmth was 0.90 (baseline) and the largest was 0.93 (48-month follow-up) across time points. The smallest McDonald's  $\omega$  for peer warmth was 0.87 (baseline) and the largest was 0.91 (60-month follow-up) across time points.

## 2.4 | Plan of analyses

To test our hypotheses, we used multivariate latent curve models with structured residuals (LCM-SR; Curran et al., 2014). The LCM-SR model is an extension of the Random-Intercept Cross-Lagged Panel Model (RI-CLPM), which allows for the disentanglement of between- and within-person effects (Hamaker et al., 2015). The LCM-SR and RI-CLPM differ in that the

TABLE 1 McDonald's  $\omega$  reliability estimates

	Baseline	Year 1 follow-up	Year 2 follow-up	Year 3 follow-up	Year 4 follow-up	Year 5 follow-up
Maternal warmth	0.898	0.923	0.923	0.920	0.929	0.926
Peer warmth	0.865	0.884	0.897	0.900	0.902	0.907
Well-being	0.908	0.936	0.937	0.939	0.942	0.935

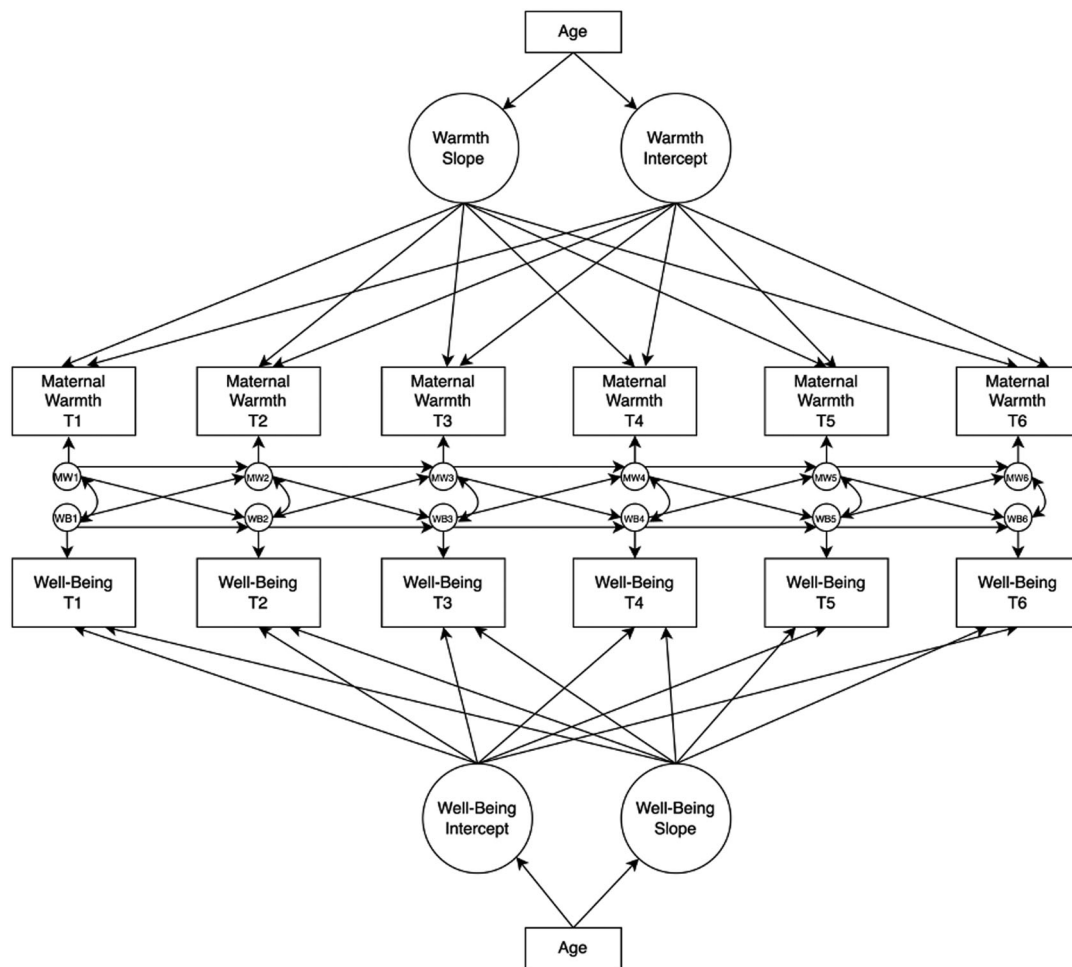


FIGURE 1 Conceptual LCM-SR of the relation between maternal warmth and well-being. LCM-SR, latent curve models with structured residuals.

LCM-SR includes a random slope and a random intercept to model between-person effects, whereas the RI-CLPM only includes a random intercept. The inclusion of a random slope is advantageous when the growth trajectory of the process being modeled is expected to vary among individuals. We expected the growth trajectories for each of our variables to vary among individuals. Therefore, we opted to use LCM-SR rather than RI-CLPM.

Within each model that was fit, we created latent growth factors (i.e., random intercept and random slope) for each variable. Factor loadings for the random slope were constrained to be linear (i.e., 0, 1, 2, 3, 4). The latent factors were allowed to covary. Age at baseline was loaded onto each latent factor to control for age-related differences. The within-person effects were measured using structured residuals created by transferring the residual variance of observed variables to latent factors. Autoregressive stability was modeled by allowing a residual of variable X at time T to be regressed on X at time T-1. Cross-lagged paths were included in which variable Y at time T was regressed on variable X at time T-1 and vice versa. Taken together, these paths allow us to model an individual's trajectory of X, how they deviate from that trajectory at a given time-point, and whether that deviation results in a deviation from their trajectory on Y.

Figure 1 displays a conceptual diagram of the LCM-SR. All analyses were conducted in Mplus 8.3 (Muthén & Muthén, 1998–2018). Parameters were estimated using maximum likelihood. A change in comparative fit index (CFI) equal to or greater than 0.01 was used to indicate a significant change in model fit, as suggested by Cheung and Rensvold (2002).

### 3 | RESULTS

#### 3.1 | Descriptive statistics and bivariate correlations

Table 2 displays the means and standard deviations of each study variable at each time point. Longitudinal measurement invariance was tested for each measure using confirmatory factor analysis. First, configural invariance was modeled.

TABLE 2 Descriptive statistics

	Baseline (N = 1216)	Year 1 follow-up (N = 1171)	Year 2 follow-up (N = 1154)	Year 3 follow-up (N = 1124)	Year 4 follow-up (N = 1095)	Year 5 follow-up (N = 1029)
Maternal warmth, <i>M</i> (SD)	3.166 (0.661)	3.111 (0.716)	3.155 (0.695)	3.209 (0.674)	3.285 (0.678)	3.280 (0.671)
Peer warmth, <i>M</i> (SD)	2.779 (0.614)	2.759 (0.647)	2.806 (0.670)	2.857 (0.668)	2.957 (0.662)	2.957 (0.668)
Well-being, <i>M</i> (SD)	3.904 (0.582)	4.040 (0.628)	4.111 (0.611)	4.184 (0.602)	4.248 (0.600)	4.285 (0.567)

If configural invariance was supported, we tested metric invariance by constraining factor loadings to be equivalent across time points. All measures displayed metric invariance, suggesting that the same construct was measured across time, well-being (CFI = 0.95,  $\Delta$ CFI = 0.002), maternal warmth (CFI = 0.95,  $\Delta$ CFI < 0.001), peer warmth CFI = 0.94,  $\Delta$ CFI < 0.001. Unconditional latent growth models were fit to determine whether measure values changed over time. Each variable gradually increased: well-being ( $b = 0.07, p < .001$ ), maternal warmth ( $b = 0.03, p < .001$ ), and peer warmth ( $b = 0.04, p < .001$ ).

Next, we used independent-sample *t*-tests to assess whether mean levels of well-being differed for adolescents who did or did not engage in offending behavior over the past 12 months. Baseline measures were not included because all participants had engaged in offending behavior within the past 12 months at baseline. At each time point, adolescents who reported that they did not engage in offending behavior had significantly different levels of well-being than adolescents who reported that they did engage in offending behavior: Time 1 ( $t(925) = 7.06, p < .001, d = 0.42$ ), Time 2 ( $t(1094) = 3.06, p = .002, d = 0.18$ ), Time 3 ( $t(1003) = 4.54, p < .001, d = 0.28$ ), Time 4 ( $t(736) = 3.90, p < .001, d = 0.26$ ), and Time 5 ( $t(758) = 6.58, p < .001, d = 0.43$ ). Well-being scores were consistently higher in the group that did not engage in offending behavior.

## 3.2 | Model 1: The relation between maternal warmth and well-being

### 3.2.1 | Model building

First, an unconstrained model was built in which all paths were allowed to vary. Next, autoregressive and cross-lagged paths were constrained to be invariant across time. The fit of the constrained model was not significantly worse than the unconstrained model ( $\Delta$ CFI = 0.006); therefore, we retained the constrained model. Model fit indices for each model are displayed in Table 3. The effects are reported in standardized terms and may differ even when paths are constrained. Unstandardized parameter estimates and standard errors are reported in Table 4.

### 3.2.2 | Between-person effects

Maternal warmth decreased linearly over time ( $\beta = -2.52, 95\%$  confidence interval [CI]  $[-3.74, -1.30], p < .001; s^2 = 0.94, 95\%$  CI  $[0.89, 0.99], p < .001$ ), well-being increased linearly ( $\beta = 1.59, 95\%$  CI  $[0.27, 2.91], p = .01; s^2 = 0.99, 95\%$  CI  $[0.98, 1.00], p < .001$ ), and there was significant individual variability in rate of change for both constructs. There was significant individual variability in baseline levels of maternal warmth ( $\beta = 7.84, 95\%$  CI  $[6.78, 8.90], p < .001; s^2 = 0.99, 95\%$  CI  $[0.97, 1.00], p < .001$ ) and well-being ( $\beta = 8.15, 95\%$  CI  $[6.79, 9.51], p < .001; s^2 = 0.98, 95\%$  CI  $[0.98, 1.00], p < .001$ ). Higher initial levels of maternal warmth were associated with a smaller decline in warmth over time,  $\beta = -0.23, 95\%$  CI  $(-0.41, -0.04), p = .01$ . Higher initial levels of well-being were associated with a smaller increase in well-being over time,  $\beta = -0.21, 95\%$  CI  $(-0.41, -0.004), p = .04$ . Participants who reported higher baseline levels of maternal warmth were more likely to report higher baseline levels of well-being,  $\beta = 0.49, 95\%$  CI  $(0.40, 0.57), p < .001$ . However, changes in maternal warmth over time were not significantly associated with changes in well-being,  $\beta = 0.09, p = .43$ . Participants who were older at baseline were more likely to have lower baseline maternal warmth scores ( $\beta = -0.12, 95\%$  CI  $[-0.19, -0.05], p < .001$ ), but higher well-being scores ( $\beta = 0.13, 95\%$  CI  $[0.05, 0.21], p < .001$ ). Older participants also reported a steeper decrease in maternal warmth,  $\beta = 0.32, 95\%$  CI  $(0.17, 0.46), p < .001$ .

### 3.2.3 | Within-person effects

#### Autoregressive effects

Across all lags, maternal warmth was significantly predicted by prior maternal warmth at the 0.001 level of significance. Standardized coefficients for maternal warmth autoregressive effects ranged from 0.17 (baseline to 1-year follow-up) to 0.20

**TABLE 3** Fit of LCM-SR models of the relation between ecological variables and well-being

	$\chi^2$ (df)	AIC	BIC	CFI	RMSEA	SRMR
Model 1				$\Delta$ .006		
Constrained	162.94*(67)	18367.04	18545.071	0.984	0.035	0.065
Unconstrained	109.42*(50)	18347.51	18612.02	0.990	0.032	0.038
Model 2				$\Delta$ .005		
Constrained	159.62*(67)	17789.08	17967.11	0.982	0.034	0.073
Unconstrained	111.94*(50)	17781.39	18061.16	0.987	0.034	0.034

Abbreviations: AIC, akaike information criteria; BIC, bayesian information criteria; CFI, comparative fit index; LCM-SR, latent curve model with structured residuals; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual.

\* $p < .05$

(1-year follow-up to 2-year follow-up). Additionally, across all lags, well-being was significantly predicted by prior well-being scores at the 0.001 level of significance. Standardized coefficients for well-being autoregressive effects ranged from 0.16 (baseline to 1-year follow-up) to 0.19 (4-year follow-up to 5-year follow-up).

### *Cross-lagged effects*

Across all lags, well-being was predicted by prior maternal warmth at the 0.001 level of significance. Standardized cross-lagged coefficients for maternal warmth predicting well-being ranged from 0.08 (baseline to 1-year follow-up) to 0.09 (4-year to 5-year follow-up). Additionally, across all lags, maternal warmth was predicted by prior well-being at the 0.01 level of significance. Standardized cross-lagged coefficients for well-being predicting maternal warmth ranged from 0.06 (Baseline to 1-year follow-up) to 0.07 (2-year to 3-year follow-up and 4-year to 5-year follow-up).

## 3.3 | Model 2: The relation between peer warmth and well-being

### 3.3.1 | Model building

The unconstrained model fit well. The constrained model was not significantly worse than the unconstrained model ( $\Delta$ CFI = 0.005, see Table 3), therefore, we retained the constrained model. Unstandardized parameter estimates are reported in Table 5.

### 3.3.2 | Between-person effects

Peer warmth ( $\beta = 2.03$ , 95% CI [0.53, 3.52],  $p = .008$ ;  $s^2 = 0.99$ , 95% CI [0.95, 1.01],  $p < .001$ ) and well-being ( $\beta = 2.41$ , 95% CI [0.01, 4.82],  $p = .005$ ;  $s^2 = 0.99$ , 95% CI [0.97, 1.01],  $p < .001$ ) both increased linearly over time and there was significant individual variability in rate of change for both constructs. There was also significant individual variability in baseline levels of peer warmth ( $\beta = 5.43$ , 95% CI [4.32, 6.54],  $p < .001$ ;  $s^2 = 0.98$ , 95% CI [0.97, 1.00],  $p < .001$ ) and well-being ( $\beta = 8.15$ , 95% CI [6.87, 9.42],  $p < .001$ ;  $s^2 = 0.99$ , 95% CI [0.97, 1.00],  $p < .001$ ). Baseline levels of well-being were significantly associated with baseline levels of peer warmth,  $\beta = 0.52$ , 95% CI [0.44, 0.60],  $p < .001$ . Participants who had higher well-being at baseline were more likely to report a steeper increase in peer warmth,  $\beta = 0.22$ , 95% CI [0.04, 0.40],  $p = .02$ . Older participants were more likely to report higher levels of both peer warmth ( $\beta = 0.10$ , 95% CI [0.02, 0.18],  $p = .01$ ) and well-being ( $\beta = 0.12$ , 95% CI [0.04, 0.20],  $p = .003$ ), and have a smaller peer-warmth slope ( $\beta = -0.13$ , 95% CI [-0.25, -0.00],  $p = .043$ ).

### 3.3.3 | Within-person effects

#### *Autoregressive effects*

Across all lags, peer warmth was significantly predicted by prior peer warmth at the 0.001 level of significance. Standardized coefficients ranged from 0.15 (baseline to 1-year follow-up) to 0.16 (4-year to 5-year follow-up). Additionally, across all lags, well-being scores were predicted by prior well-being at the 0.001 level of significance. Standardized coefficients for well-being autoregressive effects ranged from 0.16 (baseline to 1-year follow-up) to 0.19 (1-year to 2-year follow-up and 4-year to 5-year follow-up).

**TABLE 4** Parameter estimates for Model 1: LCM-SR maternal warmth and well-being

	<i>b</i>	SE	<i>p</i> Value
Fixed effects			
MW intercept	3.82	0.215	<.001***
MW slope	-0.217	0.050	<.001***
WB intercept	3.343	0.203	<.001***
WB slope	0.108	0.046	.019*
Autoregressive effects			
MW( <i>t</i> ) → MW( <i>t</i> + 1)	0.18	0.03	<.001***
WB( <i>t</i> ) → WB( <i>t</i> + 1)	0.17	0.03	<.001***
Cross-lagged effects			
MW( <i>t</i> ) → WB( <i>t</i> + 1)	0.07	0.02	<.001***
WB( <i>t</i> ) → MW( <i>t</i> + 1)	0.07	0.02	.002**
Between-person effects			
MW intercept ↔ MW slope	-0.004	0.004	.330
MW intercept ↔ WB intercept	0.10	0.01	<.001***
MW intercept ↔ WB slope	0.00	0.00	.530
WB intercept ↔ WB slope	-0.003	0.003	.355
WB intercept ↔ MW slope	0.006	0.002	.010*
WB slope ↔ MW slope	0.000	0.001	.530
Age effects			
Age ↔ MW intercept	-0.05	0.01	.001***
Age ↔ MW slope	0.02	0.00	<.001***
Age ↔ WB intercept	0.04	0.01	.002**
Age ↔ WB slope	-0.002	0.00	.407

Abbreviations: *b*, unstandardized coefficient; LCM-SR, latent curve model with structured residuals; MW, maternal warmth; WB, well-being.

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

### Cross-lagged effects

Across all lags, well-being was predicted by prior peer warmth at the 0.01 level of significance. Standardized cross-lagged coefficients for peer warmth predicting well-being ranged from 0.06 (Baseline to 1-year follow-up) to 0.07 (4-year to 5-year follow-up). Additionally, across all lags, peer warmth was predicted by the previous time point well-being score at the 0.001 level of significance. Standardized cross-lagged coefficients for well-being predicting peer warmth ranged from 0.11 (3-year to 4-year follow-up) to 0.12 (1-year to 2-year follow-up).

## 4 | DISCUSSION

Guided by the biopsychosocial model (Dodge & Pettit, 2003), the present study examined the reciprocal and between- versus within-person effects of maternal and peer warmth on the well-being of youth involved in the US JJS using LCM-SR models. Higher levels of maternal and peer warmth were associated with greater well-being. The relation between these constructs was bidirectional. These results align with the biopsychosocial model, which emphasizes the role of parents and peers in the lives of adolescents (Dodge & Pettit, 2003). Further, the presence of both between- and within-person effects and the reciprocal nature of the effects provide support for targeting constructs such as maternal and peer warmth and well-being in JJS interventions.

As hypothesized, adolescents with higher initial levels of maternal warmth were more likely to have higher initial levels of well-being. Additionally, when an individual's maternal warmth was higher than predicted given their maternal warmth



**TABLE 5** Parameter estimates for Model 2: LCM-SR peer warmth and well-being

	<i>b</i>	SE	<i>p</i> Value
Fixed effects			
PW intercept	2.25	0.20	<.001***
PW slope	0.15	0.05	.006**
WB intercept	3.36	0.20	<.001***
WB slope	0.11	0.05	.02*
Autoregressive effects			
PW( <i>t</i> ) → PW( <i>t</i> + 1)	0.15	0.03	<.001***
WB( <i>t</i> ) → WB( <i>t</i> + 1)	0.17	0.03	<.001***
Cross-lagged effects			
PW( <i>t</i> ) → WB( <i>t</i> + 1)	0.06	0.02	<.001***
WB( <i>t</i> ) → PW( <i>t</i> + 1)	0.13	0.03	<.001***
Between-person effects			
PW intercept ↔ PW slope	-0.003	0.004	.433
PW intercept ↔ WB intercept	0.09	0.01	<.001***
PW intercept ↔ WB slope	0.00	0.001	.773
WB intercept ↔ WB slope	-0.003	0.003	.396
WB intercept ↔ PW slope	0.01	0.003	.010*
WB slope ↔ PW slope	0.00	0.001	.773
Age effects			
Age ↔ PW intercept	0.03	0.01	.012*
Age ↔ PW slope	-0.01	0.004	.040*
Age ↔ WB intercept	0.04	0.01	.003**
Age ↔ WB slope	-0.002	0.003	.446

Abbreviations: *b*, unstandardized coefficient; LCM-SR, latent curve model with structured residuals; PW, peer warmth; WB, well-being.

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001.

trajectory, their subsequent well-being was higher than expected given their well-being trajectory. The association was bidirectional. Dodge and Pettit (2003) emphasized the importance of parental warmth in preventing conduct problems, but this finding suggests that parental warmth is also important in promoting the well-being of delinquent youth. By maintaining a positive relationship with parents despite justice-system involvement, adolescents may be able to more effectively cope with stressors brought on by the JJS (Moran et al., 2018). The reciprocal nature of maternal warmth and well-being suggests that increases in maternal warmth at one time could have cascading effects on the well-being of youth involved in the JJS.

Similarly, peer warmth had both between- and within-person effects on well-being. Across individuals, higher peer warmth at baseline was associated with higher well-being. When peer warmth was higher than expected given an individual's peer warmth trajectory, their subsequent well-being was also higher than expected. The within-person association was bidirectional. Traditionally, peers are viewed as risk factors for adolescents involved in the JJS, but these results suggest that certain peer characteristics may serve a protective function. Social support can provide comfort and resources to an individual during times of stress, motivate an individual to reach their goals, and increase self-esteem, culminating in increased well-being (Lucas & Dyrenforth, 2006). Simultaneously, individuals who exhibit aspects of well-being are more likely to maintain healthy social relationships (Kansky & Diener, 2017).

These findings build upon those of Vaughan et al. (2021). Taken together, these studies indicate that maternal warmth promotes both external (i.e., prosocial behavior) and internal (i.e., well-being) aspects of positive development in youth in the JJS. The current study found empirical support for between and within-person effects of peer warmth on well-being, as well as reciprocal relations between constructs. The inclusion of reciprocal effects is an especially important addition that reduces the potential for model misspecification and biased parameters (Curran & Bauer, 2011).

Among the strengths of the current study is the large sample with multiple assessment points. Most research questions about at-risk youth aim to establish within-person effects; scholars hope to identify factors that will increase the well-being (or prevent delinquency) of an individual. However, most of the models used in the literature are only able to assess between-person differences or confound variance due to between-person differences and variance due to within-person differences. We were able to establish temporal precedence, which is one necessary indicator of causation (Hill, 1965). Additionally, the present study contributes a novel perspective to the literature on the outcomes of youth in the JJS. Rather than adopting the traditional approach of preventing the development of negative outcomes in youth involved with the JJS, the present study emphasizes the importance of promoting positive outcomes.

Despite these strengths, several limitations must be addressed. Only self-report data were collected. Further, the EPOCH did not measure desistance from delinquency, which is an important indicator of positive development in this population. This study was observational, which prevents causal inferences. Studies of youth involved with the JJS will never be purely experimental, but future studies may benefit from a design that includes a control group of youth with similar demographic characteristics who are not involved in the JJS. Additionally, future studies should attempt to obtain data before the individual becomes involved in the JJS.

Another limitation of the present study is the generalizability. Although recruiting participants from three sites is an improvement from single-site studies, JJS policies and practices vary significantly across states and countries. Therefore, the current sample may not generalize to the broader population of youth involved in the JJS. The participants in the study all identified as male. Some studies have found that the strength of predictors of delinquency may differ between genders (Daigle et al., 2007). Further, research suggests that females experience poorer outcomes following JJS involvement (Lanctôt et al., 2007).

We found several significant effects at the within-person level, but few significant effects at the between-person level. For instance, systematic changes in maternal warmth were not associated with systematic changes in well-being. However, when an individual's mother scored higher on maternal warmth relative to her usual level, their well-being became higher than usual in turn. This pattern is relevant to theory and practice. As mentioned previously, few studies have the sample needed to examine within-person effects. When researchers find an absence of between-person effects, within-person effects should be considered as an appropriate area for further research. Additionally, this work supports the notion of interventions that are centered on an individual. In some cases, a mother's average score on a maternal warmth questionnaire may be less important for improving adolescent well-being than whether she is able to improve the score over time.

These results suggest that maternal and peer warmth are promising targets for interventions for youth in the JJS. Interventions that promote maternal or peer warmth may have cascading effects on well-being. When parents are involved in JJS interventions, they typically are taught appropriate ways to discipline their children and strategies to identify warning signs of delinquent behavior (Office of Juvenile Justice and Delinquency Prevention [OJJDP], 2018). Intervention programs also focus on preventing individuals from interacting with delinquent peers and/or teaching individual social skills to be used with nondelinquent peers (OJJDP, 2018). Future research should examine whether interventions can be improved by adding components aimed at increasing the warmth of parents and peers.

Interventions should also aim to directly promote well-being in adolescents involved in the JJS. Some school-based interventions for promoting well-being have been effective. For example, Ruini et al. (2009) developed a successful intervention for adolescents that involved teaching students how to identify emotions, reflect on daily interactions, recognize positive characteristics of themselves and their peers, set goals, and share positive experiences. By teaching similar skills to justice-system-involved adolescents, who may not always be present in school, it may be possible to help these youth improve their relationships with parents and peers.

The present study improves our understanding of the developmental outcomes of adolescents involved in the JJS. Specifically, the results highlight the importance of maternal and peer warmth in promoting well-being. By examining an indicator of positive development, we hope to encourage researchers to continue to examine youth involved in the JJS from a holistic perspective. Namely, research on outcomes of youth in the JJS should continue to extend beyond studies that aim to prevent recidivism and poor mental health by including studies aimed at promoting positive health and well-being.

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## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from Elizabeth Cauffman, Laurence Steinberg, and Paul Frick upon reasonable request.

## ETHICS STATEMENT

This study was found to comply with appropriate ethical standards and was exempted from the need for formal review by the College of William and Mary Protection of Human Subjects Committee (PHSC-2021-07-23-15057-dhdall).

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