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Positive Urgency and Emotional Reactivity: Evidence for Altered Responding to Positive Stimuli

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Positive urgency, defined as a tendency to become impulsive during positive affective states, has gained support as a form of impulsivity that is particularly important for understanding psychopathology. Despite this, little is known about the emotional mechanisms and correlates of this form of impulsivity. We hypothesized that positive urgency would be related to greater emotional reactivity in response to a positive film clip. Seventy-five undergraduates watched a positive film clip, and a multimodal assessment of emotion was conducted, including subjective emotional experience, physiological activation (i.e., heart rate, respiratory sinus arrhythmia, skin conductance), and facial emotional behavior (i.e., objectively coded using the Facial Action Coding System). Positive urgency was not significantly related to greater positive emotional reactivity but rather a more complex array of emotions expressed in facial behavior, as indexed by similar levels of positive yet greater levels of negative behavior. These findings show that positive urgency may be linked to altered emotionality, but does not appear related to heightened positive emotional reactivity. Potential implications for functional outcomes are discussed.

Keywords: FACS, impulsivity, positive emotional reactivity, positive urgency, physiology

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Impulsivity appears to be an important risk factor for many forms of psychopathology and problematic behavior. For example, large scale, longitudinal studies indicate that impulsivity predicts the onset, course, and severity of externalizing disorders, mania, and borderline personality disorder (Alloy et al., 2009; Cyders et al., 2007; Kwapil et al., 2000). Beyond externalizing disorders, impulsivity also has been found to be robustly correlated with depression, anxiety disorders, and suicidality (Magid & Colder, 2007; Carver, Johnson, & Joormann, 2013; Johnson, Carver, & Joormann, 2013; Pawluk & Koerner, 2013).

Researchers have increasingly turned to more refined models of the types of impulsivity that might be most closely linked to psychopathology. Whiteside and Lynam (2001) differentiate tendencies to act impulsively in response to emotions, which they label as urgency, from other forms of impulsivity, such as sensation seeking, lack of planning, and lack of perseverance. Findings of multiple studies suggest that urgency is closely tied to violence, psychopathology, and substance abuse (Cyders, Flory, Rainer, & Smith, 2009; Dick et al., 2010; Whiteside & Lynam, 2003). Indeed, urgency has been found to be more closely tied to depressive symptoms, anger problems, borderline personality disorder symptoms, anxious symptoms, suicidality, and bipolar disorder than are forms of impulsivity such as inattention and lack of follow-through (Berg, Latzman, Bliwise, & Lilienfeld, 2015).

Intriguingly, urgency does not appear to be relevant only to negative mood states. The tendency to overreact to positive emotion states—positive urgency (Cyders & Smith, 2007)—has been related to a broad range of problems, including vandalism, risky sexual behavior, gambling, drug use (Cyders et al., 2007; Zapolski, Cyders, & Smith, 2009), and history of manic symptoms (Giovanelli, Hoerger, Johnson, & Gruber, 2013; Johnson, Carver, Mulé, & Joormann, 2013; Muhtadie et al., 2014). Even disorders that involve negative affectivity, such as depression and anxiety, have been found to be related to heightened impulsivity during

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positive mood states (Carver et al., 2013; Johnson, Carver, & Joormann, 2013).

The Present Study

Although emotion-relevant impulsivity has rapidly gained ground as a substantive correlate of important outcomes of psychopathology, little research has disentangled how emotional reactivity is linked to this type of impulsivity. Alterations in emotional reactivity are a hallmark of psychopathology and may point toward underlying alterations in emotion-relevant brain circuitry (Levenson, Sturm, & Haase, 2014). Given this, it would seem important to examine whether impulsivity in the context of emotion might be reflective of more core problems in emotional reactivity. The goal of the current study was to test the hypothesis that positive urgency would be correlated with emotional reactivity. To test this, we examined reactivity to a standardized, emotion-eliciting stimulus of a positive film clip. We gathered a multimodal battery of emotional responses to a positive film clip that included subjective emotional experience, physiological activation, and facial emotional behavior, three response systems that have been widely established as key components of emotion (Ekman, 2007; Keltner & Gross, 1999; Levenson, 2014).

Method

Participants

The sample consisted of 75 undergraduate students at a large public U.S. university (64% female, age: M = 19.70, SD = 2.11; 36% European/Caucasian, 35% Asian, 16% Hispanic/Latino, 17% other ethnicity; 23% declined to answer). Participants reported a mean GPA of 3.45 (SD = .33) on a 4.0 scale (with 4.0 being the highest score) and a mean national subjective social status of 5.57 (SD = 2.00) on the 9-point MacArthur Scale (Adler & Stewart, 2007). Participants earned partial credit in psychology courses for taking part in the study. All procedures were approved by the university's Institutional Review Board.

Measures

Positive urgency. The Positive Urgency Measure (PUM, Cyders et al., 2007) is a 14-item self-report scale designed to assess the tendency to act recklessly or inappropriately when experiencing positive emotions (Cyders & Smith, 2008). Sample items include "When I am in great mood, I tend to get into situations that could cause me problems" and "I tend to lose control when I'm in a great mood." Participants are asked to respond to each item on a 4-point Likert scale, ranging from 1 = *strongly disagree* to 4 = *strongly agree*. Items were summed to provide a total score. The mean (25.21) and SD (7.82) in this sample were comparable with those observed in general adult community samples, Ms = 21 to 28.4, SD = 7.29 to 13.17 of a total possible score of 56 (Maher, Thomson, & Carlson, 2015; Muhtadie et al., 2014; Rose & Segrist, 2014). This measure has been shown to relate to a variety of specific risky behaviors such as vandalism (Cyders et al., 2007) and high alcohol consumption per sitting (Cyders et al., 2009). Positive urgency has been found to be distinct from tendencies toward positive affectivity (Cyders & Smith, 2008). Internal consistency was excellent in this sample, α = .94.

Subjective emotional experience. Subjective emotional experience was assessed before and after the positive film clip and the neutral (baseline) film clip. Participants were asked to rate their subjective emotional experience (prefilm: "How do you feel right now?"; after both film clips: "How did you feel during the last video?") using 10 items from the (high-arousal) positive affect subscale of the Positive and Negative Affect Schedule (PANAS; i.e., active, alert, attentive, determined, enthusiastic, excited, inspired, interested, proud, strong; Watson, Clark, & Tellegen, 1988), as well as irritated. Responses were on a scale of 1 = *slightly or not at all* to 5 = *very much*. The high arousal positive affect (PANAS HAP) items were averaged to form a composite score, α = .91 (prefilm baseline), α = .93 (postneutral film clip), α = .95 (post-positive film clip). Because irritation was rarely endorsed, it is not discussed further.

Physiological activation. Physiological activation was assessed during a 1-min baseline before each film clip, during the positive and neutral film clip viewing, and during a 30-s postfilm period after each film clip.[1] All physiological measures were recorded at 1000 Hz using BioLab version 2.5 acquisition software (Mindware Technologies, n.d.). Because of equipment failure, psychophysiological data was missing for some persons (9 for HR and RSA, 13 for SCL, and 10 for respiration rate).

Heart rate. Heart rate (HR) reflects influence from both sympathetic and parasympathetic branches of the autonomic nervous system (cf., Mendes, 2009) and thus was gathered as a measure of overall autonomic activity. Electrocardiogram (ECG) was recorded with three disposable snap electrodes using a modified Lead II placement. The ECG signal was processed and manually cleaned by 60-s epochs using Mindware HRV 2.10 module (Mindware Technologies, Gahanna, OH). Average HR in beats per minute was then calculated per epoch using the R-R intervals.

Respiratory sinus arrhythmia. Parasympathetic activity was indexed with respiratory sinus arrhythmia (RSA). Mindware HRV 2.10 module (Mindware Technologies, Gahanna, OH) converted the interbeat interval (IBI) series to a time series with interpolation, resampled at a frequency of 10 samples per beat for the mean IBI interval per epoch. To minimize nonstationaries in the data, the time series was linearly detrended. The data was then tapered with a Hamming window and a fast Fourier transform (FFT) was applied to derive a spectral distribution. The natural log of the integral power the respiratory frequency band (0.12–0.4 Hz band) quantified RSA in milliseconds squared. RSA values the fell below 3 ms^2 or above 10 ms^2 were deemed a measurement error and coded as missing. RSA per epoch was then averaged into composite scores for each time point.

Skin conductance. Sympathetic activity was indexed by skin conductance level (SCL). SCL was acquired through two snap electrodes attached to the participant's nondominant palm. Tonic skin conductance in microSiemens (μS) was calculated as the average skin conductance level per minute using the Mindware EDA 2.10 Module (Mindware Technologies, Gahanna, OH). Very low skin conductance (<1 μS) levels were coded as missing. Skin

[1] As positive urgency was not related to baseline or postfilm levels, we focus on physiology during the neutral and positive film clip here.

conductance responses were operationalized as increases in skin conductance above .05 μS.

Respiratory rate. As a potential control variable in understanding RSA, respiratory rate was measured using a thoracic band secured around participants' upper chest centered on the sternum. Respiratory rate was manually cleaned and processed using the Mindware HRV 2.10 module (Mindware Technologies, Gahanna, OH), yielding average number of breaths per minute. Respiratory rates that fell below 7.2 or above 24 breaths per minute were judged to be outside of the typical respiratory rate and coded as missing data. Respiratory rates per epoch were then averaged.

Facial emotional behavior. Facial emotional behavior was videotaped while participants were watching the neutral and positive film clips. Emotional behavior in response to the positive film clip was objectively coded using the Facial Action Coding System (FACS; Ekman, Friesen, & Hager, 2002) by three licensed FACS coders who were unaware of participants' impulsiveness and study hypotheses. As is standard (Eckart, Sturm, Miller, & Levenson, 2012; Haase et al., 2015; Werner et al., 2007), responses were only coded during a 30-s peak epoch, from a section of the positive video clip that supposedly elicited the strongest emotional behavior during the clip (cf. Eckart et al., 2012; Werner et al., 2007). Coding a representative time slot allowed us to capture the emotional response of interest rather than the process of building up an emotional response or regulating it after its peak, and is pragmatic given that FACS coding requires approximately one hour of scoring for each minute scored (Ekman & Rosenberg, 2005) or more if the behavior is very densely packed (Ekman, Friesen, & Hager, 2002). Emotional behavior in response to the neutral film clip was not coded for the present study because of very low base rates, similar to other studies (e.g., Haase, Seider, Shiota, & Levenson, 2012). Because of equipment failure, facial behavior could not be coded for eight persons.

FACS is an anatomically based, comprehensive system for coding facial behavior. Facial expressions are described based on minimal facial movements, so-called Action Units (AUs), away from a resting baseline. The following AUs (illustrated in Figure 1) were coded in a second-by-second interval in terms of frequency, intensity (on a 5-point scale ranging from 1 = *trace* to 5 = *maximum*, corresponding to the FACS A to E scale), and duration (in seconds): AU1 (inner brow raise), AU2 (outer brow raise), AU4 (brow lower), AU5 (upper lid raise), AU6 (cheek raise), AU12 (lip corner puller), and AU25 (lips part). An additional category "AU12 mixed with" was coded when AU12 occurred together with an additional AU such as AU7 (lid tightener), AU9 (nose wrinkle), AU10 (upper lip raise), AU13 (sharp lip puller), AU14 (dimpler), AU15 (lip corner depressor), AU20 (lip stretch), and AU24 (lip presser), because some of them could act as disqualifiers of a genuine and unblended positive affect expression (so-called *Duchenne display*, see below). Each coder coded the facial responses of about one third of all participants. To assess intercoder reliability, all three coders coded an overlap of eight (10%) of the participants' responses. For each pair of coders, an agreement ratio was computed by multiplying the number of AUs that two coders agreed on by two and then dividing the result by the total number of AUs scored by both coders (Ekman, Friesen, & Hager, 2002). The average interrater agreement ratio as calculated by this formula was satisfactory (.79).

We computed composite scores, aggregating across different AUs to index (a) *genuine positive behavior* (i.e., Duchenne display, defined by the combined and symmetric AUs 6 + 12, Frank & Ekman, 1993),[2] (b) *nongenuine positive behavior* (i.e., AU12 only or *Non-Duchenne display* [AU12 + 6 (+7 + 25) combinations that were accompanied by additional AUs], and (c) *negative behavior* (corrugators activity, AU4). Composite scores were created by normalizing the frequency, intensity, and duration scores and then averaging the three z-scores (Keltner & Bonanno, 1997). To reduce skewness, composite variables were log-transformed. Although we calculated surprise (i.e., AU1 + 2+5), anger (AU4 + 5), and sadness (AU4 + 1) behavior, these are not discussed further as they were rarely observed.

Film Clips

To assess participants during a neutral and a happy emotion state, participants were asked to view one neutral film clip and one positive film clip. To identify appropriate film clips, we began by considering film clips that have been commonly used and well-validated for inducing neutral and happy emotion states (e.g., Gross & Levenson, 1995; Gruber et al., 2008; Kreibig, 2010) and supplemented them with additional, more recent film clips. To assess how well these film clips worked in our current setting, we conducted pilot testing. That is, 12 (6 male) participants (ages 20 to 37 years, $M = 27.00$, $SD = 6.21$) came to the laboratory and watched a total of 7 positive (showing sport successes and celebrations, talent show contestants, and a music festival) and 2 neutral (showing geometric shapes and patio construction) film clips (with durations between 20 and 154 seconds) in quasi-randomized order. After viewing each film clip, they rated their emotions (enthusiastic, happy, sad, afraid, excited, proud, confident, angry, amused, and irritated) on a scale from 1 = *slightly or not at all* to 5 = *very much*. We chose the neutral and positive film clip based on results that the film clip showing geometric shapes moving around the screen without sound elicited the most neutral emotion states (all ratings below 2 except for "confident," $M = 2.17$, $SD = 1.03$) and that the film clip showing Sarah Hughes winning the Olympic Gold medal and celebrating her success elicited the highest levels of positive emotion, particularly enthusiasm ($M = 3.25$, $SD = 1.22$) and excitement ($M = 3.08$, $SD = 1.24$). Both film clips were brief (1 min for the neutral film clip and 2:34 for the positive film clip). Film clips showing geometric shapes like the one used in the present studies have been used to induce neutral emotions successfully in prior studies (e.g., Gross & Levenson, 1995). Similarly, the positive film clip has been used to induce positive emotions successfully in prior studies (e.g., Gruber et al., 2008).

Procedure

Data were gathered as part of a broader study not discussed here (Johnson, Tharp, Peckham, Sanchez, & Carver, 2016). Upon arrival at the laboratory session, participants completed written in-

[2] All results remained stable when we also included AU7 (lid tightener), AU25 (parted lips), and AU26 (open mouth; Keltner & Bonanno, 1997; Ruch, 1993) in addition to AUs 6 + 12 in the genuine positive behavior composite.

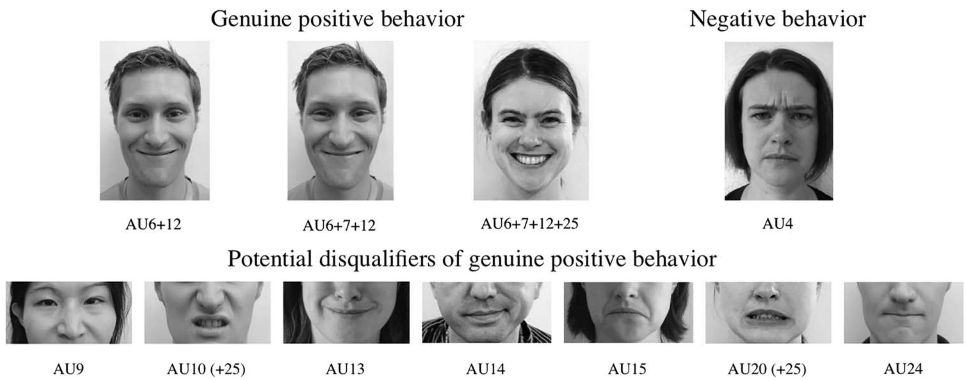

Figure 1. FACS action units coded for the present study. AU = Action Units; FACS = Facial Action Coding System. AU1 (inner brow raise), AU2 (outer brow raise), AU4 (brow lower), AU6 (cheek raise), AU7 (lid tightener), AU9 (nose wrinkle), AU10 (upper lip raise), AU12 (lip corner puller), AU13 (sharp lip puller), AU14 (dimpler), AU15 (lip corner depressor), AU20 (lip stretch), AU24 (lip presser), AU25 (lips part).

formed consent procedures and had physiological sensors attached. The procedure consisted of behavioral and questionnaire measures (not relevant to this report). Participants viewed the neutral film clip first, to provide information on their emotional experience, behavior, and physiology at baseline while watching a video. Then they viewed the happy film clip. Before both film clips, participants rated their subjective emotional experience. For each film, participants viewed: (a) a large "X" on a TV monitor for 55 seconds, during which they were instructed to relax and clear their minds (prefilm period); (b) on-screen instructions for the trial displayed for 5 seconds ("Just watch the film"); (c) the film clip; and (d) a large "X" on a TV monitor 30 seconds (postfilm period). Participants' facial behavior in response to the film clips was videotaped using a remotely controlled camera. Experimenters remained in a separate room for the entire procedure, monitoring via video camera and communicating to the participant via microphone. After each film clip, participants rated their subjective emotional experience during the film clip.

Data Analyses

To test hypotheses, hierarchical linear regression models were conducted to examine the correlations of subjective emotional experience ratings after the positive film clips with positive urgency, controlling for subjective emotional experience ratings during the neutral film clip. Physiological activation scores for the positive film clip were computed using residualized change scores to adjust for neutral film clip scores. Unless noted otherwise, bivariate Pearson correlations were conducted to examine links between these activation scores and facial emotional behavior indices with positive urgency. All analyses were completed using SPSS Version 22 (IBM). Alpha was set to .05, and all analyses were two-tailed.

Results

Preliminary Analyses

Manipulation check. To examine whether the positive film clip successfully elicited positive emotion, we examined subjective emotional experience and physiological activation in response to the positive film clip in comparison to the neutral film clip. As noted above, we coded emotional behavior only in response to the positive film clip. Mean scores for the subjective emotional experience ratings are displayed in Table 1. Paired *t* tests indicated that levels of high-arousal positive affect (PANAS HAP) was higher in response to the positive film clip than at prefilm baseline and as shown in Table 1, in response to the neutral film clip, $ps < .05$.

To examine changes in physiological activation in response to the positive film clip, we conducted a repeated measures MANOVA to examine changes in sympathetic activation, as indexed by SCL and HR, during the neutral versus positive film clip. Mean scores for physiology are displayed in Table 2. Results showed that participants had more sympathetic activation in response to the positive film clip compared to the neutral film clip, Wilks' $\lambda = .847$, $F(2, 59) = 5.337$, $p = .007$. Post hoc univariate tests suggested significant effects of film clip on SCL, $F(1, 60) = 12.74$, $p = .003$, but not HR, $F(1, 60) = 2.043$, $p = .16$. Null effects for HR are consistent with previous literature in response to

Table 1
Subjective Emotion Experience Ratings (N = 75)

Scale	Pre-film *M* (*SD*)	Post-neutral film clip *M* (*SD*)	Post-positive film clip *M* (*SD*)	Paired sample[1] *t* (*p*)
PANAS HAP	2.61 (.78)	2.26 (.83)	3.03 (.98)	−4.55 (< .001)

Note. PANAS HAP = Positive and Negative Affect Schedule high arousal positive affect.
[1] Post-positive versus post-neutral film clip.

Table 2
Means and Standard Deviation of Physiology During Positive and Neutral Film Clip Watching

Measure	*N*	Positive film clip *M* (*SD*)	Neutral film clip *M* (*SD*)
HR	66	68.60 (8.89)	68.05 (9.14)
SCL	62	7.00 (4.02)	6.39 (3.61)
RSA	66	6.52 (1.02)	6.74 (1.09)

Note. HR = Heart rate; RSA = Respiratory sinus arrhythmia; SCL = Skin conductance level.

positive stimuli (cf. Kreibig, 2010). We did not a priori hypothesize the film clips would change RSA. A dependent samples *t* test indicated that participants had lower parasympathetic activation indexed by lower RSA, $t(65) = -2.64$, $p = .01$, while watching the positive film clip compared with the neutral film clip. However, examining RSA differences between film clips using a repeated-measures ANCOVA controlling for respiration rate, RSA did not differ significantly in response to the positive compared to the neutral film clip, $F(1, 61) = .24$, $p = .63$.

Intercorrelations. Table 3 shows intercorrelations for the key study variables in response to the positive film clip. Supporting the distinctiveness of the three emotion components, relatively few associations were observed between subjective emotional experience, physiological activation, and facial emotional behavior, with some exceptions. High-arousal positive affect (PANAS HAP) was positively associated with SCL reactivity. Gender, also included in Table 3, was not associated with any of the key study variables. Correlations of positive urgency with other key variables are displayed in the final line of the table; these will be discussed further below.

Associations Between Emotional Reactivity and Positive Urgency

Subjective emotional experience and positive urgency. As shown in Table 3, bivariate correlations of subjective emotional experience (PANAS) were not significantly correlated with positive urgency. For tests of hypotheses, we conducted a hierarchical regression analysis to examine emotional experience scores (for PANAS HAP) in response to the positive film clip, controlling for experience in response to the neutral film clip in block 1, as related to positive urgency. Controlling for high-arousal positive affect (PANAS HAP) ratings after the neutral film clip, PANAS HAP after the positive film clip was not significantly related to positive urgency, $\beta = .22$, $p = .16$.

Physiological activation and positive urgency. Table 3 shows correlations of positive urgency with the residualized change scores in physiological activity during the positive film clip derived from the neutral film clip. Positive urgency was not significantly related to HR, RSA, or SCL reactivity. The association of positive urgency with RSA was not changed substantively by controlling for respiration rate.

Facial emotional behavior and positive urgency. Genuine positive behavior remained skewed, and so nonparametric Kendall's tau *B* correlations are reported. As shown in Table 3, neither genuine positive behavior nor nongenuine positive behavior during the positive film clip were significantly related to positive urgency. In contrast, negative behavior was positively related to positive urgency (scattergrams provided in supplemental materials).

Analyses of Potential Confounds

A number of covariates were assessed as potential confounds, including gender, age, hunger levels, and caffeine and nicotine consumption within the previous 12 hours. None of these potential confounds were correlated significantly with positive urgency, all $rs < .19$, all $ps > .07$. Controlling for gender did not substantively change any of the effects noted.

Discussion

The present study provides the first multimodal examination of how positive urgency relates to emotional reactivity, as measured in subjective emotional experience, physiological activation, and emotional behavior in response to a positive film clip. Our findings provide new insights into the emotional correlates of positive

Table 3
Intercorrelations of Key Study Variables in Response to the Positive Film Clip (N = 75)

Variable	PANAS HAP	HR	RSA	SCL	Genuine positive behavior	Non-genuine positive behavior	Negative behavior	Gender
HR	.07							
RSA	.17	−.26*						
SCL	.36**	.07	.24†					
Genuine positive behavior	.10	.02	.19	.09				
Non-genuine positive behavior	.02	−.07	.05	.23†	.04			
Negative behavior	−.22†	.19	.01	−.06	−.16	.06		
Gender	−.07	−.06	−.14	−.07	−.01	.16	.18	
PUM	.05	−.13	.12	.18	−.07	−.10	.29*	−.13

Note. PANAS HAP = Positive and Negative Affect Schedule high-arousal positive affect; HR = Heart Rate; RSA = Respiratory Sinus Arrhythmia; SCL = Skin Conductance Level; PUM = Positive Urgency Measure. Subjective emotional experience and behavior scores are reported in response to the positive film clip. For physiological activation indices, partial correlations were conducted controlling for physiological indices in response to the neutral film clip. Behavior scores are log-transformed to reduce skewness. Genuine positive behavior remained skewed, and so nonparametric Kendall's Tau B correlations are reported. Due to equipment failure, behavior scores are missing for 8 persons, HR and RSA are missing for 9 persons, and SCL is missing for 11 persons.
† $p \leq .10$. * $p \leq .05$.

urgency. That is, findings did not support the hypothesis that positive urgency was related to a simple increase in positive emotion responses to a positive stimulus, consistent with previous work that urgency is distinct from heightened emotionality (cf., Kaiser, Milich, Lynam, & Charnigo, 2012). That is, positive urgency was not significantly related to ratings of high-arousal positive affect, sympathetic responses as indexed by SCL or HR, parasympathetic responses as indexed by RSA, nor facial behavior connoting either genuine or nongenuine positive emotional displays. Results remained stable when controlling for gender. Even though Duchenne smiles were relatively rare, the null effects did not appear to be simply an issue of restriction of range, in that participants in this study endorsed the full range of affective states on the PANAS. Overall, current findings provide no support for the idea that positive urgency is tied to heightened emotional reactivity in response to positive stimuli.

Rather, the results indicate a much more nuanced profile of specific aspects of emotional behavior as correlates of positive urgency. More specifically, positive urgency was related to more FACS-coded negative behavior within a 30-s time frame while watching a peak episode of the Sarah Hughes winning a gold medal. That is, within a short time period, those with high levels of positive urgency were more likely to show unexpected negative emotion behavior to a positive film clip, despite comparable levels of positive facial behavior.

Theory (Cacioppo & Berntson, 1994; Norris, Gollan, Berntson, & Cacioppo, 2010) and empirical studies (Ersner-Hershfield et al., 2008; Griffin & Sayette, 2008; Harris & Alvarado, 2005; Larsen, McGraw, Mellers, & Cacioppo, 2004; Zayas & Shoda, 2015) indicate that stimuli can activate positive and negative affect in healthy individuals. However, greater activation of negative and positive emotions in response to a given stimulus has been observed among individuals with a history of abuse (Berenson & Andersen, 2006), borderline personality disorder (Ebner-Priemer et al., 2008), and schizophrenia (Cohen et al., 2010; Kring & Elis, 2013). Current findings, then, suggest that those with high levels of positive urgency respond to positively valenced stimuli in a manner that is parallel to responses observed in those with psychopathology. This is intriguing, given the burgeoning literature suggesting that positive urgency is robustly related to a broad range of disorders, including depression (Carver et al., 2013). Caution is warranted, however, in that this pattern of facial behavior was not hypothesized, and relatively few individuals showed genuine positive emotional behavior in response to the film clip.

Caution is also warranted in that those with higher positive urgency scores did not report greater negative subjective emotional experience in response to the positive film clip, and indeed few individuals reported negative emotion in response to the film clip. This may reflect our reliance on a single item to assess irritability, but also likely reflects the temporal dynamics of these negative emotions, which may be too fleeting to be captured by aggregate ratings of a several minute period. FACS coding and other behavioral (or neural) indices captured on a second-by-second basis may provide more sensitivity than overall self-report ratings for capturing fleeting emotions other than the primary emotions elicited by a stimulus (see Grabenhorst, Rolls, Margot, da Silva, & Velazco, 2007). Spontaneous facial expressions of emotion also may be less under conscious control than self-ratings of emotional states (e.g., Ekman & Cordaro, 2011; Scherer, 2009).

Beyond the limited coverage of negative emotional experience, broader limitations of the current study include the reliance on a small sample of undergraduate students at a competitive university in the United States. Although the sample includes individuals from a broad range of cultural and ethnic backgrounds, and the mean and variability of the positive urgency scores were comparable to those observed in general community samples, the sample homogeneity restricts the ability to examine key variables such as age, which is highly related to impulsivity (Roberts, Walton, & Viechtbauer, 2006). The small sample size limited our power to detect small correlations.

Another limitation was the lack of counterbalancing among the films clips. Each participant watched the neutral film clip first and the positive film clip second. This was intentional, to prevent emotion elicited by the positive film clip from influencing emotion during the neutral film clip. (As the neutral film clip was unlikely to elicit strong emotion, we were not concerned about the neutral film clip influencing emotional reactivity during the positive film clip.) Although well-validated and commonly used (Gross & Levenson, 1995; Gruber et al., 2008), it should be noted that the film clips also varied from each other in that only the positive film clip involved sound and people.

Finally, further research is recommended to evaluate whether the emotion profile observed here can be replicated and to further characterize the nature of negative emotions elicited. It will be particularly important to consider how this emotion profile might extend to more intense emotion stimuli.

Notwithstanding the limitations, the current study provides the most careful study to date of whether positive urgency is related to greater emotional reactivity. Our findings did not support the idea that this form of impulsivity is a manifestation of greater emotional reactivity. Findings tentatively indicate that urgency may be tied to an altered emotional response, characterized by a more negative facial response to a standard positive emotion stimulus, consistent with findings of negative responses to positive stimuli observed in studies of psychopathology. It is notable that these effects were observed with a brief, moderately positive film clip. Future research is recommended to assess whether the more complex blend of positive and negative emotions elicited might relate to emotion regulation in the face of more salient and powerful emotion events.

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