



# Defense mechanism is predicted by attachment and mediates the maladaptive influence of insecure attachment on adolescent mental health

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## Abstract

There is limited research exploring attachment style and defenses in adolescents. The purpose of the current research is to explore the relationship between adolescent attachment style and development of defense mechanisms, as well as attachment style and problem behaviors. A total of 1487 students from two California high-schools completed three self-report questionnaires to establish defense mechanisms, psychiatric symptoms, and attachment style. Attachment styles characterized by a positive self-image predict greater levels of mature defense mechanisms, and lower levels of immature defense mechanisms, both in the interpersonal and intrapsychic domains. Relationships between insecure attachment styles and psychopathology were mediated by greater levels of immature defense mechanisms. These results provide initial compelling evidence that: a) attachment style is an important determinant of the type of defense mechanisms utilized by the individual to maintain psychological stability; and b) defense mechanisms serve to transmit the detrimental effects of insecure attachment style on psychological health.

**Keywords** Attachment · Development · Defense mechanism · REM-71 · Behavioral problems

## Introduction

Defense mechanisms function at an unconscious level to prevent conflicts and accompanied anxiety from entering awareness (Vaillant 1994). They work either to cope with conflicts of the “inner world” or may skew an individual’s perception of reality. Consequently, defenses function permanently to maintain psychological stability (Malone et al. 2013). A growing

body of evidence demonstrates defense mechanism adaptivity impacts various measures of wellbeing, such as physical (Malone et al. 2013) and psychological outcomes (McMahon et al. 2005; Vaillant 2000).

A vast majority of the literature distinguishes between mature, neurotic and immature defense mechanisms, but there is an ongoing debate about how to best categorize and label them. Aligned with Vaillant’s original model of immature versus mature defenses, the REM-71 is a self-report instrument which has good psychometric properties (Araujo et al. 2006; Steiner et al. 2001) that organizes defenses into two categories: Factor 1 defenses (assimilation) and Factor 2 defenses (accommodation) (Prunas et al. 2014). Factor 1 and Factor 2 are each sub-categorized into intrapsychic defenses, which are internally focused, and interpersonal defenses, which manifest in the context of relating to others (Steiner et al. 2001). The terms “assimilation,” or absorbing external information based on one’s internal schema, and “accommodation,” or modifying internal schemas based on external information, represent a similar adaptive hierarchy as “immature” and “mature,” respectively. However, assimilation and accommodation are less ambiguous labels, as “maturity” can refer either to a developmental construct or adaptive efficacy. Using the REM-71, defense mechanisms have been associated with

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psychosocial functioning (Steiner et al. 2001) and psychiatric symptoms (Besharat and Khajavi 2013; Prunas et al. 2014) in adolescents, with accommodation promoting more adaptive functioning than assimilation.

Defenses have long been conceptualized as a developmental phenomenon that emerge early in infancy (Cramer 1991; Freud 1979). In newborns, “immature” defense mechanisms, like splitting or fantasy, are present, and they develop over early childhood to more mature ones. This development is thought to be influenced by the primary relationships. Therefore, one worthwhile area of study is the potential influence of attachment style (Besharat and Khajavi 2013). Attachment refers to the formation of interpersonal emotional bonds.

Attachment behavior is activated especially when the infant is experiencing fear, in strange situations, under pain or overwhelmed by its fantasies. The infant is hoping for a secure place near its primary caregiver. It is an active partner in this interaction. The empathic reaction in several interactions leads to the unique inner working model of the child (Bowlby 1973). In the beginning the working models are flexible, throughout development they lead to a stable representation of attachment being a behavioral system which is based on information processing.

It can be thought of as a system that regulates emotion through interpersonal dynamics, given that a child manages feelings of stress or fear through his proximity to a caregiver (Guttman-Steinmetz and Crowell 2006). Attachment styles are quite stable (Ravitz et al. 2010). Bowlby described two prominent features of infant attachment that become one’s prototype for future relationships: an internal working model of the self as worthy or unworthy of love and support, and an internal working model of others as a reliable or unreliable source of love and support (Bowlby 1973). Bartholomew combined these internal working models of self-image and image of others to produce four theoretical adult attachment styles: secure, preoccupied, fearful, and dismissing (Bartholomew and Horowitz 1991).

Securely attached individuals, characterized by a positive self-image and a positive image of others, have both a sense of worthiness of love and an expectation that others are responsive. A preoccupied attachment style (negative self-image and positive image of others) results in a dependence on the acceptance of others for self-worth. The fearful style (negative self-image and negative image of others) leads to an avoidance of close relationships as a means to protect oneself against anticipated rejection. Finally, the dismissing (positive self-image and negative image of others) individual avoids close relationships as a way to prevent being disappointed by others. Preoccupied, fearful, and dismissing styles all indicate insecure attachment. Griffin and Bartholomew further suggested that the self and other models are fundamental dimensions of attachment that underlie all measures of adult attachment (Griffin and Bartholomew 1994).

Although attachment styles and defensive mechanisms are distinct concepts of how we cope with stressful situations, both refer to a form of information processing. Defensive mechanisms are stable dynamic patterns, attachment style is a behavioral concept. Both are thought to develop in early childhood, and in recent literature, parallels between these systems are found. Ciocca et al. (Ciocca et al. 2017) showed that paranoid ideation characterized by immature defense mechanisms is clearly associated with an insecure attachment style. The same author (Ciocca et al. 2015) demonstrated that immature defense mechanisms and fearful attachment styles are involved in homophobic attitudes, whereas neurotic defense mechanisms and secure attachment are indicating low levels of homophobia.

Defense mechanisms of pregnant women predicted attachment security in their toddlers as mature, healthy defenses were significantly associated with greater toddler attachment security. Possible mechanisms discussed included parental attunement and mentalization. (Porcerelli et al. 2016)

A large body of research has shown that an individual’s attachment style influences a range of psychological and social factors (Ravitz et al. 2010), including externalizing behavior problems (Guttman-Steinmetz and Crowell 2006), internalizing psychiatric symptoms (Esbjorn et al. 2012), and emotion regulation (Esbjorn et al. 2012; Gillath et al. 2005; Guttman-Steinmetz and Crowell 2006; Moutsiana et al. 2014; Roque et al. 2013). Insecure maternal attachment was found to be associated with depression in ADHD children. (López Seco et al. 2016). Mothers’ arousal and regulation while parenting interacted to predict infant attachment disorganization and behavior problems (Leerkes et al. 2017). Also, the interaction of insecure attachment and behavioral inhibition increased the risk for internalizing problems such as anxiety (Lewis-Morrarty et al. 2015). Defense mechanisms, attachment styles and psychotic phenomena were studied in a non-clinical sample of students (Berry et al. 2006). The authors observed significant associations between insecure attachment and non-clinical psychotic phenomena.

Additionally, emerging research suggests one’s attachment style also impacts physical health and thus makes it even more worthwhile studying, also outside the scope of Child and Adolescent Psychiatry.

Esposito et al. found a higher prevalence of avoidant attachment style and a significantly lower prevalence of the secure attachment style among children affected by migraine without aura compared with the normal controls. Another study (Davies et al. 2009) showed that patients with chronic widespread pain were more likely to report a preoccupied, dismissing or fearful attachment style than those free of pain. Moreover, insecure attachment style was associated with the number of pain sites, the degree of pain related disability but not with pain intensity. Anno et al. (Anno et al. 2015) showed that in a general adult population the prevalence of chronic

pain was higher in individuals reporting affectionless parental bonding style in childhood. Mc Williams et al. (McWilliams 2017) found that even after adjusting for depressive and anxiety disorders attachment insecurity was positively associated with medically unexplained chronic pain.

Migraine headaches (Esposito et al. 2013), chronic pain (Davies et al. 2009), chronic illness, and disease (McWilliams and Bailey 2010; McWilliams et al. 2010), have all been attributed to insecure attachment styles.

The findings of Adams et al. (Adams and McWilliams 2015) demonstrate that sleep disturbances independent of health conditions and concurrent psychiatric disorders is related to attachment insecurity. And also in eating disorders attachment was found to be a predictor of risk. (Szalai and Czegledi 2015); (Jewell et al. 2016)

However, there remains a paucity of research on the relationship between attachment and defenses. The few studies that have been conducted indicate an association between attachment styles and specific defense mechanisms. For example, more adaptive defenses are one well-validated indicator of resilience, found to relate to secure attachment (Simeon et al. 2007). In addition, maladaptive defenses have been associated with insecure attachment (Cramer and Kelly 2010; Lopez 2001; Mikulincer and Horesh 1999). Defense mechanisms have also been found to play a partially mediating role between insecure attachment and alexithymia in a group of adolescents (Besharat and Khajavi 2013). Still, empirical data is lacking on the connection between attachment styles and the development of defense mechanisms. Furthermore, no study has explored the relationship between defenses and working models of the self and other, despite the centrality of self and other working models to attachment (Griffin and Bartholomew 1994).

Here, we describe the first attempt to address these gaps in knowledge by investigating the relationship between attachment styles and 21 defense mechanisms as measured by the REM-71 in a non-clinical group of 1487 adolescents. We hypothesized that attachment style influences development of defenses. Given Griffin and Bartholomew's hypothesis that self and other working models are fundamental attachment dimensions, we hypothesized that self- and other-models specifically influence the development of defenses. As such, we expected attachment styles with positive internal working models of self/others (secure) to be associated with adaptive defense mechanisms (accommodation), while attachment styles characterized by negative internal working models of self/others would be associated with maladaptive defense mechanisms (assimilation). In addition to this, we aimed to extend our insight into this association and build on previous research to more precisely explore the relationship between attachment style and problem behaviors (Erkan et al. 2015). In particular, we hypothesized that

attachment would predict problem behaviors and that this relationship is mediated by defense mechanisms.

## Methods

### Participants

Subjects were students from two local suburban high schools in California, U.S., who agreed to participate in the study. Informed consent was given by the participating student. Informed consent was additionally given by the parents or legal guardian in case of the age being below 16 years to participate in the study, which was approved by the institutional review board of Stanford University. Clinically trained individuals administered the questionnaires to subjects after they had been given sufficient information regarding the purpose of the study. The study was carried out in accordance with the latest version of the Declaration of Helsinki.

### Measures

#### Defense Mechanisms

To evaluate defense mechanisms, participants completed the Response Evaluation Measure (REM-71) (Steiner and Feldman 1995), a 71-item, self-report questionnaire that has been validated for the assessment of 21 defenses in child, adolescent, and adult populations (Araujo et al. 2006; Steiner et al. 2001; Yasnovsky et al. 2003). Each defense is assessed based on the average score of the three or four items that represent that defense. Each item is rated on a 9-point scale from “strongly disagree” (“1”) to “strongly agree” (“9”). The current study utilized a two-factor solution yielded by un-rotated principal components analysis. This has been confirmed in a second large sample of Italian adolescents and adults (Prunas et al. 2009). Factor 1 (F1) is comprised of 14 assimilation defense mechanisms that distort reality according to expected outcome. Factor 2 (F2) is comprised of 7 accommodation defense mechanisms that attenuate distressing reality. Factor 1 and Factor 2 defenses are further differentiated into intrapsychic and interpersonal defenses.

#### Psychiatric Symptoms

To assess psychiatric symptoms, subjects completed the Youth Self-Report (YSR) (Achenbach and Rescorla 2001). This self-report measure is designed to assess emotional and behavioral problems in adolescents. Subjects endorse 112 items on a three-point Likert scale from “not true” (“0”), “somewhat or sometimes true” (“1”), to “very true or often true” (“2”). The YSR yields scores for eight empirically derived narrow-band syndrome scales: social problems, withdrawal, anxiety/

depression, somatic complaints, thought problems, attention problems, delinquency, and aggression. These scales are further grouped into two broad-band summary syndromes: Externalizing (aggressive, gets into fights, undercontrolled) and Internalizing (depressed, withdrawn, overcontrolled). A Total Problem Behaviors score is also provided. The YSR scales have well-established validity and reliability.

### Attachment Style

To evaluate attachment style, subjects completed the Relationship Scales Questionnaire (RSQ), a 30-item self-report dimensional measure of attachment (Griffin and Bartholomew 1994) that yields scores for Bartholomew and Horowitz's four attachment styles (secure, dismissing, fearful, and preoccupied) (Bartholomew and Horowitz 1991). The measure uses a 5-point Likert-type scale for each item ranging from "not at all like me" to "very much like me". The RSQ has demonstrated good reliability and convergent validity (Bartholomew and Horowitz 1991), and longitudinal studies have shown the RSQ to have temporal stability (Scharfe and Bartholomew 1994; Scharfe and Cole 2006).

Continuous scores of each of the four attachment styles are derived by calculating the mean rating of the items representing each attachment prototype. We used these continuous variables to calculate path analyses. As suggested by Griffin and Bartholomew, self-model scores and other-model scores, which have demonstrated construct validity and can be reliably assessed by self-report measures, were derived from the four attachment style scores (Griffin and Bartholomew 1994). As such, the self-model score was obtained by summing the ratings of the two attachment domains with positive self-model (secure and dismissing) and subtracting the ratings of the two attachment domains with negative self-model (preoccupied and fearful) (Griffin and Bartholomew 1994). The other-model score was obtained by summing the ratings of the two attachment domains with positive other-model (secure and preoccupied) and subtracting the ratings of the two attachment domains with negative other-model (dismissing and fearful) (Griffin and Bartholomew 1994).

### Analyses

Since our sample was of considerable size, we decided to perform a split sample algorithm carried out in R, which allowed us to create two data sets, one for exploratory, the other one for confirmatory analyses. Carrying out a confirmatory analysis yields a clear formulation of a theory to be tested in its application and thus reaches more generalizable results.

Statistics for both exploratory and confirmatory analyses were first calculated using the Statistical Package for the Social Sciences (SPSS) Version 21. We performed linear regressions with sex, age, and self-model score/other-model

score as independent variables, and intrapsychic and interpersonal assimilation/accommodation as dependent variables.

In addition, path analysis, a method to determine whether or not a multivariate set of non-experimental data fits well with a particular (a priori) causal model, was employed and carried out in R. Four focal predictors (continuous variables of attachment styles), 4 mediators (interpersonal/intrapsychic assimilation/accommodation), 2 outcomes (internalizing and externalizing problem behaviors), and 2 covariates (age, sex) of all 10 variables were added to the path analysis. Again, path analyses were performed for each exploratory and confirmatory data set separately.

## Results

### Sample

Of the students surveyed, 89% returned valid surveys. Of these 1487 students, 45% were male ( $N = 663$ ) and their mean age was 15.9 years (S.D. = 1.2, range 13–20). Ethnic composition of the sample was as follows: Caucasian 39.5%, Hispanic 25.8%, Asian 12.9%, Other 11.8%. Their parents' employment levels were average for the region (94% of fathers and 82% of mothers were employed; 77% of the students came from two-income homes).

### Analyses in the Exploratory Dataset

#### Self Versus Other Model: Independent Contributions of Self Versus Other Model to Interpersonal and Intrapsychic Assimilation and Accommodation

We calculated the self-model and other-model score and assessed how these scores map onto interpersonal and intrapsychic dimensions of assimilation and accommodation.

We performed linear regressions with sex, age, and self-model score as predictors of intrapsychic and interpersonal assimilation. We performed a second linear regression with sex, age, and self-model score as predictors of intrapsychic and interpersonal accommodation.

The self-model score was a significant predictor in each of the two regression models, both for intrapsychic ( $B = -0.26$ ,  $p < 0.01$ ) as well as interpersonal ( $B = -0.36$ ,  $p < 0.01$ ) assimilation (Table 1). Self-model score also predicted the intrapsychic ( $B = 0.10$ ,  $p < 0.01$ ) and interpersonal domains ( $B = 0.13$ ,  $p < 0.01$ ) of accommodation (Table 1).

In addition, we constructed analogous regression models of other-model score as a predictor of intrapsychic and interpersonal assimilation in one model and as a predictor of intrapsychic and interpersonal accommodation in a separate regression model. Other-model score significantly predicted both intrapsychic ( $B = -0.14$ ,  $p < 0.01$ ) and interpersonal

**Table 1** Exploratory analyses. Linear regressions with sex, age, and self-model score as predictors of intrapsychic and interpersonal assimilation

	Model 1: Assimilation-Intrapsychic			Model 2: Assimilation-Interpersonal			Model 1: Accommodation-Intrapsychic			Model 2: Accommodation-Interpersonal		
	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta
(Constant)	5.066***	0.567		6.258***	0.678		3.160***	0.810		5.972***	0.733	
Sex	-0.037	0.084	-0.018	0.111	0.101	0.045	0.438***	0.120	0.164	-0.355**	0.109	-0.147
Age	-0.026	0.035	-0.031	-0.076	0.042	-0.074	0.086	0.050	0.077	-0.018	0.045	-0.017
Self-Model	-0.264***	0.025	-0.434	-0.355***	0.030	-0.477	0.098**	0.036	0.122	-0.127***	0.033	0.174

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

assimilation ( $B = -0.21$ ,  $p < 0.01$ ) (Table 2). A comparably significant contribution was found when assessing the interpersonal domain of accommodation and the independent contribution of the other-model score ( $B = 0.16$ ,  $p < 0.01$ ) (Table 2). There was no significant contribution for the other-model score and the intrapsychic domain of accommodation.

#### Attachment and Problem Behaviors, Mediated by Defense Mechanisms

We used path analyses to test the hypothesis that attachment would predict problem behaviors as assessed with the Youth Self Report, which would be mediated by defense mechanisms.

Four focal predictors (continuous variables of attachment styles), 4 mediators (interpersonal/intrapsychic assimilation/accommodation), 2 outcomes (internalizing and externalizing problem behaviors), and 2 covariates (age, sex) of all 10 variables were added to the path analyses.

Due to the large number of indirect effects we were testing, we report here only those significant at  $p < 0.01$ . Internalizing and externalizing problem behaviors were predicted by both preoccupied attachment ( $p < 0.01$ ) and fearful attachment ( $p < 0.01$ ), showing a significant positive relationship between problem behaviors and attachment domains. These relationships were significantly mediated both by intrapsychic and interpersonal assimilation. Internalizing and externalizing problem behaviors were

also predicted by the secure attachment domain, showing a significant negative relationship ( $p < 0.01$ ), that was mediated by interpersonal assimilation.

#### Analyses in the Confirmatory Dataset

##### Self Versus Other Model: Independent Contributions of Self Versus Other Model to Interpersonal and Intrapsychic Assimilation and Accommodation

All of the described significant relationships from the exploratory dataset could be replicated in the confirmatory dataset, with the self-model score contributing significantly to the regression model, both for the intrapsychic as well as the interpersonal domain of assimilation and accommodation. The same set of relationships could be established for the other-model score, with the exception, that, like in the exploratory dataset, there was no significant contribution of the other-model score and the intrapsychic domain of accommodation.

##### Attachment and Problem Behaviors, Mediated by Defense Mechanisms

The most significant effects from the exploratory dataset were replicated in the confirmatory sample. In addition to replicating the findings from the exploratory dataset, the mentioned relationship for externalizing problem behavior was mediated by interpersonal assimilation for the preoccupied and fearful

**Table 2** Exploratory analyses. Linear regressions with sex, age, and other-model score as predictors of intrapsychic and interpersonal assimilation

	Model 1: Assimilation-Intrapsychic			Model 2: Assimilation-Interpersonal			Model 1: Accommodation-Intrapsychic			Model 2: Accommodation-Interpersonal		
	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta
(Constant)	4.536***	0.608		5.688***	0.734		3.404***	0.813		5.936***	0.722	
Sex	-0.123	0.090	-0.061	-0.007	0.109	-0.003	0.471***	0.121	0.176	-0.305**	0.107	-0.126
Age	-0.005	0.038	-0.006	-0.055	0.046	-0.054	0.076	0.051	0.068	-0.013	0.045	-0.013
Other-Model	-0.140***	0.027	-0.233	-0.212***	0.033	-0.289	0.032	0.036	0.041	0.163***	0.032	-0.226

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

**Table 3** Confirmatory analyses. Linear regressions with sex, age, and self-model score as predictors of intrapsychic and interpersonal assimilation

	Model 1: Assimilation-Intrapsychic			Model 2: Assimilation-Interpersonal			Model 1: Accommodation-Intrapsychic			Model 2: Accommodation-Interpersonal		
	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta
(Constant)	4.530***	0.586		6.299***	0.643		2.504**	0.780		4.988***	0.730	
Sex	-0.061	0.087	-0.029	0.181	0.095	0.075	0.44***	0.116	0.165	-0.378**	0.108	-0.155
Age	0.003	0.036	0.003	-0.084	0.040	-0.084	0.119*	0.048	0.107	0.039	0.045	0.038
Self-Model	-0.262***	0.026	-0.424	-0.344***	0.028	-0.491	0.170***	0.034	0.217	0.099**	0.032	0.138

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

attachment domain, and by interpersonal accommodation only for the secure attachment domain (Tables 3 and 4).

### Discussion

To our knowledge, this study presents the first pieces of evidence that attachment style influences the predominant expression of defense mechanisms, and these defense mechanisms serve to mediate the association between insecure attachment styles and psychopathology. We utilized a large sample of healthy adolescents to derive these findings and furthermore replicated effects in a separate sample. This study produced the following primary findings. Attachment styles characterized by a positive self-image predict greater levels of mature defense mechanisms, those characterized by accommodation, and lower levels of immature defense mechanisms, those characterized by assimilation, both in the interpersonal and intrapsychic domains. Attachment styles characterized by a positive other self-image predict lower levels of assimilation in the interpersonal and intrapsychic domains, but higher levels of accommodation in only the interpersonal domain. Relationships between several insecure attachment styles and psychopathology were mediated by greater levels of assimilation and lower levels of accommodation. In aggregate, these results provide initial compelling evidence that: a) the attachment style lets us deduce to the type of defense mechanisms utilized by the individual to maintain psychological

stability; and b) defense mechanisms serve to transmit the detrimental effects of insecure attachment style on psychological health.

Our results are generally in line with research that links mature defenses, i.e. accommodation, with secure attachment (Simeon et al. 2007) and immature defenses, i.e. assimilation, with insecure attachment (Cramer and Kelly 2010; Lopez 2001; Mikulincer and Horesh 1999). In a recent study using the Adult Attachment Interview, findings suggest that adult attachment in patients with systemic lupus erythematosus has an influence on the presence of alexithymic features (Barbasio and Granieri 2013). We postulate that emotion regulation difficulties associated with insecure attachment may inhibit the development of adaptive defense mechanisms, while secure attachment may facilitate the use of more mature defense mechanisms (Besharat and Khajavi 2013). It is also possible that insecure attachment is a developmental risk factor for consolidating maladaptive defense mechanisms, which convey the influence of attachment style on emotion regulation efficacy (Besharat and Khajavi 2013).

Here, we expand previous research by differentiating between intrapsychic and interpersonal defenses. Our results demonstrate striking connections between internal working models of the self and intrapsychic defense mechanisms, and internal working models of others and interpersonal defense mechanisms. We found attachment styles characterized by a negative self-image to be associated with intrapsychic assimilation. In other words, the

**Table 4** Confirmatory analyses. Linear regressions with sex, age, and other-model score as predictors of intrapsychic and interpersonal assimilation

	Model 1: Assimilation-Intrapsychic			Model 2: Assimilation-Interpersonal			Model 1: Accommodation-Intrapsychic			Model 2: Accommodation-Interpersonal		
	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta
(Constant)	4.437***	0.636		6.171***	0.713		3.016***	0.809		4.533***	0.725	
Sex	-0.184	0.093	-0.088	0.023	0.104	0.010	0.518***	0.118	0.194	-0.328**	0.106	-0.135
Age	-0.001	0.039	-0.001	-0.089	0.044	-0.089	0.096	0.050	0.086	0.068	0.045	0.067
Other-Model	-0.136***	0.026	-0.234	-0.191***	0.029	-0.289	-0.007	0.033	-0.009	0.158***	0.030	0.234

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

view that one is unworthy of love and support was linked with internally focused maladaptive defense mechanisms. Likewise, attachment styles with positive self-image were significantly associated with intrapsychic accommodation, attachment characterized by a sense of worthiness of love and support was linked with internally focused adaptive defenses. This pattern was also found for interpersonal defenses: interpersonal assimilation was significantly associated with attachment styles characterized by a negative image of others; while interpersonal accommodation associated with attachment styles characterized by a positive view of others.

While some caution should be exercised in interpreting these associations due to the fundamental differences in the constructs of attachment and defenses (Ravitz et al. 2010), there does therefore seem to be a parallel between one's internal working models and maturity of defenses.

Results of our path analysis indicate that assimilation (interpersonal and intrapsychic) indirectly affect the relationship between attachment styles characterized by a negative view of the self and internalizing and externalizing problem behaviors. In other words, assimilation may build a bridge between a negative internal working model of the self and problem behaviors. This is in line with research indicating that insecure attachment may put children on a path toward developing problem behaviors or psychiatric symptoms (Ciocca et al. 2017; Esbjorn et al. 2012; Guttman-Steinmetz and Crowell 2006).

By mapping an attachment model differentiated by self-image and image of others onto the adaptiveness of intrapsychic and interpersonal defense mechanisms, our study supports the hypothesis that facets of attachment exert influences on the development of defense mechanisms—put differently, the way in which one relates to others early in life may affect how maturely developed the defense mechanisms used for self-regulation are. (one then self-regulates using defense mechanisms.) The parallels between the four attachment styles and defenses found in our study also support the organization of defense mechanisms into assimilation and accommodation categories as summarized by Factor 1 and Factor 2 of the REM-71. Finally, our results highlight the value of differentiating between intrapsychic and interpersonal defense mechanisms when assessing their relationship with other psychological constructs.

Limitations of this study include the retrospective nature of the Bartholomew Attachment Interview and the use of self-report instruments, which can allow for biased responses due to either the desire for social desirability or the pre- and unconscious level of information processing. The cross-sectional study design also prevents us from being able to draw causal conclusions; longitudinal studies are needed in order to establish causal relationships

between attachment and defenses. Research on large samples of clinical populations of adolescents would be beneficial in order to compare results with nonclinical samples. In addition, further research is required in order to better understand the influential role that attachment styles may have on defenses, to evaluate the predictive value of attachment with regard to defenses, and to explore additional variables that may influence how defenses originate and evolve.

Given our findings that attachment has a significant effect on defenses, as well as the growing body of literature suggesting both attachment and defenses have a significant impact on physical health (Davies et al. 2009; Esposito et al. 2013; McWilliams and Bailey 2010; McWilliams et al. 2010), it is important to consider the medical implications of these factors when assessing a pediatric patient.

## Summary

In conclusion, these results provide initial compelling evidence that: a) attachment style is an important determinant of the type of defense mechanisms utilized predominantly by the individual to maintain psychological stability; and b) defense mechanisms serve to transmit the detrimental effects of insecure attachment style on psychological health.

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## Compliance with Ethical Standards

**Conflict of Interest** Clarissa Laczkovics declares that she has no conflict of interest. Gregory Fonzo declares that he has no conflict of interest. Brianna Bendixsen declares that she has no conflict of interest. Emmanuel Shpigel declares that he has no conflict of interest. Ihno Lee declares that she has no conflict of interest. Katrin Skala declares that she has no conflict of interest. Antonio Prunas declares that he has no conflict of interest. James Gross declares that he has no conflict of interest. Hans Steiner declares that he has no conflict of interest. Julia Huemer declares that she has no conflict of interest.

**Ethical Approval** All procedures performed were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments.

**Informed Consent** Informed consent was obtained from all individual participants included in the study. Informed consent was additionally given by the parents or legal guardian in case of the age being below 16 years.

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