Research Article

Parental Attachment and Peer Support as Moderators of Associations Between Childhood Mobility and Young Adult Sense of Belonging and Depression

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Abstract: Objectives: This study examined how childhood residential moves and non-normative school transitions are associated with a sense of belonging and depression in young adults, and how parental and peer relationships may serve as moderators of these associations. **Methods:** The participants were 487 young adults (358 females, 129 males; mean age = 19 years, age range = 17 to 30) who completed retrospective measures of family instability, parental and peer support (the Attachment History Questionnaire; Pottharst, 1990), depression (the Centre for Epidemiologic Studies-Depression scale; Kohout et al., 1993), and the Psychological scale from the Sense of Belonging Instrument (Hagerty & Patusky, 1995). **Results:** The bivariate associations for residential moves and school transitions were weak, but there were significant interactions involving parental attachment and peer support. The interaction patterns revealed that when parental attachment or peer support were high, sense of belonging was high and depression scores were low, even when there were many residential moves and school transitions. However, for people with more impoverished relationship contexts, outcomes were more positive (for six out of eight interactions) when there was more mobility. **Conclusion:** The findings provide a more nuanced perspective on the correlates of residential moves and school transitions than what has been previously reported in the literature.

Keywords: mobility, residential moves, school transitions, attachment, peer support, sense of belonging, depression

1. Introduction

Multiple early transitions pose a potential threat to young adults' sense of belonging, mental health, physical health, and academic achievement. For example, school transitions and frequent residential moves during grades 4 through 8 have been linked to depression, even when controlling for covariates such as poverty, family risk factors, juvenile delinquency, and child abuse and neglect (Brown et al., 2012; Herbers et al., 2013). Previous studies have focused primarily on bivariate associations between mobility and these outcome variables. The correlates of mobility are generally negative, although the magnitudes of the effect sizes vary considerably across studies (for reviews and representative recent studies, see Anderson et al., 2014; Bramson et al., 2016; Bures, 2003; Choi & Oishi, 2020; Cotton, 2016; Gillespie, 2017; Humke & Schaefer, 1995; Jelleyman & Spencer, 2008; Mok et al., 2016; Oishi & Schimmack, 2010; Rumbold et al., 2012; Tønnessen et al., 2016; Tseliou et al., 2016; Voight et al., 2020; Webb et al., 2016). The

focus of the present study was on whether the associations between mobility and two outcome variables vary depending on the levels of previously experienced parental attachment and peer support.

"Mobility" is a relatively broad construct that could be approached in quite different ways in research investigations. One approach could be to focus on specific kinds of moves or on the specific reasons for residential or school transitions (e.g., parental divorce). In the present study, as in many previous studies, the focus was on the broader phenomenon: In a larger sample, and regardless of the reasons for particular transitions, (1) do those young adults who experienced more residential moves (to a new house or apartment until the age of 16) and school transitions (school changes from elementary to high school) have more negative psychological adjustment outcomes than did young adults who experienced fewer such moves and transitions, and (2) are the associations moderated by a person's relationship context?

1.1 *Mobility and development*

Residential mobility and school transitions frequently appear as items on checklists of stressful life events for adults (Schwarzer & Schulz, 2003). These experiences must therefore also be a challenge for developing children and adolescents. In Bronfenbrenner and Morris's (2007) bioecological model, child development occurs in multiple embedded contexts (homes, schools, neighborhoods). Residential and school changes can potentially disrupt ongoing developmental systems and routines, with ripple effects. There is presumably a loss in social capital and an increase in stress. Rebuilding is a challenge, and the effects of multiple transitions may accumulate (Coley & Kull, 2016).

The possibility that the associations between residential mobility and mental health (schizophrenia, bipolar disorder, major depression) might be due to a shared genetic liability was ruled out in a large, Danish population study by Paksarian et al. (2020). Using data from 4,207 people with schizophrenia, 18,215 people with major depression, 1,402 people with bipolar disorder, and a 17,582 random population sample, the authors found that the associations between mobility between ages 10 to 14 years and subsequent mental health were predominantly environmental in nature and not genetic. They recommended that research should focus on identifying social and behavioral mediators and moderators of mobility effects.

Recent research has sought to identify personal and contextual moderator variables (Anderson, 2017), given that the bivariate associations for residential mobility and school transitions are inconsistent and sometimes weaker than expected. Moving is not necessarily an adverse event (Gillespie, 2015, 2017). "Protective factors" in childhood development research are variables that reduce the negative impact of risk factors in people facing challenging circumstances (Sameroff, 2010). A number of protective (moderating) factors have already been identified in the childhood mobility literature. School connectedness, caring student-teacher relationships, and emotional competence have been found to operate as protective factors for the emotional and academic performance problems that otherwise tend to occur among students who experience school transitions (Dinnen et al., 2020). Similarly, involvement in afterschool programs appears to protect against the negative impact of school transitions on students' academic achievement (Voight et al., 2020).

1.2 *Parental and peer attachment as potential protective factors*

The present focus on parental and peer relationships as possible protective, moderator variables is grounded in attachment theory and research findings (Ainsworth, 1989; Bowlby, 1980; Mikulincer & Shaver, 2007). From infancy, the attachment system is involved in the regulation of stress and emotions. Early bonds with caregivers provide the template for later behavior, emotion, and cognition. Secure attachments develop when caregivers are sensitive and responsive, which fosters beliefs that others will be available, comforting in times of distress, and that unpleasantness can be overcome (Miller et al., 2016). Secure parental attachments result in internal working models of the world that enable the formation of trusting and healthy relationships and are particularly helpful when dealing with stress. "Supportive parent-child relationships may provide children with more resources for coping with threatening or stressful events and consequently, their initial appraisals may be less likely to develop into broader patterns of depressive, anxious, or aggressive symptomatology" (DeBoard-Lucas et al., 2010, p. 165). These phenomena are also consistent with Interpersonal Acceptance-Rejection Theory, which also highlights the importance of close relationships and which has been supported in cross-cultural research (Rohner, 2021).

In contrast, when early caregivers are not available or responsive, attachments become insecure and negative internal working models of the world develop, which jeopardizes the capacity to effectively cope with environmental stressors (Mikulincer & Shaver, 2007). A wider range of situations may be experienced as stressful and high levels of arousal and vigilance ensue. This depletes the psychological resources necessary to regulate emotions and behavior, especially in stressful situations (Alink et al., 2009).

Peer relationships are also important. As reliance on parental caregivers subsides, peer attachments increase and they presumably also provide comfort, responsiveness, and support during times of stress (Ainsworth, 1989; Bowlby, 1980; Miller et al., 2016). Peer attachment security is associated with the ability to form close relationships with peers while also maintaining autonomy to explore the world. It is also associated with the development of adaptive emotional regulation skills to handle conflict and other stressful situations (Allen et al., 2007). "Those who form secure attachment to peers are more likely to develop and utilize adaptive coping strategies (e.g., peer support) to deal with stressors, and thus be less likely to show signs of psychological distress in response to stressors" (Heinze et al., 2018, p. 179). Muris et al. (2001) found that adolescent boys and girls (12 - 14 years old; $N = 155$) who reported having a secure friendship attachment orientation were more likely to trust their peers and not feel alienated as compared to adolescents who reported having an avoidant or anxious attachment orientation. It has also been found that peer support moderates the otherwise negative effects of early life experiences in severely disadvantaged living environments (Yearwood et al., 2019), and of exposure to violence (Heinze et al., 2018) and family adversity (Forster et al., 2020).

There is growing support for the claim that attachment security buffers the otherwise more negative consequences of stress. For example, physiological reactivity levels after a stressor are blunted among children who have a secure attachment relationship with their mother compared to insecurely attached children (Ahnert et al., 2004; Alink et al., 2009; Gilissen et al., 2008). Adults who experienced higher levels of parental warmth in childhood display less hypothalamic-pituitary-adrenocortical axis dysregulation in response to daily stressors (Hanson & Chen, 2010). More generally, positive parental and peer relationships are associated with more positive future relationships, with socio-emotional competence, with a greater sense of belonging, higher self-esteem, and fewer internalizing problems (e.g., Birkeland et al., 2014; Chu et al., 2010; Ciarrochi et al., 2017; Cohen, 2004; Mattanah et al., 2011; Nickerson & Nagle, 2005; Rohner, 2021; Siddall et al., 2013; Sroufe et al., 2010). Secure attachment histories are believed to provide children and adults with a kind of "bounce back" resiliency for dealing with adversity (Sroufe et al., 2005), which facilitates exploration and competency. However, it is not known whether parental and peer relationships buffer the effects of frequent residential moves and school transitions.

1.3 *The present study*

Gillespie (2014), using data from 3,168 children and adolescents (ages 5.8 - 15.2 years) who participated in the National Longitudinal Survey of Youth, found that the effects of childhood residential mobility on behavior problems and academic achievement were buffered by maternal closeness, which was measured by a single item. However, the nature of the moderating effect was not graphed or fully revealed in the research report. The present study therefore used more elaborate measures of parental and peer relationships and focused on the precise nature of any moderating effects. It was predicted, on the basis of theory and previous research, that there would be statistically significant buffering, by parental and peer relationships, of the associations between mobility and outcome variables. The follow-up analyses for these predicted interactions focused on revealing the precise nature (i.e., patterns) of the interactions, for which the patterns were less certain.

If positive parental and/or peer relationships do buffer the otherwise negative effects of mobility, how effective is the buffering? Do more positive relationships just slightly soften the blow on outcome variables, or is the buffering more complete? Are there parental and/or peer relationship contexts that completely negate, or aggravate, the effects of mobility? Answers to these questions were sought in the present study, regardless of the root causes of mobility. Parental and peer relationships were expected to serve as moderators, but the forms of the interaction patterns were uncertain.

The focus was on two outcome variables: sense of belonging and depressive symptoms. Depression has often been used as an outcome variable in previous mobility research (e.g., Brown et al., 2012; Herbers et al., 2013). Sense of belonging is a less commonly examined but potentially important outcome variable for research on the effects of mobility. Sense of belonging, including school belongingness, has well-established associations with a variety of psychological adjustment variables, including loneliness, depression, and anxiety (Allen & Boyle, 2018; Fisher et al.,

2015; Hagerty et al., 1996), even when controlling for levels of stress and social support (Choenarom et al., 2005). Sense of belonging might well be disrupted by frequent moves and school transitions.

2. Methods

2.1 *Participants*

Participants were 487 students recruited from psychology classes at the University of British Columbia in Kelowna, Canada. There were 358 females and 129 males. The mean age was 19 years (SD = 1.6, range = 17 to 30). Most participants (75%) were of a self-reported European background, 19% were Asian, and the remaining 6% were from a variety of other backgrounds. Twenty-five participants reported either being married or cohabiting with a partner. Data from additional participants were not used because of missing values. Participants were compensated with their choice of course credit or entry into a draw to win $ 100. The data collection was approved by the university research ethics board.

2.2 *Procedure*

Potential participants were made aware of the study via the psychology department's research participation website. Clicking on a link to the study brought the participants to the study consent form. Once they agreed to participate, the participants were asked to complete the online questionnaire. The participants were assured that their data would remain confidential. The participants were instructed to create an 8-digit participation code that was used to keep their names completely separate from their responses. The measures were administered online after participants provided informed consent. The order of the measures was not varied or counterbalanced across the data collection. The participants were compensated by course credits which were assigned by a third party and not by the researchers, in order to ensure confidentiality.

2.3 *Measures*

2.3.1 *Sociodemographic measures*

Participants were asked to provide demographic information that included questions regarding their age, gender, cultural background, and marital status. They also indicated whether they experienced parental divorce during their childhood or adolescence.

2.3.2 *Residential moves and school transitions*

Items assessing residential moves and school transitions were derived from a family instability index based on Ackerman et al. (1999) sources of family instability and adapted by Marcynyszyn et al. (2008). The items used in this study included the numbers of: (a) residential moves, (b) families with whom the child lived, (c) changes of caregivers' intimate relationships, and (d) non-normative school transitions. However, very few participants in the sample experienced familial changes (e.g., complete changes in caregivers were experienced by less than 2.7%). The analyses therefore focused solely on residential moves and school transitions, which were each assessed with a single item. The text for residential moves was: "Thinking first about how many houses/apartments you lived in between the time you were born until you were 16, please indicate as closely as you can remember, the number of times you moved to a new house/apartment from the time you were born until you were 16". The text for school transitions was: "Now, think about all the schools you attended from the time you were born until you were 16. How many times did you change schools before you would have ordinarily expected to? For example, you may have changed schools between grade one to grade two, or maybe in the middle of the school year. Do not include expected changes such as from elementary to middle school or from middle to high school."

2.3.3 Sense of belonging

The Psychological scale from the Sense of Belonging Instrument consists of 18 items (SOBI-P; Hagerty & Patusky, 1995), which were used to assess participants' current sense of belonging. Participants indicated their degrees of agreement with statements such as "I am just not sure if I fit in with my friends" and "I feel like an outsider in most situations" on a 4-point response scale. After reverse scoring all negatively phrased items, a high score on the SOBI-P is indicative of a greater sense of psychological belonging. Internal consistency values for the SOBI-P for a variety of populations in previous studies are in the .91 - .93 range (Hagerty & Patusky, 1995; McLaren, 2009). The Cronbach's alpha value for the SOBI-P in the present study was .95.

2.3.4 Depression

The Centre for Epidemiologic Studies-Depression scale (CES-D; Kohout et al., 1993) was used to measure symptoms of depression in the past week. The CES-D has been validated in a variety of populations (e.g., Chin et al., 2015). We used the 11-item Iowa short form version of the measure, which has shown good internal consistency (Cronbach's alpha = .90) and other psychometric statistics (Carleton et al., 2013). The items focus on symptoms of depression (e.g., "I felt lonely" and "I enjoyed life"). Respondents are asked how often they have experienced these states or symptoms in the previous week on a 3-point scale from 0 (hardly ever or never) to 2 (much or most of the time). The Cronbach's alpha value for the measure was .75 in the present study.

2.3.5 Parental (primary parental figure) attachment

The Secure Attachment Base subscale and the Threats of Separation subscale of the Attachment History Questionnaire (AHQ; Pottharst, 1990) were used to measure parental attachment. The AHQ is a retrospective, self-report inventory that assesses young adults' perspectives on their childhood relationships. The following language was used for the two subscales: "Please answer the following questions about the adult with whom you had a life-long, parental or parent-like relationship. If you had such a relationship with more than one adult, such as both of your parents, answer these questions about the adult you felt closest to." Sample item: "How often did you feel loved or cared for by this adult?". Responses were provided on a 7-point scale ranging from *never* to *always*.

The "adult you felt closest to" language was used instead of separate maternal and paternal relationship questions because (1) non-traditional parental arrangements are now common, (2) there could have been excessive missing values and analytic complexities had separate questions been asked about both mothers and fathers, (3) there could well be variation across the participants in whether their mothers or fathers were the most supportive; and (4) previous findings indicate that having at least one supportive parent-like figure is most important when dealing with stressful life events (Werner, 1989; see also Howes & Spieker, 2016; Mikulincer & Shaver, 2014). In the present data, the "adult you felt closest to" was identified as a parent (mother or father, biological or adoptive) for 461 (95%) of the respondents.

The Cronbach's alpha value for the Secure Attachment Base subscale (25 items) in the present study was .92. The Cronbach's alpha value for the Threats of Separation subscale (9 items) in the present study was .77. The Pearson correlation between the Secure Attachment Base and Threats of Separation subscales was -.65 ($p < .00001$), which was considerably higher than the item inter-correlations within each subscale. Overall "Parental Attachment" scores were therefore computed from the combined pool of items (after reverse-scoring the Threats of Separation items). Higher scores on parental attachment indicated more positive attachments. This scoring method is commonly used in research using the AHQ (Crowell et al., 2008). The Cronbach's alpha value for the parental attachment scores was .93, which is consistent with the .91 value reported in the review by Crowell et al. (2008, p. 612).

2.3.6 Peer emotional support

The Peer Affectional Support subscale of the AHQ (Pottharst, 1990) was used to characterize the nature of childhood peer relationships. Nine questions were used to evaluate young adults' memories of the emotional support received from their friends in childhood (sample item: "Did your friends support you when you were in trouble or having difficulty?"). Two items that are often included with the scale are also part of the AHQ secure attachment scale and so they were not used in peer support scale for this study ("How often did you prefer to be alone?" and "Did

you feel your friends really liked YOUR parents/caregivers?"). High scores on this scale indicate higher quality peer relationships. The Cronbach's alpha value for the peer emotional support scale in the present study was .70.

2.4 *Analytic methods*

Robust, non-parametric statistical and graphical methods were used to reveal the bivariate associations and the interaction patterns in the data. Conventional Pearson's correlations and least squares regressions can fail to identify associations between variables, especially when there is non-normality, outliers, heteroscedasticity, and/or curvature, and when there are interactions between predictors (Wilcox, 2012; Wilcox & Keselman, 2012). Robust methods are resistant to deviations from the assumptions of traditional ordinary least squares (OLS) methods and they yield results that are essentially identical to traditional methods when assumptions are met. The lplotPV and adtest functions described by Wilcox (2012), for the WRS2 package in *R*, were used to provide significance tests for the main effects and interactions.

The lplot function from the WRS2 package was used to produce data points for regression plots. It is a non-parametric, local area, polynomial regression procedure (Cleveland, 1993; Simonoff, 1996) that does not require specification of any function or model form for the data. The method involves a series of local regression analyses that permits the formation of a curve to vary across the variable continuums. For each specified neighborhood of data points, a weighted least squares regression is performed that fits linear or quadratic functions of the predictors at the centers of the neighborhood. Different types of regression and weight functions may thus be used in the estimation. The procedure is a robust fitting method that is flexible and ideal for revealing potentially complex, unanticipated patterns of association between variables. The procedure produces a smoothed, nonlinear curve fit to the data that are the best, unbiased depictions of the patterns in the data. The curves are much more accurate than are the lines (linear or quadratic) that are imposed on the data in familiar parametric analyses. The lattice package in *R* was then used to produce plots of the data points that were provided by lplot.

Two familiar effect sizes indices are available from these robust regression methods. One is an *R*-squared-like index of explanatory power, which is the variance of the predicted dependent variable (DV) values divided by the variance of the observed DV values. A robust measure of scatter is used instead of the simple variance in this computation. The square root of this index is an *R*-like coefficient called the explanatory measure of association.

3. Results

Participants reported between 0 and 18 residential moves, and between 0 and 9 school transitions. However, very few participants reported more than 8 residential moves (2.7%) or more than 6 school transitions (0.8%). Plots that extend into variable regions in which there are so few cases can be misleading. We therefore set any residential moves value greater than 8 to 9, and any school transitions value greater than 5 to 6. These minor changes had no effect on the patterns of significant and non-significant findings reported below, and they resulted in more meaningful graphical depictions of the patterns in the data. This method of dealing with unusual values was recommended by Tabachnick and Fidell (2019, p. 67). The depression scores were positively skewed, and the sense of belonging scores were negatively skewed. This is common in research using community (non-psychiatric) samples (Micceri, 1989), and suggests the importance of using robust non-parametric data analysis methods, such as those that were used in the present study.

Descriptive statistics and Pearson correlations between the variables are provided in Table 1. There was a positive correlation between residential moves and school transitions (r = .47, p < .01 [CI .40, .53]), a moderate negative correlation between sense of belonging and depression, and a small positive correlation between parental attachment and peer emotional support. The correlations between the outcome variables (sense of belonging and depression) and residential moves and school transitions were very small, varying from r = -.01, p > .05 [CI -.09, .09], to r =.06, p > .05 [CI -.03, .14]. The correlations between residential moves and school transitions and parental attachment and peer emotional support were also small, varying from r = -.03, p > .05 [CI -.13, .05], to r = -.15, p < .05 [CI -.23, -.06].

The effect sizes and p-values from the eight separate robust regressions are provided in Table 2. All eight of the interactions for residential moves, school transitions, and parental and peer emotional support were significant. Heat maps of these interactions are provided in Figures 1 - 4. Perusal of the heat maps revealed that one clear, consistent

trend in the findings was for high levels of parental attachment and peer emotional support to be associated with a stronger sense of belonging and less depression regardless of the number of residential moves or school transitions.

For residential moves when parental attachment was low, sense of belonging was low and depression was high when there were *fewer* residential moves (Figures 1 and 2). Similarly, when peer emotional support was low, sense of belonging was low and depression was high when there were small to moderate numbers of residential moves (Figures 1 and 2).

For school transitions when parental attachment was low, sense of belonging was low and depression was high when there were *more* school transitions (Figures 3 and 4). In contrast, when peer emotional support was low, sense of belonging was low and depression was high when there were *fewer* school transitions (Figures 3 and 4).

**Table 1.** Descriptive statistics and Pearson correlations

			Pearson Correlations				
	Mean	*SD*	Res. Moves	School Trans.	Parental Attach.	Peer Support	Sense of Belonging
Residential Moves	2.51	2.34					
School Transitions	1.22	1.51	.47**				
Parental Attachment	5.82	.74	-.09*	-.15**			
Peer Emotional Support	4.16	.79	-.03	-.04	.15**		
Sense of Belonging	3.37	.60	.03	-.01	.48**	.40**	
Depression	.29	.16	.03	.06	-.44**	-.23**	-.46**

Note: $^*p < .05$; $^{**}p < .01$, for two-tailed tests.

Table 2. Robust effect sizes and *p*-values for eight regression equations for sense of belonging and for depression
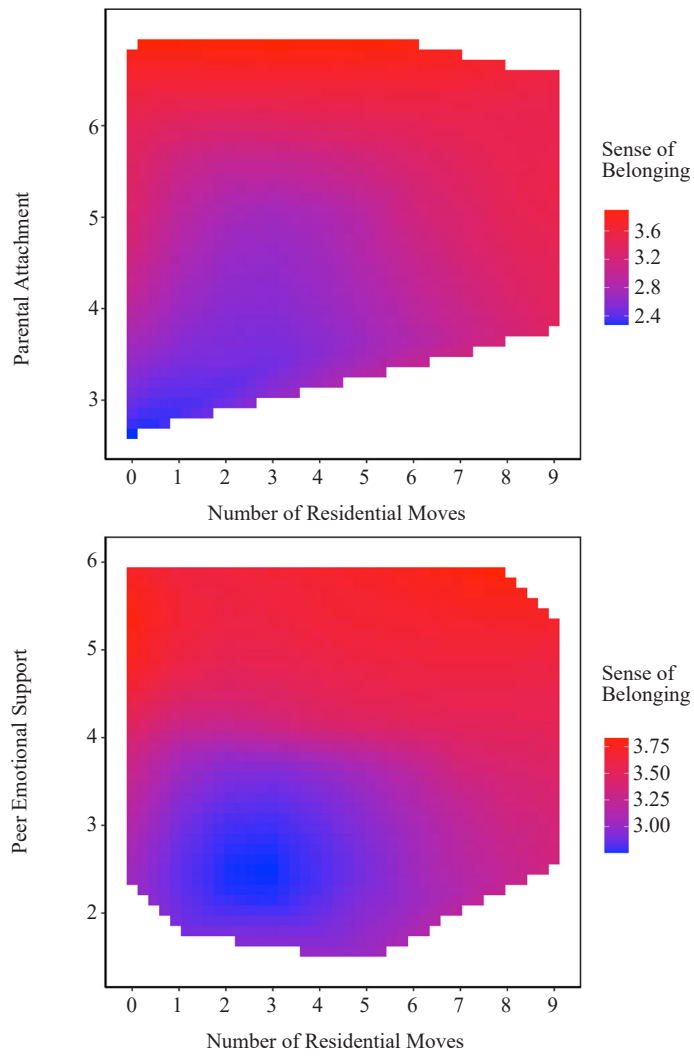
	Sense of Belonging			Depression		
	r	Rsq.	*p*-value	*r*	Rsq.	*p*-value
EQ 1: Parental Attachment	.52	.27	.000	.24	.06	.000
EQ 2: Peer Emotional Support	.39	.15	.000	.08	.01	.047
EQ 3: Residential Moves	.23	.05	.003	.07	.01	.17
EQ 4: EQ 3 + Residential Moves x Parental Attachment	.61	.37	.000	.49	.24	.000
EQ 5: EQ 3 + Residential Moves x Peer Emotional Support	.56	.31	.000	.27	.07	.000
EQ 6: School Transitions	.13	.02	.18	.05	.01	.53
EQ 7: EQ6 + School Transitions x Parental Attachment	.58	.34	.000	.46	.21	.000
EQ 8: EQ6 + School Transitions x Peer Emotional Support	.46	.21	.000	.24	.06	.02

Note: "EQ" = regression equation; "*r*" is the *R*-like effect size and "Rsq." is the *R*-squared-like effect size from the loess regressions; "*p*-value" is the significance level from the robust significance tests (lplotPV for the bivariate associations, and adtest for the interactions; see Wilcox, 2012). The Rsq. and *r* values for the interactions are for the full models, whereas the corresponding significance tests are for the additional prediction provided by the interaction terms beyond the bivariate effects.
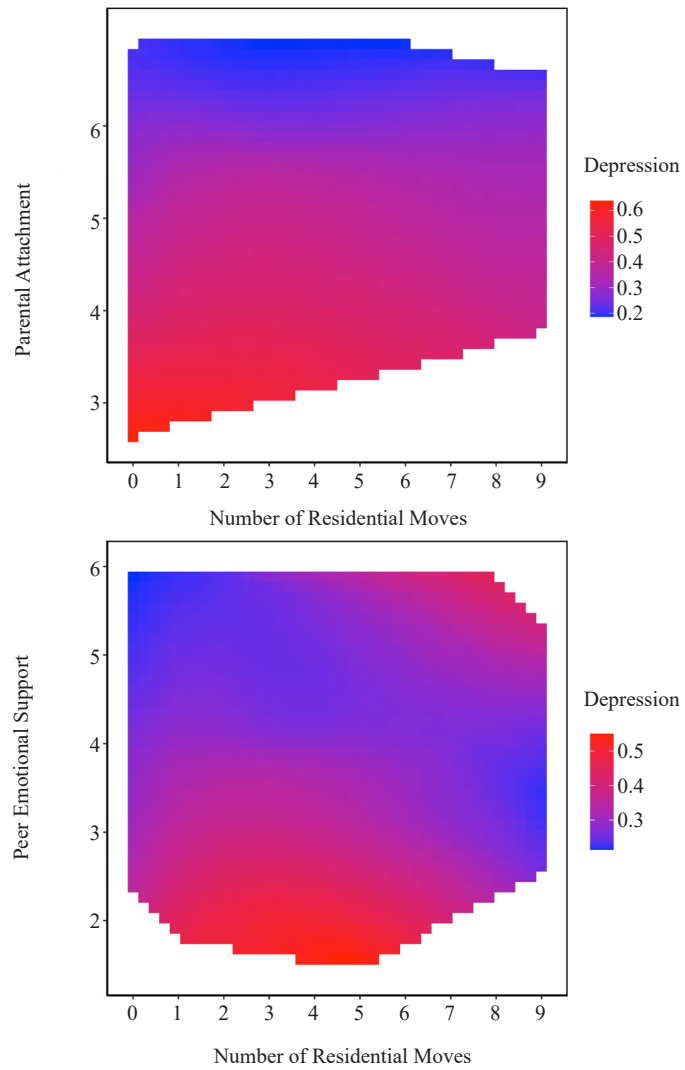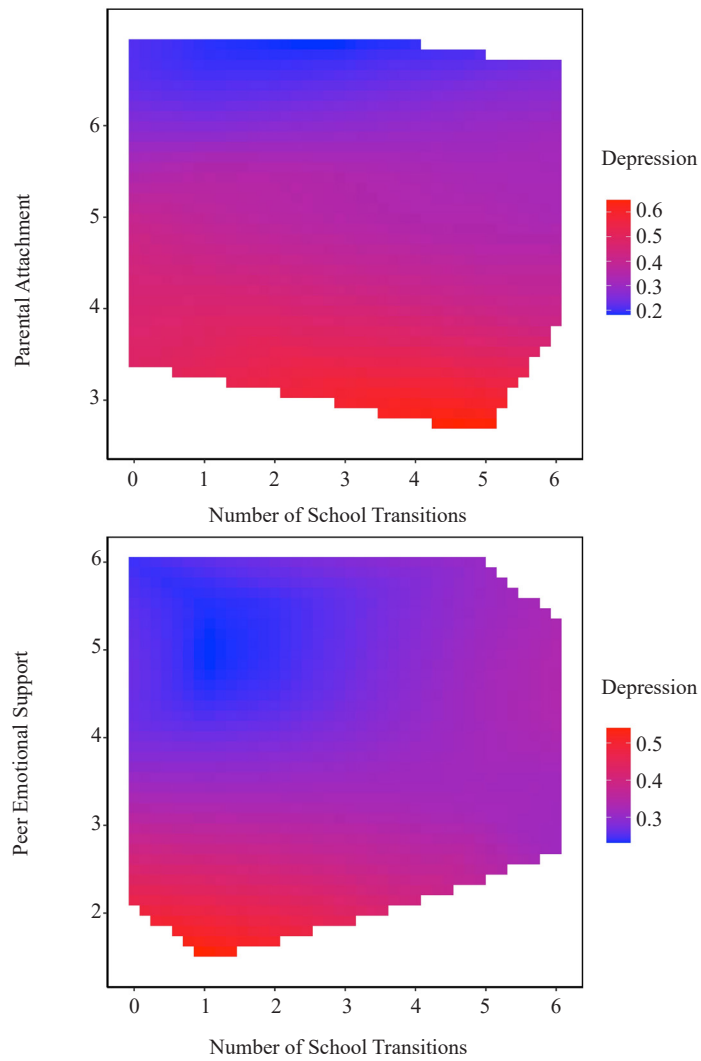
Note: Darker red indicates greater depression; darker blue indicates lower depression. The depression scores were on a 0-to-2 scale (the means of the item responses).

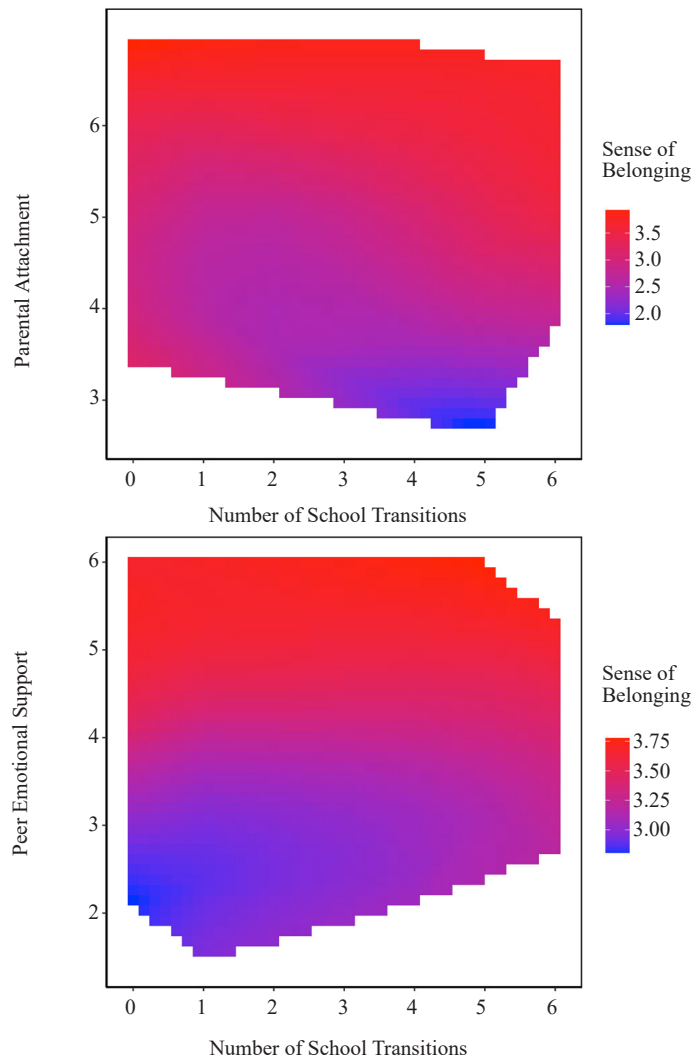**Figure 1.** Interaction patterns for number of residential moves predicting depression

Note: Darker red indicates greater sense of belonging; darker blue indicates lower sense of belonging. The SOBI scores were on a 1-to-4 scale (the means of the item responses).

Figure 2. Interaction patterns for number of residential moves predicting sense of belonging

Note. Darker red indicates greater depression; darker blue indicates lower depression. The depression scores were on a 0-to-2 scale (the means of the item responses).

Figure 3. Interaction patterns for number of school transitions predicting depression

Note. Darker red indicates greater sense of belonging; darker blue indicates lower sense of belonging. The SOBI scores were on a 1-to-4 scale (the means of the item responses).

Figure 4. Interaction patterns for number of school transitions predicting sense of belonging

3.1 *Supplementary analyses*

Supplementary analyses were conducted focusing on whether parental divorce or separation was contributing to the above interaction patterns. There is a separate literature on the sometimes negative consequences of parental divorce or separation for children (D'Onofrio & Emery, 2019). Parental divorce or separation could be a cause of residential moves and school transitions. The supplementary analyses were conducted to determine whether parental divorce or separation could be responsible for the above interaction patterns, i.e., whether such experiences could account for the findings.

Sixty-seven of the participants reported having lived through a parental divorce, whereas the remaining participants had not experienced parental divorce. The Pearson correlation between parental divorce (where 0 = no divorce, 1 = divorce) and number of residential moves was .28, $p < .05$ [*CI* .20, .36]. The correlation for number of school transitions was .04, $p > .05$ [*CI* -.05, .13]. The interaction patterns described above were clearly evident in the robust regression results for the no-parental-divorce participants. The patterns were more variable and less distinct in the much smaller grouping of participants who had experienced parental divorce. This was perhaps to be expected, given that complex data patterns are less likely to stabilize or emerge in a sample of just 67 cases. More generally, the whole-sample interaction patterns described above and, in the Figures, cannot be attributed to parental divorce because they occurred

very clearly in the large subsample of participants who had not experienced parental divorce.

4. Discussion

Parental and peer relationships were expected to serve as moderators of the associations between residential moves, school transitions and outcome variables, but the forms of the interaction patterns were uncertain. Interaction patterns have not been explored in previous studies and a variety of possibilities could occur, which could account for the mixed bivariate associations in previous research (Anderson, 2017; Choi & Oishi, 2020; Cotton, 2016; Dinnen et al., 2020; Gillespie, 2015, 2017; Humke & Schaefer, 1995; Jelleyman & Spencer, 2008). More positive relationships could just slightly soften the blow on outcome variables, or the buffering could be more complete. There could also be relationship contexts that aggravate the effects of mobility. Robust statistical and graphical regression methods were used to reveal the possible linear and/or nonlinear patterns in the data.

Parental attachment and peer emotional support clearly buffered the associations between childhood mobility and depressive symptoms and sense of belonging in the present large sample of young adults. The levels of the buffering were high, and could even be described as complete or near-complete. When parental attachment history was strong (high), or when peer emotional support was high, young adults who had experienced high levels of childhood mobility were as well off as young adults who had experienced low levels of mobility, at least with regards to depressive symptoms and sense of belonging. High levels of mobility apparently had no ill effects on these outcome variables when relationship contexts were positive. This confirms previous statements in the literature regarding the protective benefits of positive relationships when dealing with potentially stressful life events (e.g., DeBoard-Lucas et al., 2010; Forster et al., 2020; Heinze et al., 2018; Miller et al., 2016; Sroufe et al., 2005; Yearwood et al., 2019). Moreover, the bivariate and interactions effect sizes for parental relationships were almost always higher than the findings for peer relationships, indicating the primary importance of previous parental behavior to standings on future psychological outcome variables.

The data patterns that occurred when relationship contexts were not positive were more complex and sometimes surprising. A reasonable expectation might have been that high levels of mobility should be detrimental and that the harm should be amplified or most severe when the mobility occurs in combination with less supportive parental or peer relationships. There was only some evidence for this pattern. The intuitively reasonable pattern occurred for parental attachment (but not for peer emotional support) and school transitions (but not for residential moves). In other words, only two out of the eight statistically significant moderated regression results were consistent with this expectation. Both findings were for school transitions in combination with parental attachment. The lowest levels of sense of belonging and the highest levels of depressive symptoms occurred when there were more school transitions in the context of poor parental attachments.

In contrast, the data patterns for the other six statistically significant moderated regression results at the lower ends of the relationship variable continuums were different and unexpected. All six indicated that sense of belonging was lowest and depression was highest when there were few or moderate numbers of residential moves or school transitions and when parental attachment or peer emotional support were low. In other words, for people with more impoverished relationship contexts, outcomes were more positive when there were *more* moves and transitions compared to when there was less mobility. This pattern was not hypothesized and it has apparently not been previously reported in the literature. The pattern is likely not an aberration, given that it occurred for six out of the eight interactions that were tested. The robust statistical and graphical regression methods that were used, provided more accurate depictions of nonlinear data patterns than do conventional methods, which have produced conflicting findings in previous studies (Anderson, 2017; Choi & Oishi, 2020; Cotton, 2016; Dinnen et al., 2020; Gillespie, 2015, 2017; Humke & Schaefer, 1995; Jelleyman & Spencer, 2008).

The unexpected findings can perhaps be explained by the hypothesis of Oishi et al. (2015) that childhood mobility may spur reaching out to others, leading to increased social involvement and possibly a greater sense of belonging. Once a young person has moved many times, they may adjust to being the outsider, learning more about the nature of belonging in the course of their moves and how to go about accomplishing it if they so desire (see Anderson et al., 2014, for an overview of relevant theorizing). What is interesting regarding this possibility in the present data is that the reaching out may have occurred in some young adults who had more negative relationship histories.

The findings suggest that an adjustment (an expansion) is required to the guiding beliefs in the literature regarding the role of relationships in coping with stressful life events (DeBoard-Lucas et al., 2010 Forster et al., 2020; Heinze et al., 2018; Miller et al., 2016; Rohner, 2021; Sroufe et al., 2005; Yearwood et al., 2019). There was clear support for the notion that positive parental and peer relationships may assist in coping with mobility. The required adjustment is with regards to what happens when parental and peer relationships are not positive. Less mobility in these contexts may serve to entrench already negative working models of self and others and result in a sense that one does not belong and in depressive symptoms. Mobility may provide some relief for such young people. Statistical interactions indicate that variables operate together in predicting an outcome. It was expected that positive relationships would mitigate the negative consequences of mobility, and this did happen. But it appears that mobility itself may also buffer the impact of poor relationships. In other words, when relationship contexts are not positive, it may be residential moves and school transitions that do the buffering.

The inconsistency in the findings for school transitions requires resolution: There were more negative outcomes when there was low peer support and *fewer* school transitions, and when there was low parental support and *more* school transitions. What is most important to children and adolescents may vary across domains and time. Parental environments are more consistently important for residential moves, whereas peer environments may slowly become more important for school transitions.

Further research that examines higher order interactions is required for an integrated understanding of the joint operation of these variables. The effects of one variable likely depends on levels of the other variables. For example, the effects of school transitions may depend on levels of residential mobility, parental support, and peer support. Much larger datasets would be required to study such four-way interactions, but the results would likely better honor the real-world complexities of the phenomena.

4.1 *Limitations and recommendations for future research*

The present sample was relatively homogeneous. It consisted of primarily white university students. The sample was also 74% female, and it is important to confirm the interaction patterns in both genders in further research. There were no indications of such gender differences in the present dataset in which there were relatively fewer males. The parental divorce rate in the sample (14%) was probably lower than what was the case in many previous samples. The degree of experienced family disruption in the sample may not have been as great as what may occur in samples from larger cities or from more culturally, economically or geographically diverse populations. Perkins (2017) found that the effects of moving were significantly worse among African American and Latino children than white children. The sample homogeneity likely served to attenuate the observed effect sizes in the present study. Measures of externalizing behavior problems were not included in the data collection and the moderating influences and parental and peer relationships should be tested for such outcome variables. Another limitation is the use of retrospective measures of parental and peer relationships. Longitudinal research would have been preferable, especially to help identify other possible confounding or moderating variables.

The interaction patterns in the present cross-sectional dataset were nevertheless strong and justify further investigation. Robust statistical and graphical methods should be used to identify data patterns that could otherwise be missed. The buffering effects provided by maternal and paternal relationships may not be the same, and they may vary depending on the gender and personality characteristics of the children involved (Oishi & Schimmack, 2010). There may be higher-order interactions, such as between mobility, parental attachment, peer support, and child personality. Relationships with peers may serve as buffers when the transitions are closely tied to problematic parental relationships, but the buffering may not be as complete as what was observed in this study. The risks associated with mobility may be higher when mobility occurs in adolescence than in childhood (Anderson et al., 2014; Mok et al., 2016; Webb et al., 2016), which suggests the potential importance of the timing of supportive relationships. Finally, the buffering that is provided by relationship contexts is apparently not always the same for residential moves and school transitions. The reason for the differences requires further investigation.

4.2 *Conclusion*

In conclusion, high numbers of childhood residential moves or school transitions do not necessarily have negative outcomes for young adults. Positive parental and peer relationships can effectively buffer the otherwise negative effects, at least with regards to sense of belonging and depressive symptoms. More moves and school transitions can sometimes be better than few moves and transitions when parental and peer relationships are not positive. In these cases, it may be better to experience mobility than to remain stuck in one place.

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Conflict of interest statement

The authors declare no competing and/or relevant financial interests.

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