

## Young adolescents' emotional and regulatory responses to positive life events: Investigating temperament, attachment, and event characteristics

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*(Received 23 July 2012; accepted 10 September 2013)*

Very little is known about what factors predict variations in responses to positive events among youth. Consequently, we examined young adolescents' positive emotional reactions and their savoring and dampening responses to their most intense positive event across a four-day period. The investigated predictors were parent-reported adolescent temperament, adolescent-reported attachment security with mothers and fathers, and researcher-coded event characteristics. The sample was 56 youth (31 boys, 10–14 years of age). More support was found for temperament than attachment. Specifically, effortful control predicted more savoring and sustained positive affect (PA) about the events, whereas negative emotionality predicted more dampening. Adolescents' reports of more secure attachment to fathers were marginally linked to more savoring of their positive event. Girls reported higher levels of initial PA yet endorsed more dampening responses than boys. Event type (interpersonal vs. not) was unrelated to responses to the events. Overall, this study offers new information on the development of PA regulation and responses to positive events in youth.

**Keywords:** positive events; positive emotions; attachment; temperament; gender; children; adolescents; savor; maximize; minimize; dampen; capitalize; coping

Experiencing more frequent positive affect (PA) and deriving lasting effects from positive events are goals that many people may be interested in achieving. Moreover, PA begets additional benefits including better personal relationships, physical and mental health, and success at work (e.g. Boehm & Lyubomirsky, 2008; Fredrickson, 1998b; Fredrickson & Losada, 2005; Lyubomirsky, King, & Diener, 2005; Steptoe, Dockray, & Wardle, 2009). A growing body of research suggests that people can respond to positive events in ways (e.g. savoring, capitalizing, maximizing) that allow them to maintain and enhance their PA and reap more benefits from the events (e.g. Bryant, 2003; Bryant & Veroff, 2007; Gentzler, Morey, Palmer, & Yi, 2013; Langston, 1994). However, little information exists on why people may or may not respond effectively to positive events, despite the recognition that investigating the origin of these responses and how PA can be cultivated are critical research directions (Bryant, Chadwick, & Kluwe, 2011; Fredrickson, 1998a). As a result, we examined how temperament, attachment with parents, and event characteristics were linked to adolescents' emotional and regulatory responses to their positive life events.

### Responses to positive events

Early research with adult samples on variations in responses to positive events included Langston's (1994)

work on capitalizing and Bryant's work on savoring (1989). Capitalizing is exemplified by marking, sharing, and celebrating a positive event (Langston, 1994), with more recent research focusing on sharing positive events within close relationships (e.g. Gable, Reis, Impett, & Asher, 2004). Savoring refers to people's ability to control and enhance PA through engagement in a range of responses such as anticipating future positive events, mindfully focusing on positive experiences as they occur, or reminiscing on previous positive events (Bryant, 2003; Bryant & Veroff, 2007). These strategies generally appear to be adaptive responses to positive events given their links to extended positive feelings about the events, greater PA, life satisfaction, happiness, self-esteem, trust, and prosocial feelings (Bryant, 2003; Feldman, Joormann, & Johnson, 2008; Gentzler, Kerns, & Keener, 2010; Hurley & Kwon, 2011; Jose, Lim, & Bryant, 2012; Langston, 1994; Quoidbach, Berry, Hansenne, & Mikolajczak, 2010; Reis et al., 2010; Verduyn, Van Mechelen, & Tuerlinckx, 2011). In contrast, less effective responses, namely dampening or minimizing strategies, involve having negative thoughts or downplaying the significance of a positive event. These responses are linked to negative outcomes, such as lower self-worth and depressive symptoms (Feldman et al., 2008; Raes, Smets, Nelis, & Schoofs, 2012; Wood, Heimpel, & Michela, 2003).

Research on how children and young adolescents respond to positive events is more limited. One study

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indicated that children reporting greater capacity to savor also reported higher levels of well-being, PA, and self-esteem (Cafasso, 1994, as cited in Bryant & Veroff, 2007). In an earlier paper, we reported that various maximizing or savoring responses (including sharing, marking, celebrating, and reflecting on the event or PA) were linked to young adolescents' sustained positive feelings toward a positive event, whereas minimizing or dampening responses were related to internalizing and externalizing problems (Gentzler et al., 2013). Another study focusing on emotion regulation of PA found that lower levels of positive rumination (i.e. reflecting on PA and achievements) predicted greater increases in depressive symptoms for 10- to 14-year-olds who reported more stressors (Bijttebier, Raes, Vasey, & Feldman, 2012). Other research on depressive attributions in children has linked certain inferences following positive events to higher levels of depressive symptoms or depression – namely, attributing the cause of the positive event to specific, unstable, or external factors rather than global, stable, and internal factors (Gladstone & Kaslow, 1995; Joiner & Wagner, 1995; Thompson, Kaslow, Weiss, & Nolen-Hoeksema, 1998). Overall, this body of work suggests that responses to positive events and their ramifications may operate similarly in children and adolescents as they do in adults.

Early adolescence may be a particularly critical period to investigate responses to positive events. Adolescents may be especially sensitive to positive events and to rewards more generally as suggested by some neuroimaging data (e.g. Chein, Albert, O'Brien, Uckert, & Steinberg, 2011; Forbes et al., 2010; Van Leijenhorst et al., 2010). By mid-adolescence, teens are also experiencing higher levels of depression (Hankin et al., 1998), and as noted in recent reviews (Carl, Soskin, Kerns, & Barlow, 2013; Gilbert, 2012), dysregulated PA is prevalent in numerous other disorders. Thus, understanding factors that predict variation in these savoring or dampening processes is crucial from a prevention standpoint. Additionally, the evolutionarily adaptive benefits of PA have been identified by Fredrickson's broaden and build theory and related research (Fredrickson, 2001). However, this work predominantly focuses on adult samples and the outcomes of PA. Therefore, the current project's focus on the developmental contributors to PA and its regulation can offer important new insight into the cultivation of PA (Fredrickson, 1998a).

### *Factors affecting responses to positive events*

In this study, we focus on three plausible predictors of young adolescents' responses to positive events. The first is children's temperament, which pertains to moderately stable, biologically influenced predispositions in reactivity and regulation (Rothbart & Derryberry,

1981). The second, attachment, is also a relatively stable individual characteristic that originates early within the parent-child relationship but becomes an internalized, habitual style of regulating affect and interacting in future close relationships (Bowlby, 1973; Main, Kaplan, & Cassidy, 1985). The third pertains to characteristics of the events that may result in variations in emotional or regulatory responses to positive events.

### *Temperament*

Because temperament is defined as individual differences in reactivity and regulation and is closely tied to children's emotional reactions and coping responses (Rothbart & Bates, 2006), we expected temperament to influence children's reactions to positive life events in several ways. One facet of temperament that should be especially pertinent to responses to positive events is surgency, which reflects the propensity to experience intense PA and exhibit high levels of approach behavior. Surgency is often measured by specific temperament dimensions, such as positive emotionality, high intensity pleasure, approach behavior, activity level, and low shyness (Kochanska, Aksan, Penney, & Doobay, 2007; Muris & Meesters, 2009; Rothbart, Ahadi, Hershey, & Fisher, 2001). It strongly relates to extraversion and is very closely tied to the behavioral activation or approach system (Derryberry & Rothbart, 1997). Due to its direct relevance to the pursuit and enjoyment of positive activities, surgency could therefore be expected to relate to more intense PA in response to events. We also could expect that surgency may relate to greater savoring responses given that savoring is more common with events that elicit more PA (Gentzler et al., 2013) and because surgency involves a preference for social situations and some savoring strategies are social (i.e. sharing the event, celebrating).

Negative emotionality, another basic component of the reactive facet of temperament, involves the intensity and frequency of negative emotions like fear, sadness, and anger or frustration (Rothbart et al., 2001). We could expect that greater negative emotionality predicts less intense positive emotional reactions, as some research would suggest that negative affect and PA are bipolar, or negatively correlated (e.g. Green, Goldman, & Salovey, 1993; Russell & Carroll, 1999). Although some research suggests a general proclivity to react more intensely regardless of the affective valence (Larsen, Diener, & Emmons, 1986), past studies have indicated that early adolescents' trait levels of negative emotionality does predict less intense PA (e.g. Gumora & Arsenio, 2002). Negative emotionality also may relate to greater dampening because research indicates that children rated higher on negative emotionality tend to have more negative appraisals of life events (Lengua, Sandler, West,

Wolchik, & Curran, 1999). Though traditionally assessed with negative life events, this negative outlook may be evident with positive life events as well, which could be detected from interpretations (e.g. thinking an event was not a big deal) that may dampen their enthusiasm for their good events. In addition, other research suggests that children who are higher on negative emotionality rely on ineffective coping strategies (e.g. venting or acting out) with negative events (Carson & Bittner, 2001; Eisenberg, Fabes, Nyman, Bernzweig, & Pinuelas, 1994), which may be extended to ineffective responses to positive life events.

Finally, effortful control is a broad regulatory factor of temperament reflecting the degree to which children can control their attention and behavior. Specifically, Rothbart and Bates (2006) describe it as central to sustaining attention and being able to inhibit a dominant response or activate a non-dominant response. This ability to regulate attention and behavior may allow children to select and enact adaptive responses to positive events, such as attending to positive aspects of events rather than considering potential negative implications. Research also indicates that children who are rated higher on effortful control are better able to cope with or regulate negative affect (Eisenberg et al., 1993, 1994). As a result, children's effortful control should predict their reliance on more savoring and less dampening strategies.

### *Attachment*

Attachment is the universal need to maintain emotional bonds with close others, but individual differences arise early in life largely due to how infants are responded to when distressed (Bowlby, 1973). As theorized by Bowlby and empirically supported by others in both correlational studies and interventions (where high-risk parents are taught more effective parenting techniques), attachment security tends to develop when young children have responsive, sensitive, and warm caregivers (Ainsworth, Blehar, Waters, & Wall, 1978; for reviews, Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003; De Wolff & van IJzendoorn, 1997). These children develop more effective regulatory strategies (e.g. turning to others for support) to manage negative affect (Cassidy, 1994; Contreras, Kerns, Weimer, Gentzler, & Tomich, 2000). By contrast, attachment insecurity tends to develop when caregivers are more unreliable or unresponsive. Specifically, avoidant or dismissing attachment pertains to a rejecting caregiving history where children learn to suppress emotion expressions in part to deactivate the attachment system, whereas anxious-ambivalent or preoccupied attachment pertains to an inconsistent caregiving history where children learn to exaggerate negative affect to activate the attachment system (Ainsworth et al., 1978; Mikulincer, Shaver, & Pereg, 2003).

Although attachment differences develop mainly in the context of the child being distressed, there can be important implications for one's experience of PA (Cassidy, 1994; Diamond & Aspinwall, 2003; Mikulincer & Shaver, 2005; Shaver & Mikulincer, 2008). For example, given that expressing emotion of any kind can be an intimate exchange, avoidant or dismissing children may learn to suppress expressions of PA (Cassidy, 1994). Research with adults supports the pattern that securely attached adults report higher PA than insecure individuals (e.g. Deniz & Isik, 2010; Simpson, Collins, Tran, & Haydon, 2007; Torquati & Raffaelli, 2004). Findings with infants also indicate that secure infants display more PA than insecure infants (Waters, Wippman, & Sroufe, 1979). Although the literature in middle childhood or early adolescence is especially sparse, some links between attachment and PA have been found. Children's security was associated with higher levels of trait and state PA (Borelli et al., 2010) and parent-child attachment security predicted more positive mood on four days of daily reports (Kerns, Abraham, Schlegelmilch, & Morgan, 2007).

Research on attachment and regulatory responses to positive events or PA is even rarer. However, studies on positive event sharing with adults suggest that attachment shapes people's responses to their own and their romantic partners' positive events (Gosnell & Gable, 2013; Hicks & Diamond, 2008; Shallercross, Howland, Bemis, Simpson, & Frazier, 2011). Adults scoring higher on anxious and avoidant attachment dimensions also underestimate their initial positive emotional reactions to positive events (Gentzler & Kerns, 2006) and minimize or dampen their positive events more than less insecure adults (Gentzler et al., 2010). Additionally, more securely attached adults exhibited greater reflection on a standardized positive experience in the lab, indicating a tendency to savor (Gentzler et al., 2010). However, no published research to our knowledge has addressed how attachment relates to responses to positive events in youth.

### *Event characteristics*

Certain types of events may evoke particular responses simply due to the characteristics of the events. With negative life events, some evidence suggests that interpersonal events may be more consequential for adolescent girls than boys (Rudolph & Hammen, 1999; Shih, Eberhar, Hammen, & Brennan, 2006). With positive events, studies with college students found that achievement vs. non-achievement events elicited different types of positive emotions (Goetz, Frenzel, Stoeger, & Hall, 2010) and that students were more likely to minimize or dampen non-interpersonal events compared to interpersonal events (Gentzler et al., 2010). Event duration (whether or not events are likely to have lasting effects)

may also be important in that events with longer lasting impacts may result in sustained PA and more savoring responses.

### **Present study**

Our goal was to identify factors that explain variations in young adolescents' experience of PA and their regulatory responses to positive events by focusing on their temperament, attachment with parents, and event characteristics. We examined 10- to 14-year-olds' initial PA in response to a positive event, their PA about the event approximately a week later so that we could assess change in feelings about the events, and how much they engaged in savoring and dampening responses. For temperament, we expected: surgency to relate to (1a) more intense initial PA, (1b) more positive (or less negative) change in PA across time, and (1c) higher levels of savoring; negative emotionality to relate to (2a) less initial PA, (2b) a greater decrease in PA over time, and (2c) more dampening; and higher effortful control to relate to (3a) more savoring, and (3b) less dampening. For attachment, we hypothesized that children who are higher on attachment security with their mother or father would report (4a) more intense initial PA, (4b) more positive change in PA across time, (4c) greater savoring, and (4d) less dampening responses. For event characteristics, we coded event domain (interpersonal vs. non-interpersonal) and duration (long vs. short-term). The domain coding was exploratory, whereas for duration, we expected (5a) increased (or less of a decrease) in PA over time, (5b) more savoring, and (5c) fewer dampening responses when events were considered to have long-term effects. On an exploratory basis, we also investigated how children's sex and age were associated with their responses to positive events.

## **Method**

### **Participants**

Fifty-six youth (31 boys and 25 girls) between the ages of 10 and 14 ( $M = 11.88$  and  $SD = 1.38$ ) participated in this study. The study consisted of an initial meeting, four days of daily reports, and a follow-up telephone interview. The racial-ethnic distribution of the child sample was 76.8% Caucasian, 1.8% African-American, and 19.6% biracial (5.4% African-American/Caucasian, 5.4% Asian/Caucasian, 5.4% American Indian/Caucasian, and 3.6% Latino/Caucasian). Siblings were allowed to participate in the study. The participants came from 45 families, including five sibling dyads and three sibling triads. For participating parents, 92.9% were the biological mother, 5.4% were the biological father, and one reported being neither biological parent nor stepparent. Regarding the current family structure, 85.7% of

the child participants were from a two-parent family (either biological or step family), 12.5% were from a single-parent family, and 1.8% had missing information. For parent's highest education level, 3.6% completed 9th–12th grade; 17.9% had some college or trade school; 39.3% graduated from a four-year college, and 39.3% completed graduate school.

Participants came from a larger sample of 65 children. Initially, participants were required to be a minimum age of 7, but we increased the minimum age to 10 years after the first five participants because younger children had difficulty completing daily reports on their own. We therefore excluded four children because they were younger than 10. We also excluded three youth because they only completed the initial session and another two for mailing the forms back late and appearing to complete them all on the same day. These five adolescents did not differ from the remaining sample on attachment with mothers, temperament, age, or gender. However, the excluded adolescents reported less secure attachment with fathers ( $M = 2.52$  and  $SD = 0.38$ ) than the remaining sample ( $M = 3.16$ ,  $SD = 0.57$ ,  $t(56) = -2.32$ , and  $p = 0.024$ ).

### **Procedure**

The study was advertised as a study on 'Emotional and Coping Responses in Children' to parents and children in the university and surrounding community (e.g. by posting flyers, using email or website posts, and through in-person recruitment at community events). Interested parents contacted research staff to set up the initial session at the family's home or the research lab. Each parent and adolescent received \$20 for participating. Our university's institutional review board approved our study.

At the initial session, parents and adolescents completed surveys after giving consent and assent. Adolescents were given a folder with their daily reports and were told to complete the forms at the end of each day for four days starting on the next Monday. They were told to mail the previous day's surveys back to the university each morning in a postage-paid envelope. This method ensured that adolescents completed forms each day, thereby shortening the event-to-reporting delay and decreasing potential bias in estimating immediate emotional reactions to events. Although the postmark date was not always visible to verify mailing dates, we did review reports as they were returned to ensure that participants generally had followed the procedures. Adolescents described their most negative and positive event for the day and rated their immediate emotional reaction to the events on each daily report.

During the follow-up telephone interview (though two adolescents were interviewed in person), adolescents

were asked about their emotional reactions and regulatory responses to one negative and one positive event from their daily reports. Because the negative event is not the focus of this paper, it is not discussed further. The positive event was chosen by researchers because it elicited the most intense initial emotional reaction as recorded on the child's daily reports. If the same intensity was reported for multiple events, one was chosen at random. This method of selection was used to assess a potentially memorable and meaningful event. The follow-up interviews all took place within 12 days of the event ( $M = 8.45$  days and  $SD = 2.01$ ).

## Measures

### Positive emotional reactions to events

On each daily report, after describing the best thing that happened to them that day, adolescents rated their initial positive emotional reaction when the event first occurred. Specifically, they indicated how happy, excited, and proud they felt when the event happened on a five-point scale from 0 (*not at all*) to 4 (*really happy/excited/proud*), which were averaged to form the *initial PA* score.

About a week later, as part of the follow-up interview, adolescents were provided with a description of their most positive event and were asked if they remembered that event (all said they did). They were asked to rate how they felt about the event now using the same five-point scales and three emotions (happy, excited, and proud), which were averaged to create the *later PA* score.

### Responses to positive events

Adolescents reported their responses to their chosen positive event during the follow-up interview. The four-item *savoring scale* ( $\alpha = 0.68$ ) assessed sharing, celebrating, and reflecting on the positive event and feelings (e.g. 'you did something to celebrate or reward yourself;' and 'you thought about how good you felt'). The three-item *dampening scale* ( $\alpha = 0.55$ ) assessed downplaying the event's significance or likelihood to recur (e.g. 'you decided the event was not a big deal'). One item was deleted from the dampening scale because it was not highly correlated with the other items, resulting in the three final items. These scales, previously called *maximizing* and *minimizing* (Gentzler et al., 2013), were based on similar items used with adults (Gentzler et al., 2010). Adolescents reported the frequency of each using a five-point scale from 0 (*did not do this at all*) to 4 (*did it a lot*).

### Attachment

The security scale (Kerns, Klepac, & Cole, 1996) was used to assess the adolescents' perceived security with parents. This 15-item questionnaire was completed for

each parent. Adolescents read questions like, 'Some kids find it easy to trust their mom/dad BUT other kids are not sure if they can trust their mom/dad.' They chose which statement was most like them and then decided whether the statement was sort of true for them or really true for them. The items tapped children's beliefs about parental responsiveness and availability, children's reliance on the parent in times of stress, and their communication with the parent. Corresponding items were averaged, with higher scores indicating more secure attachment with mothers ( $\alpha = 0.78$ ) and fathers ( $\alpha = 0.88$ ). Two adolescents chose not to complete the security scale for their fathers and one other adolescent's data were excluded due to problems with the form completion.

### Temperament

The Early Adolescent Temperament Questionnaire – Revised, parent-reported form (Ellis & Rothbart, 2001) was used to assess the temperamental predisposition of the adolescents. This 62-item questionnaire consists of eight temperament scales (activation control, affiliation, attention, fear, frustration, high intensity pleasure, and inhibitory control, shyness) and two behavioral outcome scales (aggression and depressive mood). Parents rated each item based on how much it described their child on a five-point Likert scale from 1 (*almost always untrue*), to 5 (*almost always true*). One typographical error in an inhibitory control item changed the meaning of the statement and scores for this scale were computed without this item. Based on an exploratory factor analysis with the eight temperament scales using oblique rotation, three factors emerged accounting for 73.1% of the variance: (1) surgency ( $\alpha = 0.85$ ), composed of high intensity pleasure and affiliation, and low levels of shyness; (2) negative emotionality ( $\alpha = 0.77$ ), including frustration and fear; and (3) effortful control ( $\alpha = 0.91$ ), comprising activation control, inhibitory control, and attention. This factor structure is mostly consistent with prior research (Putnam, Ellis, & Rothbart, 2001), except that affiliation loaded onto the surgency scale in the current study, rather than being its own scale. However, the loading of affiliativeness on the surgency factor is consistent with surgency's close overlap with extraversion and approach behavior (Derryberry & Rothbart, 1997).

### Event coding

Events were coded on domain and duration. For domain coding, adolescents' events were coded into one of 10 possible categories. For adolescents' most positive event across the 4 days of daily reports, these codes included 30.4% recreation/leisure, 21.4% school, 21.4% friends, 8.9% parents, 5.4% other non-interpersonal events, 5.4%

other relatives, 3.6% siblings, 1.8% romantic interests, and 1.8% acquaintances. These codes were developed a priori as categories that were likely to be relevant to children and adolescents, but were modified as reported events required. For example, ‘romantic interests’ was not a category originally developed for this population, but was added once a reported event necessitated it. An independent rater coded all positive events ( $N = 221$ ) and another rater coded approximately 25% ( $n = 55$ ) of the events to compute inter-rater reliability ( $\kappa = 0.89$ ). Based on our previous work with adults (Gentzler et al., 2010), these categories for the most intense event were then collapsed into two domains: 32 (57.1%) *non-interpersonal* (originally coded as school, recreation/leisure, and other non-interpersonal events) and 24 (42.9%) *interpersonal* (originally coded as friends, parents, siblings, other relatives, acquaintance, and romantic) positive events. It is possible that adolescents’ non-interpersonal events took place in the presence of other people, however events were only coded as interpersonal if another person was explicitly mentioned by the adolescent. Examples included: ‘Getting an A+ on a social studies project’ (non-interpersonal); and ‘My aunt and uncle came from England’ (interpersonal).

For duration, we developed three codes: short-term (with no likely lasting effects); long-term (with potential for recurring positive events); and anticipatory (events related to something that would happen in the future). Examples of their most positive events included: ‘We went to the pool’ (short-term); ‘I made the basketball team; she picked 18 people out of 50 that tried out’ (long-term); and ‘We left school two hours early today and there is no school tomorrow’ (anticipatory). The latter two were combined into a longer term category. An inter-rater reliability analysis indicated that the kappa was 0.51 when examining reliability for participants’ total number of events ( $N = 221$ ; 79 reliability cases), indicating only a moderate agreement between raters. However, coders matched on 100% ( $\kappa = 1.0$ ) of participants’ most positive events ( $N = 56$ ; 20 reliability cases) which were the data analyzed in this study. Most events were short-term (91% of all events and 95% of most positive events).

### **Analytic approach**

We report preliminary analyses, followed by tests of our hypotheses using hierarchical mixed models. We relied on mixed models to account for dependency in the data resulting from the inclusion of siblings. Intra-class correlations indicated that our level 2 variable (family) accounted for 53% of the variance in savoring ( $ICC = 0.53$  and  $p < 0.001$ ). The below eight models were run using SPSS (version 18) Mixed Models using REML and the default estimation of degrees of freedom

(Satterthwaite method; Sarson, 2013). These models include parental ID as a random effect to account for the within-family correlations. We combined conceptually similar predictors into the same models so that we could examine the predictors’ independent effects due to some intercorrelations among them (negative emotionality and effortful control,  $r = -0.37$  and  $p = 0.006$ , and attachment to mothers and fathers,  $r = 0.64$  and  $p < 0.001$ ). Thus, to examine the outcomes of interest (initial PA, later PA, savoring, and dampening), we conducted four models with the temperament factors and four with the attachment scales. Because initial PA was correlated with later PA and savoring (Gentzler et al., 2013), we also included initial PA as a covariate in the models so that the results isolate the predictors’ effects on the subsequent PA or responses from the immediate impact of the event. Finally, we report effect sizes for the tests of gender differences using  $d = M_A - M_B / SD_{\text{pooled}}$  (Cohen, 1988), and for the fixed-effect predictors in the mixed models using  $r_{\text{effect size}} = \sqrt{t^2 / (t^2 + df)}$  (Rosnow, Rosenthal, & Rubin, 2000).

## **Results**

### **Preliminary analyses**

Adolescents’ age was unrelated to any variables, but several unanticipated gender differences emerged (see Table 1). Girls reported more intense initial PA and more dampening responses to their positive events than boys. Boys reported more attachment security with fathers than girls and were rated lower on negative emotionality than girls. Because of these associations, we included gender as a covariate in the below models. Using Cohen’s conventions for effect size (Cohen, 1988), the significant gender differences were medium (with the one for dampening approaching large). Small effects in our sample did not reach statistical significance (for later PA, savoring, or effortful control). In addition, we explored whether or not event characteristics varied by adolescents’ characteristics (age, gender, attachment, or temperament). However, none of the predictors were found to predict event characteristics.

### **Predicting emotional and regulatory responses**

#### *Temperament*

For the first set of hypotheses, we expected surgency to relate to more intense initial PA (Hypothesis 1a), more positive change in PA across time (Hypothesis 1b), and higher levels of savoring (Hypothesis 1c). However, no hypotheses were supported (see Table 2). For negative emotionality, it was unrelated to initial PA (Hypothesis 2a) and did not predict change in PA over time (Hypothesis 2b); but as expected (Hypothesis 2c), it did predict greater minimizing. With effortful control, it did predict

Table 1. Gender differences on major variables.

	Boys Mean (SD)	Girls Mean (SD)	<i>t</i>	Effect size
Initial PA	2.85 (0.70)	3.25 (0.75)	-2.08*	0.55
Later PA	1.67 (1.09)	2.16 (0.97)	-1.77 <sup>+</sup>	0.47
Savor	1.58 (0.96)	2.05 (1.00)	-1.79 <sup>+</sup>	0.48
Dampen	0.52 (0.57)	1.08 (0.84)	2.87**	0.78
Negative emotionality	4.79 (1.11)	5.47 (1.25)	-2.18*	0.58
Surgency	10.78 (1.84)	10.63 (1.85)	0.31	0.08
Effortful control	10.02 (2.33)	10.58 (2.31)	-0.89	0.24
Security – mother	3.32 (0.44)	3.28 (0.29)	0.42	0.11
Security – father	3.31 (0.45)	2.99 (0.66)	2.06*	0.57

Notes: <sup>+</sup>*p* < 0.083. \**p* < 0.05. \*\**p* < 0.01.

more savoring as expected (Hypothesis 3a), and it predicted marginally less dampening, in line with Hypothesis 3b. In addition, effortful control was also found to predict higher levels of change in PA over time. Also noted in Table 2, initial PA predicted greater PA over time and more savoring. Using Cohen's guide for effect size for  $r_{\text{effect size}}$  (Cohen, 1988), the effect sizes for initial PA predicting more intense later PA and savoring were large (>0.60) and the significant findings for temperament all were medium in magnitude (~0.30).

#### Attachment

Although we expected attachment security to predict higher levels of PA, results suggested that attachment was unrelated to initial PA (Hypothesis 4a), or change in PA over time (Hypothesis 4b). We also expected that youth reporting higher levels of security would engage in more savoring (Hypothesis 4c) and less dampening (Hypothesis 4d). Results indicated that adolescents who reported a more secure attachment with fathers reported marginally more savoring ( $p = 0.054$ ).<sup>1</sup> This finding was small (but approaching medium) in its effect size ( $r_{\text{effect size}} = 0.27$ ). Attachment was unrelated to dampening (see Table 3).

#### Event characteristics

For the fifth set of hypotheses, we intended to examine whether or not duration (short- or long-term) predicted emotional responses to positive events, but we could not due to the low number of long-term events. For event domain (interpersonal vs. non-interpersonal), the analyses were exploratory. These results indicated that event type did not significantly predict initial or later PA, or savoring and dampening responses.

#### Discussion

Our study is one of the first to examine factors that may contribute to young adolescents' reliance on different responses to positive events. In line with some hypotheses, we found evidence that temperament may influence emotional and regulatory responses to positive events. A marginal finding in the expected direction also linked adolescents' attachment security with fathers and savoring. Also, although not predicted, girls and boys varied in their emotional and regulatory responses. Our study therefore offers new evidence about why youth may react differently to positive events.

Table 2. Linear mixed models predicting responses to positive events from parent-reported child temperament.

Predictors	Later PA			Savor			Dampen		
	<i>B</i> (SE)	<i>t</i>	Effect size	<i>B</i> (SE)	<i>t</i>	Effect size	<i>B</i> (SE)	<i>t</i>	Effect size
Intercept	1.86 (0.18)	10.45***	0.83	1.86 (0.18)	10.35***	0.83	1.01 (0.13)	7.50***	0.73
Child gender	0.04 (0.25)	0.16	0.02	-0.12 (0.25)	-0.49	0.07	-0.43 (0.19)	-2.27*	0.31
Initial PA	0.85 (0.16)	5.37***	0.60	0.68 (0.16)	4.25***	0.52	0.11 (0.12)	0.92	0.13
Negative emotionality	0.16 (0.11)	1.53	0.21	-0.01 (0.11)	-0.09	0.01	0.20 (0.08)	2.48*	0.33
Surgency	0.02 (0.06)	0.41	0.06	-0.06 (0.06)	-1.04	0.15	0.03 (0.05)	0.74	0.10
Effortful control	0.15 (0.05)	2.70**	0.36	0.13 (0.05)	2.33*	0.31	-0.08 (0.04)	-1.97 <sup>+</sup>	0.27

Note: Girls = 0; and Boys = 1. For each model, *df* = 50. <sup>+</sup>*p* = 0.054. \**p* < 0.05. \*\**p* < 0.01. \*\*\**p* < 0.001.

Table 3. Linear mixed models predicting children's responses to positive events from their reported attachment security with their parent.

Predictors	Later PA			Savor			Dampen		
	<i>B</i> (SE)	<i>t</i>	Effect size	<i>B</i> (SE)	<i>t</i>	Effect size	<i>B</i> (SE)	<i>t</i>	Effect size
Intercept	2.04 (0.18)	11.05***	0.85	2.08 (0.17)	11.98***	0.87	1.06 (0.14)	7.78***	0.75
Child gender	-0.18 (0.26)	-0.69	0.10	-0.46 (0.25)	-1.88+	0.26	-0.38 (0.19)	-1.99+	0.28
Initial PA	0.85 (0.17)	5.10***	0.59	0.62 (0.16)	4.01***	0.50	0.15 (0.12)	1.23	0.17
Security – mother	-0.02 (0.44)	-0.05	0.007	0.07 (0.41)	0.16	0.02	-0.07 (0.32)	-0.22	0.03
Security – father	0.21 (0.28)	0.74	0.11	0.53 (0.27)	1.97+	0.27	-0.01 (0.21)	-0.03	0.004

Note: Girls = 0; and Boys = 1. For all models,  $df = 48$ . +  $p < 0.066$ . \*\*\*  $p < 0.001$ .

### Temperament

Regarding temperament, contrary to our expectations, adolescents who were rated higher in surgency (more high intensity pleasure, more affiliativeness, and less shyness) did not report more intense PA (Hypotheses 1a and 1b) or savoring responses to their positive events (Hypothesis 1c). It is possible that we would detect associations with a wider range of representative positive events or that surgency might better map onto the frequency of positive events instead of their reactions to a single intense event. Previous research suggests that surgency is related to better coping ability under some circumstances because children can distract themselves with more positive activities (Lagacé-Séguin & Gionet, 2009) but it also relates to more constant activity, approach behavior, and exuberance that is predictive of externalizing or social problems (Berdan, Keane, & Calkins, 2008; Dollar & Stifter, 2012). Thus, these adolescents may have trouble modulating their affect and activity level, and may seek out additional positive experiences instead of focusing on and savoring a single event.

For negative emotionality, results indicated that negative emotionality was unrelated to adolescents' PA reactions (Hypotheses 2a and 2b), but consistent with expectations, it predicted more dampening (Hypothesis 2c). Limited research has demonstrated that children who are higher in negative emotionality or related dimensions judged stressors as more severe or developed more negative attributions about events, suggesting that certain youth focus on negative aspects of events (Lengua et al., 1999; Mezulis, Hyde, & Abramson, 2006). Our study suggests that these negative cognitions may extend to positive events as well, consistent with research on depressive explanatory styles in response to positive events (e.g. Thompson et al., 1998).

Effortful control predicted more positive change in PA about the event approximately a week later (which was not expected) and higher rates of savoring (Hypothesis 3a), but was unrelated to dampening (Hypothesis 3b). Comparable links between effortful control and effective emotion regulation or coping with negative

events have been demonstrated in youth samples (Eisenberg et al., 1993, 1994; Lengua et al., 1999). Thus, having greater capacity to control one's behavior and redirect attention may facilitate better regulatory abilities in general, including effective responses to positive events. By controlling for initial PA, we lessened the concern that the adolescents rated higher on effortful control were simply exposed to more objectively positive events. However, it is possible that adolescents rated higher on effortful control had different resources available to them (e.g. more receptive friends and family to hear about their positive events or to celebrate with), which facilitated their ability or desire to capitalize on their positive experiences. Our findings also revealed that effortful control was linked to sustained PA about the events. One possibility was that the sustained PA resulted from adolescents' higher rates of savoring (Bryant & Veroff, 2007; Gentzler et al., 2013; Jose et al., 2012; Langston, 1994), but a post hoc analysis including savoring in the above model indicated that the parameter estimate for effortful control only decreased slightly to marginal ( $B = 0.10$ ,  $SE = 0.05$ ,  $t = 1.82$ , and  $p = 0.076$ ). Thus, although savoring likely has some influence, additional factors may also account for this link between effortful control and how feelings about the positive events change over time.

### Attachment

The findings with attachment were limited. We hypothesized that attachment security may be linked to higher levels of PA over time, more savoring, and less dampening (Hypotheses 4a–d). However, our results only suggested a trend that adolescents who reported more attachment security with their fathers engaged in more savoring behaviors after their positive event (Hypothesis 4c). Still, the finding is in line with attachment theory, in that securely attached children may become comfortable expressing various positive emotions, such as joy or interest, because those would communicate investment in the relationship (Cassidy, 1994). In addition, experiencing PA with loved ones may foster the desire to savor



those experiences with them (Fredrickson, 2001). In the future, mediating factors could be examined, such as whether secure adolescents' positive views towards others facilitate sharing. Researchers also could focus on specific interaction patterns within parent-child dyads. Yap, Allen, and Ladouceur (2008) found that mothers who dampened or invalidated their adolescents' PA had adolescents with higher levels of depressive symptoms and who relied on more maladaptive strategies to regulate negative affect. Whether or not insecure adolescents' parents respond similarly remains a question for future research.

Interestingly, our marginal effect was only apparent for fathers. It is possible that fathers play a different role in socializing children's responses to positive events than do mothers. For example, fathers tend to engage in greater physical play with their children, often creating higher levels of positive arousal (e.g. Yogman, 1981), indicating that fathers and mothers may co-regulate children's PA and teach their children about PA regulation in different ways (Feldman, 2003). Specifically, Feldman (2003) found evidence that fathers' but not mothers' own attachment security was linked to synchrony (i.e. the close matching of parent-infant PA arousal and expression) with infant daughters but not sons. Another study found that attachment quality with fathers, but not mothers, was associated with infants' PA during an interaction (Diener, Mangelsdorf, McHale, & Frosch, 2002). Although experiences of PA are not synonymous with savoring, this research highlights the importance of examining father-child relationships in children's emotional development, a less developed area compared to mother socialization processes (Morris, Silk, Steinberg, Myers, & Robinson, 2007). Additionally, it may be important for future research on responses to positive events or PA regulation to study parental attachment in conjunction with other emotion-related beliefs (e.g. display rules), more general parenting styles or behaviors (Huta, 2012), and broader systems such as culture (Tsai, 2007).

### *Event characteristics*

Event characteristics, though tested as exploratory, did not result in differences in emotional reactions or regulatory responses. Prior research found higher rates of dampening responses for non-interpersonal events in college students (Gentzler et al., 2010). Although our coding system was similar, this interpersonal vs. non-interpersonal distinction may not have been specific enough for this population and it also relied on children's specific mention of other people in their event description, which may not have accurately reflected the role of other people in the events. In future work, we could explicitly ask adolescents about the presence of others. Unfortunately, due to the disproportionate number

of short-term events, we were unable to examine event duration as a predictor of responses (Hypotheses 5a and 5b). Adolescents' events from this study appeared to be mostly relatively minor everyday positive events, such as having a good time with friends or family or doing well on a school or extracurricular task, in line with other researchers' assessments of adolescents' positive daily life events (Compas, Davis, Forsythe, & Wagner, 1987; Shahar, Henrich, Reiner, & Little, 2003). In future work, researchers could assess how responses vary for minor vs. major positive events, along with other event characteristics. For instance, less certainty about a positive event is linked to longer lasting positive emotional reactions (Wilson, Centerbar, Kermer, & Gilbert, 2005), and the controllability of the events appears to be important for coping with negative life events (e.g. Lazarus & Folkman, 1984). In general, a multi-level design with detailed reports about multiple events could better tease apart the effects of the adolescent as compared to those of the event.

An additional point about particular event characteristics or contexts is that increased PA and use of savoring strategies are not always going to be effective or adaptive responses. In general, emotions must be evaluated in light of the particular situations and the person's specific goals (Gruber, Mauss, & Tamir, 2011; Tamir, 2009; Tamir, Mitchell, & Gross, 2008). Given adolescents' propensity for risky behaviors (Steinberg, 2007), there may be instances where intense PA reactions or savoring of a positive event could be problematic if those reactions are reinforcing and increase the likelihood of repeating a risky behavior in the future. Thus, we must be cautious in suggesting that elevated PA or savoring is necessarily adaptive, particularly for adolescents. Attaining more details about adolescents' positive life events would provide more insight into the types of events they are reacting to as well as how to judge the appropriateness of their responses.

### *Gender*

Several unanticipated gender differences also emerged, which may have important consequences. First, girls rated their most positive event as being more intense than did boys. This finding mirrors some research with adults indicating women report more intense emotional reactions than men (e.g. Fujita, Diener, & Sandvik, 1991). Interestingly, this gender difference was less pronounced in adolescents' later feelings about the event. Moreover, in response to these same events, girls reported higher levels of dampening responses suggesting they downplayed the events' significance. Perhaps, these negative thoughts sabotage PA and other salubrious effects (e.g. positive self-worth) of earlier events. As a

meta-analysis showed, girls' positivity bias in their attributions significantly declines starting at age 12, whereas boys' positive attributions do not significantly decrease from childhood (Mezulis, Abramson, Hyde, & Hankin, 2004). We also know that girls' rates of depression (symptoms or diagnoses) increase dramatically in mid-adolescence relative to boys' (e.g. Hankin et al., 1998). In light of this research, we assessed whether girls were older than boys in our sample. However, the average ages were almost identical ( $M_{\text{boys}} = 11.90$ ,  $SD = 1.27$ ; and  $M_{\text{girls}} = 11.84$ ,  $SD = 1.52$ ) suggesting that girls' age does not account for their greater likelihood to dampen compared to boys. Still, because we did not assess puberty status, it is unclear whether or not puberty played a role given that girls tend to start puberty earlier than boys (Sun et al., 2002) and some research indicates that post-pubertal teens have more extreme emotional and physiological reactions to emotional stimuli than do pre- or early-pubertal youth (Silk et al., 2009). Regardless of the explanatory mechanism, our results suggest that girls might especially benefit from being taught more effective responses to positive events, such as reflecting on PA and achievements, which may have a protective effect against depressive symptoms in stressed youth (Bijttebier et al., 2012).

### *Limitations and implications*

One of the biggest limitations of the current study is the small sample, which makes replication of these findings especially critical. For instance, the finding for attachment security with fathers and savoring was marginal after controlling for initial positive reactions. With the sample size, we were also unable to detect small effects and perform many analyses, such as tests to determine if predictors interact in their effects (e.g. how temperament dimensions interact with each other or with attachment). Additionally, although our study was hypothesis-driven, we conducted several large models with our very modest sample. Second, given our homogenous sample, it is unclear whether or not our results may generalize to youth from other ethnic backgrounds. Broader cultural values likely influence parents' and adolescents' beliefs about PA regulation (Tsai, Louie, Chen, & Uchida, 2007), thus our effects for attachment and temperament may be moderated by these other socializing agents.

A third important limitation was our measures. Several were limited in scope (e.g. our PA indicators only comprised three moderate-to-high-arousal emotions, and our attachment measure only distinguished more secure from less secure youth). Additionally, some scales (e.g. dampening) demonstrated poorer reliability than we anticipated. We also relied only on parent report of adolescents' temperament. Although this decision could be considered a strength to demonstrate across-reporter

findings linking temperament and children's responses, parent reports can be biased or show a lack of correspondence with other temperament measures (Muris & Meesters, 2009). Therefore, in future work, researchers can improve existing measures or assess constructs using a more comprehensive and multi-method approach. Fourth, we were unable to determine if any specific methodological aspect of the study, such as the order of the questions, influenced the findings given that the protocol was the same for all adolescents. Finally, we chose a design strategy where we could examine a relatively intense (and hopefully more meaningful) positive event for each adolescent, and followed up with adolescents about a week after the events occurred to allow time for their responses to unfold and to detect change in their feelings. However, this method prevented a more comprehensive investigation of event-specific effects within the adolescents.

Despite the limitations, our study provides new evidence on predictors of adolescents' responses to positive life events, which has several implications for public health. We know that maladaptive responses to PA or positive events are linked to depressive symptoms in youth (Bijttebier et al., 2012; Vines & Nixon, 2009) as well as other psychological disorders (Carl et al., 2013; Gilbert, 2012). Even fMRI research substantiates abnormal processing that occurs in depressed youth after positive events when anticipating a reward (Olinio et al., 2011). As mentioned, given our finding about girls' tendency to dampen their positive events, preventative efforts could especially be directed at them. In addition, we know that savoring and capitalizing responses are linked to sustained PA (Gentzler et al., 2013; Langston, 1994) and PA results in numerous health benefits (e.g. Steptoe et al. 2009). Thus, by offering some of the first insight into early processes that may contribute to how young adolescents learn to respond to positive events, this study identifies target areas for prevention and for enhancing well-being. Although temperament and attachment show moderate stability (Fraleigh, 2002; Kagan, Snidman, Kahn, & Towsley, 2007), parents' specific efforts to socialize children's responses to PA and positive events may be a source of influence. The father-child relationship may be an important area to target, which fits with other literature showing that fathers' emotion-coaching more strongly relates to child outcomes than does mothers' (Baker, Fenning, & Crnic, 2011; Gottman, Katz, & Hooven, 1996; Hunter et al., 2011). With temperament, because research indicates that some children may be more susceptible to both negative and positive environmental effects (Belksy & Pluess, 2009), it is critical to understand how youth who may be vulnerable to low PA can be parented in a way that teaches them to maximize their PA (Hankin et al., 2011). Overall, this study's findings offer new insight into

predictors of children's regulation of PA and suggest important directions for future research.

### Acknowledgment

Authors would like to thank the participating families who generously donated their time to help with our research.

### Note

1. The model predicting savoring without controlling for initial PA indicated a significant effect for attachment security with fathers,  $B = 0.63$ ,  $SE = 0.30$ ,  $t(49) = 2.07$ , and  $p = 0.044$ .

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