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The temporal dynamics of emotional acceptance: Experience, expression, and physiology[☆]

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ABSTRACT

Emotional acceptance has begun to attract considerable attention from researchers and clinicians alike. It is not yet clear, however, what effects emotional acceptance has on early emotion response dynamics. To address this question, participants ($N=37$) were shown emotional pictures and cued either to simply attend to them, or to accept or suppress their emotional responses. Continuous measures of emotion experience, expressive behavior, and autonomic responses were obtained. Results indicated that compared to no regulation, acceptance led to more positive emotions, transiently enhanced expressivity, and lowered respiratory rate. Compared to suppression, acceptance led to more positive emotions, stronger expressivity, and smaller changes in heart rate, blood pressure, and pulse amplitude, as well as greater oxygenation. Acceptance and suppression thus have opposite effects on emotional response dynamics. Because acceptance enhances positive emotion experience and expression, this strategy may be particularly useful in facilitating social interactions.

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1. Introduction

Acceptance, which may be defined as the process of fully embracing the present moment (Block-Lerner, Salters-Pedneault, & Tull, 2005), has long been a topic of interest to scholars of philosophy and religion (Block-Lerner, Wulfert, & Moses, 2009; Miller, 1999). For example, close relationships are found between some tenets of Buddhism and acceptance (Hayes, 2002; Kumar, 2002). At the beginning of the 20th century, acceptance became a topic of concern in psychology (e.g., the psychoanalytic current, Block-Lerner et al., 2009). Since then, acceptance has been elaborated in several psychotherapeutic approaches (see e.g., Greenberg, 2002), particularly in the acceptance and commitment therapy (ACT) (Hayes, Luoma, Bond, Masuda, & Lillis, 2006). From an ACT perspective, acceptance entails fully experiencing emotions, thoughts,

and bodily sensations without trying to change, control, or avoid them (Hayes, Strosahl, & Wilson, 1999).

Recently, acceptance has been described as a form of emotion regulation (Wolgast, Lundh, & Viborg, 2013). This description might seem surprising given that emotion regulation refers to attempts to alter the unfolding emotional response (Gross, 1998), which is at odds with the emphasis placed in acceptance on trying not to alter mental processes. However, acceptance involves a strong focus on emotional responses (Hofmann & Asmundson, 2008; Wolgast, Lundh, & Viborg, 2011) and an overriding of automatic responses (Alberts, Schneider, & Martijn, 2012). Given that these aspects are essential features of emotion regulation strategies, acceptance may well in fact influence unfolding emotional responses.

One helpful contrast in this regard is with experiential avoidance. Experiential avoidance, i.e., the unwillingness to remain aware and conscious of a particular private experience, has often been observed in different pathologies and has been shown to be associated with the use of different forms of suppression (Blackledge & Hayes, 2001; Chawla, 2007; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). One way of countering experiential avoidance is to turn to the acceptance of private experience (Chapman, Gratz, & Brown, 2006; Chawla, 2007; Hayes & Wilson, 2003). This contrast suggests the value of conceptualizing acceptance as a form of emotion regulation, but much remains to be learned about (a) how acceptance impacts emotional responding, and (b) how acceptance might be differentiated from other

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emotion regulation strategies, particularly with respect to its dynamic effects on early emotional responses.

1.1. The affective impact of emotional acceptance

Several studies have investigated the impact of acceptance on stress, and emotion responses in non-clinical populations. When viewing negative films of 90–216 s and attempting acceptance, Wolgast and collaborators (Wolgast et al., 2011) showed that acceptance reduced negative emotions as compared to an unregulated condition. Another study showed a decrease in negative mood following an 8-min film clip for participants who performed acceptance (Alberts et al., 2012). However, a recent review by Kohl, Rief, and Glombiewski (2012) concluded that although acceptance seems to be effective for pain management (also evidenced in a study by Braams, Blechert, Boden, & Gross, 2012), it mostly does not help to reduce negative affect.

Regarding expressivity and physiological arousal, acceptance seems to reliably decrease negative expressivity as measured by the *M. Corrugator* activity (Wolgast et al., 2011). Acceptance has been shown not to affect heart rate (Dunn, Billotti, Murphy, & Dalgleish, 2009; Low, Stanton, & Bower, 2008) as compared to an unregulated condition; whereas it seems to augment sympathetic nervous system activation (Wolgast et al., 2011).

What emerges from past studies on acceptance is thus that this strategy may have significant affective consequences, particularly in the domain of emotional expressivity. It is thus interesting to contrast acceptance to other emotion regulation strategies that also have effects in this domain, such as expressive suppression, to observe potential differences.

1.2. The affective impact of suppression

In itself, expressive suppression seems to leave the subjective experience of negative emotions unaffected (see e.g., Gross & Levenson, 1993; Roberts, Levenson, & Gross, 2008) and to predominantly decrease the experience of positive emotion reports (Gross & Levenson, 1993, 1997; John & Gross, 2004; Strack, Martin, & Stepper, 1988). Suppression is also well known to strongly and durably decrease emotion expressivity (Gross, 1998; Gross & Levenson, 1993, 1997; Jackson, Malmstadt, Larson, & Davidson, 2000; Richards & Gross, 1999; Roberts et al., 2008), and has been repeatedly and strongly associated with an increased sympathetic activation in negative emotion-eliciting contexts over minute-long recordings (Gross, 1998; Gross & Levenson, 1993, 1997; Harris, 2001; Kunzmann, Kupperbusch, & Levenson, 2005; Roberts et al., 2008). Conversely, for shorter and earlier periods, suppression appears to cause a heart rate deceleration (Dan-Glauser & Gross, 2011), which has long been associated with an orienting response to stimulation (Graham & Clifton, 1966; Hare, 1972).

1.3. The temporal dynamics of emotion regulation early effects

All past studies on impact of emotional acceptance have focused on anticipation/preparation, stimulation, and recovery phases that last from 2 to 15 min, with no exploration of early temporal dynamics. This is unfortunate because effects of emotion regulation strategies can appear and disappear in a matter of seconds (Dan-Glauser & Gross, 2011). Acceptance could thus have effects that are undetectable when observing responses averaged over several minutes, but which shows with a dynamic second-by-second analyses. Indeed, according to Roe (2008), one of the main objectives of research in psychology is to define the dynamic features of the phenomenon to be studied. Dynamic features are here defined as “the pattern of change in the attributes comprised by the phenomenon” (Roe, 2008, p. 43), which could give important

information regarding the processes under study by identifying, among other features, stability vs. variability of changes.

In emotion processes, and more specifically in emotion regulation processes, a consideration of temporal dynamics has played an essential role. Previous analyses of pre-frontal activations have shown that specific activity patterns were linked to specific strategies (Goldin, McRae, Ramel, & Gross, 2008). Even more relevant studies regarding temporal dynamics addressed event-related potentials (ERP) during emotion regulation. These have focused on the variation of the late positive potential (LPP), which showed different amplitude depending on the emotion regulation strategy used (see e.g., Moser, Hajcak, Bukay, & Simons, 2006; Paul, Simon, Kniesche, Kathmann, & Endrass, 2013). Most importantly, results of studies of the temporal dynamics of emotion regulation have shown that specific emotion regulation activities can occur as early as 0.3 s after stimulus onset (Moser et al., 2006), and that different strategies may have different reaction onsets spanning from 0.3 to 2.5 s after stimulus onset (Schoenfelder, Kanske, Heissler, & Wessa, 2014; Thiruchselvam, Blechert, Sheppes, Rydstrom, & Gross, 2011). These indications of subtle and strategy-specific effects on the central dynamics of emotion regulation raise questions about the dynamics of peripheral effects in this early window.

To our knowledge, only two studies have evaluated the impact of emotion regulation on the dynamics of peripheral responses during the first few seconds following image presentation. The first one is a study from our lab, describing the early dynamic impact of suppression on emotional responses (Dan-Glauser & Gross, 2011). We found that participants could indeed efficiently suppress the early manifestations of their emotional expressivity. More interestingly, we also showed that suppression can affect emotion responses on specific portions of the considered time windows, and with different dynamics between conditions. For example, negative emotional states were reached more rapidly in a suppression condition than in an unregulated condition. The second study addressed the impact of reappraisal on cardiovascular responses over a five second period, and showed an early impact of this strategy, particularly during the viewing of positive stimulations (Pavlov et al., 2014). These results show how rapidly regulation strategies can affect responses, even when measuring the peripheral nervous system.

1.4. The present study

The major aim of this study was to assess the impact of acceptance on the unfolding of emotional responses in the first few seconds after emotion stimulation. More specifically, we wanted to evaluate how the *temporal dynamics* of the different responses are impacted by acceptance. As emotions involve changes in experiential, expressive, and autonomic response systems (Buck, 1994; Frijda, 2007; Gross, 2014; Lang, 1995; Levenson, 1994), we examined the first eight seconds of participants' emotional responses with (a) a continuous assessment of emotion experience, (b) continuous EMG, to assess *Corrugator Supercilii* and *Zygomaticus Major* responses, and (c) continuous measures of cardiovascular and respiratory responses. To better grasp the specific impact of acceptance, we contrasted its effects with those of an unregulated condition, and a *global* suppression condition, targeting both physiological and expressive responses. This latter condition is an interesting contrast to acceptance strategy, which works on accepting every manifestation of emotion, i.e., multiple emotion responses simultaneously.

Previous research on the topic has provided inconsistent results, but has mostly shown no effect of acceptance on emotional experience. Our design allowed us to explore the possibility that previous null findings were a result of lack of precision to capture early, transient effects of acceptance. This is why we target here the impact of

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