

Motivational conflict influences the timing of emotions and their regulation

Amelia Aldao¹ · Blair E. Wisco²

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Abstract Our emotional responses to stressors do not occur in a vacuum; rather, they are dependent upon the context in which they take place. In recent years, there has been a growing interest in identifying such contextual influences on emotional processes. However, two important questions have yet to be answered. First, little is known about how motivational context (e.g., motivational conflict) can affect the timing of emotional experiences (i.e., affective chronometry). Second, the influence of motivational context on the utilization of emotion regulation strategies has been largely unexplored. We recruited 166 participants and assigned them to a motivational conflict condition (watch a disgust-eliciting film clips while anticipating a food tasting) or one of two no conflict conditions (watch a disgust-eliciting film while anticipating a food-unrelated task or watch a craving-inducing film clip while anticipating a food tasting). We found that motivational conflict moderated the time course of anxiety. These findings highlight the importance of examining motivational processes when seeking to understand how and when individuals experience and regulate their emotions.

Keywords Emotion regulation · Context · Disgust · Motivation · Affective chronometry

Introduction

In recent years, there has been a growing excitement in understanding how context can influence the experience and regulation of emotions (e.g., Aldao 2013; Aldao et al. 2015; Bonanno and Burton 2014; Rottenberg and Kashdan 2010). A number of critical contextual factors have been identified, such as the degree of controllability of a stressor (e.g., Troy et al. 2013), the amount of intimacy evoked by the situation (Kashdan et al. 2014), and the intensity of the emotion-eliciting stimuli (e.g., Sheppes et al. 2014), among others. However, closer inspection of this literature suggests that a particular type of context has been largely overlooked: motivation, and more specifically motivational conflict (e.g., Baumeister and Vohs 2007). The most common form of motivational conflict is the approach-avoidance type, whereby we are pulled towards approaching and avoiding two competing goals (e.g., eating cake versus sticking to our diet). In addition, there are approach–approach conflicts and avoidance–avoidance conflicts. In the former, we are faced with pursuing competing approach-related goals (e.g., going on a date versus hanging out with our friends). In the latter, we are confronted with pursuing competing avoidance-related goals (e.g., avoid going to the party versus avoid saying no to the friend who invited us).

In many cases, motivational conflict results in the generation of anxiety, which, when unregulated, further interferes with conflict resolution, thus leading to a vicious cycle of difficulties enacting instrumental, goal-driven behaviors consistent with our values (e.g., Barlow 2002; Fauerbach et al. 2009; Gray and McNaughton 2000; Mennin and Fresco 2014). In fact, it has recently been suggested that “inherent in the notion of an anxiety disorder is conflict between approach-related drives (e.g., to

✉ Amelia Aldao
aldao.1@osu.edu

Blair E. Wisco
bewisco@uncg.edu

¹ Psychology Department, The Ohio State University,
1835 Neil Ave, Columbus, OH 43210, USA

² Psychology Department, University of North Carolina at
Greensboro, PO Box 26710, Greensboro, NC 27402, USA

seek positive social interactions, to leave the house) and avoidance-related drives (e.g., to prevent being humiliated or having a panic attack)” (Aupperle and Paulus 2010, p 518).

Although growing evidence supports the notion that motivational conflict generates anxiety, little is known about the *timing* of anxious responding to such conflicts. Such an omission is noteworthy for two reasons. First, timing plays a critical role in how emotions are experienced and regulated (e.g., Davidson et al. 2000; Gross 2015; Kring et al. 2011; Mackiewicz et al. 2007). For example, research suggests that emotion regulation via the utilization of cognitive change strategies might be more effective early in the emotion generative process (e.g., Sheppes and Meiran 2008). Thus, identifying how and when emotions might reach high levels of intensity is essential for the development of a more nuanced understanding of how to more effectively regulate them. In this respect, it becomes important that we examine how different levels of motivational conflict might lead to diverging anxiety trajectories, particularly given the anticipatory nature of anxiety (Barlow 2002; Mackiewicz et al. 2007).

Second, motivational conflict itself unfolds over time. That is, quite frequently, a goal or emotion at time 1 can facilitate or interfere with the pursuit of a goal at time 2. For example, we refrain from having a third drink at the bar because we have an important meeting in the morning. Or, according to research by Tamir et al. (2008), we choose to increase negative emotions in the present when we are preparing to pursue aggressive goals in the future. Thus, in light of this sequential nature of motivational conflict, it becomes essential that we examine how the anxiety experienced while pursuing a particular goal varies as a function of whether the subsequent goal is in harmony or conflict with it.

In addition, much less is understood about how people might utilize emotion regulation (ER) strategies to modify the anxiety resulting from motivational conflict. This is particularly important in light of the fact that ER can likely help solve such conflicts (e.g., Mennin and Fresco 2014; Robinson et al. 2008). Given that ER also unfolds over time (e.g., Sheppes and Gross 2011; Yoon and Joormann 2012; Urry 2009) it is important to examine the influence of motivational conflict on the time course of the use of regulation strategies.

Thus, in this investigation, we sought to advance the literature on motivational conflict and emotions and their regulation by examining the role of sequential motivational conflict on the time course of anxiety and the use of ER strategies. Our motivational conflict manipulation consisted of watching a disgust-eliciting film clip while anticipating a food tasting task (disgust + food). We compared this condition to two no conflict conditions in which the emotions elicited by the film clip were

compatible with the upcoming task. One no conflict condition consisted of watching the disgust-eliciting film clip while anticipating a toy block-rating task (disgust + toy block). The other one consisted of watching a craving-eliciting film clip while anticipating the food tasting task (craving + food).

In terms of ER strategies, we assessed participants’ experiential avoidance (i.e., attempts to escape thoughts, feelings, memories, and other internal experiences; Gamez et al. 2011; Hayes et al. 1999), and perseverative cognition (i.e., thinking repetitively and passively about one’s emotions by ruminating, worrying, or obsessing; Nolen-Hoeksema et al. 2008; Watkins 2008). We focused on these strategies because they represent extreme levels of maladaptive engagement with emotion eliciting stimuli and/or situations (see Sheppes et al. 2014). Whereas avoidance consists of disengagement, perseverative cognition entails overengagement. Importantly, both strategies are central to current models of anxiety disorders (e.g., Barlow 2002; Borkovec et al. 2004; Hayes et al. 1999). Further, meta analytic work suggests that the habitual use of these ER strategies is associated with elevated anxiety symptoms (d ’s ranging from .29 to .42; see Aldao et al. 2010).

We expected that participants in the conflict condition (disgust + food) would experience greater anxiety than those in the control conditions, consistent with prior research that motivational conflict is associated with anxiety (e.g., Aupperle and Paulus 2010; Fauerbach et al. 2009; Gray and McNaughton 2000; Mennin and Fresco 2014). Further, we examined whether motivational conflict would also impact the time course of anxiety. We expected that participants in the high motivational conflict condition (disgust + food) would experience two increases in anxiety: (1) at the beginning of the disgust film clip, coinciding with the elicitation of disgust (e.g., Aldao and Nolen-Hoeksema 2013), and (2) after the disgust film clip, in preparation for the task that would be at odds with their current emotional state (e.g., Corr 2004; Gray and McNaughton 2000; Mennin and Fresco 2014; Robinson et al. 2008). In contrast, we expected that participants in the disgust + toy block (no conflict) condition would experience an increase in anxiety only at the beginning of the disgust film clip. This is because the experience disgust tends to be accompanied by the experience of anxiety (e.g., Aldao and Nolen-Hoeksema 2013). We predicted that participants in the craving + food (no conflict) condition would not experience an increase in anxiety in response to the pleasant craving film clip. Rather, we expected them to report greater anxiety while anticipating the tasting of mysterious foods because this involved a certain amount of uncertainty. We expected that changes in the use of ER strategies would accompany increases in the experience of anxiety and/or disgust.

Method

Participants

A total of 166 undergraduate students (56 % female; mean age = 20.30, SD = 3.63; 71 % Caucasian, 11 % African American, 10 % Asian, 5 % Hispanic/Latino, 3 % Other) participated in a 1-h laboratory study. They either earned course credit or \$7. Participants in each of the conditions did not differ in terms of age, gender, or primary ethnicity (p 's > .423).

Procedures

Experimental manipulation

We told participants that we were interested in examining people's responses to different types of stimuli. Participants then sat in front of a computer running Medialab v4 (Jarvis 2012) on a 17-inch monitor. The first screen contained text explaining that they would first rate their emotional responses to a disgust-eliciting film clip. Participants were randomly assigned to disgust + food (conflict; $n = 56$), disgust + toy blocks (no conflict; $n = 57$), or craving + food (no conflict; $n = 53$). Those assigned to the disgust + food (conflict) and craving + food (no conflict) conditions read that after watching the film clip, they would have to participate in a food tasting task, in which they would have to smell and taste a number of foods and rate them on their appeal. Participants assigned to disgust + toy block (no conflict) condition read that after the film clip, they would have to look at a number of figures built out of toy blocks and that they would have to rate them on the basis of how architecturally sound they seemed. Following this induction, all participants rated the emotions they were experiencing and the ER strategies they were using (pre-film assessment).

Participants then watched either the disgust- or craving-eliciting film clips (see below) and provided additional ratings of their emotions and ER strategies after 100 s (early-film assessment), 200 s (mid-film assessment), and 300 s (post-film assessment). The film clip was briefly stopped to allow them to make these ratings. After participants completed the post-film assessment, the computer instructed them to tell the research assistant that it was time for him/her to bring the food or the toy blocks for the next task. The research assistant told participants that s/he needed to get those from the other room, so in the meantime, they should go ahead and answer the remaining questions on the computer (pre-task assessment). This allowed us to capture participants' emotions and their regulation while the anticipated task was most imminent

and therefore more motivationally salient (e.g., Cunningham and Brosch 2012). When the research assistant came back, s/he told the participants that they would not have to do a food tasting or a toy blocks rating because we were only interested in how they felt while anticipating such tasks. The research assistant debriefed participants and gave them full course credit or payment for their participation.

Materials

Emotions and ER strategies ratings

At each time point, participants rated the intensity of their emotions (disgust, desire to eat, anxiety), and the extent to which they used ER strategies (experiential avoidance, perseverative cognition). They made each rating on a 9-point scale ranging from 1 = "not at all" to 9 = "extremely" administered at 5 time points (pre-film, early-film, mid-film, post-film, pre-task). In order to make sure that participants understood the differences between the two ER strategies, we provided them with a description of each strategy at the beginning of the study. We described experiential avoidance broadly, as "escaping your emotions, for example through distraction or suppression" (e.g., Gamez et al. 2011; Hayes et al. 1999) and perseverative cognition as "worrying, ruminating, and/or obsessing about how you are feeling" (e.g., Watkins 2008). We encouraged participants to seek further clarification from the research assistants, if needed.

Readiness ratings

During the pre-task time point participants also rated their readiness to complete the subsequent task (eating food or assessing blocks) on a 9-point scale ranging from 1 = "not at all" to 9 = "extremely."

Film clips

The disgust-eliciting film clip depicted scenes from two episodes of the television show "Fear Factor," in which contestants ate live bugs, blood, and raw cow brains (see Shiota and Levenson 2012). The craving-eliciting film clip depicted scenes from the Travel Channel depicting some people eating pizza and others eating ice cream.

Data analytic strategy

Because the assessments of emotions and their regulation were nested within participants, we used generalized estimating equations (GEE), which is an extension of the

general linear model that assumes correlated observations of dependent variables and is fairly robust to missing data and to misspecifications of the covariance matrix (e.g., Ghisletta and Spini 2004; Liang and Zeger 1986). We found that an independent covariance matrix structure offered the best fit to the data. We entered emotions/ER strategies as level 1 outcome variables (within subjects), time as a level 1 predictor variable (within subjects), and experimental condition as a level 2 predictor variable (between subjects). We tested the interaction between condition and changes over time in emotions (disgust, desire to eat, anxiety) and ER strategies (experiential avoidance, perseverative cognition). We followed up significant interactions in two ways: (1) by comparing each time point to the previous one within each condition (within condition comparisons), and (2) by comparing the same time points across conditions (between condition comparisons) (all Bonferroni adjusted). Because GEE only generates unstandardized coefficients, we present those with their corresponding standard errors.

Results

Basic descriptives

We transformed skewed variables using inverse and square root transformations so that they would approximate normal distributions (i.e., skewness estimate/SE < 2). At the pre-film assessment, the conditions did not differ in anxiety, disgust, desire to eat, experiential avoidance, or perseverative cognition (p 's > .48). Table 1 contains the mean levels of disgust, desire to eat, anxiety, and the use of each of the ER strategies for each condition and time point.

Manipulation checks

We ran two GEE models (N participants = 166, n observations = 830) predicting disgust and desire to eat with time and condition.

Disgust

There were main effects of time, Wald's $\chi^2 = 683.635$, $p < .001$ and condition, Wald's $\chi^2 = 224.505$, $p < .001$, that were qualified by a two-way interaction, Wald's $\chi^2 = 287.715$, $p < .001$.

Within condition comparisons

In the disgust + food (conflict) condition, disgust increased from pre- to early-film, $p < .001$ and marginally decreased from post-film to pre-task, $p = .074$ (all other p 's = 1). In

the disgust + toy block (no conflict) condition, it increased from pre- to early-film clip, $p < .001$ and marginally from early- to mid-film clip, $p = .065$, and it decreased from post-film to pre-task, $p < .001$ (all other p 's > .319). In the food + craving (no conflict) condition, it increased from pre- to early-film clip, $p = .022$, and it decreased from post-film to pre-task, $p = .005$ (all other p 's = 1).

Between condition comparisons

Comparisons of each time point across the three conditions indicate that there were no differences at pre-film clip, p 's > .880, and that disgust was higher in the disgust + food (conflict) and the disgust + toy block (no conflict) conditions than in the craving + food (no conflict) condition during the early, mid, post-film clip and pre-task assessments, all p 's < .001. The disgust conditions did not differ from each other, all p 's = 1. Thus, the disgust film clips elicited greater levels of disgust than the craving film clip.

Desire to eat

There were main effects of time, Wald's $\chi^2 = 18.773$, $p = .001$ and condition, Wald's $\chi^2 = 60.746$, $p < .001$ that were qualified by a two-way interaction, Wald's $\chi^2 = 153.530$, $p < .001$. *Within condition comparisons* In the in the disgust + food (conflict) condition, desire to eat decreased from pre- to early-film clip, $p < .001$, marginally from early- to mid-film clip, $p = .061$, and it did not change afterwards (all other p 's = 1). In the disgust + toy block (no conflict) condition, it decreased from pre- to early-film clip, from early- to mid-film clip, p 's < .039, and it increased marginally from post-film to pre-task, $p = .067$ (all other p 's = 1). Conversely, in the craving + food condition (no conflict), it increased from pre- to early-film clip, from early- to mid-film clip, and from mid- to post-film clip, and it decreased from post-film clip to pre-task, all p 's < .001. *Between condition comparisons* Comparisons of each time point across the three conditions indicate that there were no differences at pre-film clip, p 's = 1, and that the desire to eat was lower in the disgust + food (conflict) and the disgust + toy block (no conflict) conditions than in the craving + food (no conflict) condition during the early, mid, post-film clip and pre-task assessments, all p 's < .001. The disgust conditions did not differ from each other, all p 's > .916. Thus, the craving film clip generated a greater desire to eat than the disgust film clips.

Readiness to perform the next task

There was a significant effect of condition, $F = 15.202$, $p < .001$, such that, readiness ratings were lower in the

Table 1 Descriptives for emotions and er strategies in each condition and time point

	Pre-film	Early-film	Mid-film	Post-film	Pre-task	Total
<i>Disgust</i>						
Disgust + food (conflict)	-.465 (.011)	-.192 (.013)	-.177 (.013)	-.191 (.015)	-.236 (.019)	-.252 (.011)
Disgust + toy (no conflict)	-.465 (.011)	-.192 (.015)	-.165 (.014)	-.181 (.015)	-.255 (.020)	-.252 (.011)
Craving + food (no conflict)	-.480 (.009)	-.434 (.016)	-.444 (.014)	-.428 (.015)	-.458 (.011)	-.449 (.011)
<i>Desire to eat</i>						
Disgust + food (conflict)	2.087 (.076)	1.791 (.065)	1.725 (.060)	1.754 (.068)	1.775 (.063)	1.826 (.059)
Disgust + toy (no conflict)	2.050 (.062)	1.744 (.053)	1.685 (.050)	1.666 (.052)	1.737 (.053)	1.779 (.047)
Craving + food (no conflict)	2.096 (.071)	2.359 (.078)	2.488 (.070)	2.594 (.072)	2.417 (.079)	2.391 (.067)
<i>Anxiety</i>						
Disgust + food (conflict)	-.327 (.018)	-.316 (.019)	-.301 (.018)	-.321 (.018)	-.282 (.019)	-.309 (.016)
Disgust + toy (no conflict)	-.344 (.019)	-.311 (.018)	-.285 (.018)	-.296 (.019)	-.323 (.018)	-.312 (.016)
Craving + food (no conflict)	-.343 (.019)	-.394 (.019)	-.407 (.018)	-.413 (.018)	-.365 (.020)	-.384 (.016)
<i>Experiential avoidance</i>						
Disgust + food (conflict)	-.389 (.018)	-.378 (.018)	-.346 (.019)	-.360 (.019)	-.347 (.019)	-.364 (.016)
Disgust + toy (no conflict)	-.385 (.018)	-.366 (.019)	-.299 (.019)	-.311 (.018)	-.345 (.019)	-.341 (.015)
Craving + food (no conflict)	-.357 (.018)	-.417 (.016)	-.424 (.015)	-.414 (.015)	-.422 (.015)	-.407 (.013)
<i>Perseverative cognition</i>						
Disgust + food (conflict)	-.349 (.019)	-.351 (.019)	-.343 (.019)	-.342 (.018)	-.325 (.018)	-.342 (.016)
Disgust + toy (no conflict)	-.358 (.019)	-.300 (.019)	-.293 (.020)	-.293 (.018)	-.327 (.019)	-.314 (.016)
Craving + food (no conflict)	-.320 (.019)	-.368 (.018)	-.385 (.019)	-.365 (.019)	-.372 (.019)	-.362 (.016)

These are transformed variables. Disgust, anxiety, experiential avoidance, and perseverative cognition required an inverse transformation. Desire to eat required a square root transformation

disgust + food (conflict) condition than in the disgust + toy block (no conflict) and craving + food (no conflict) conditions, p 's < .001. There were no differences between the no-conflict conditions, $p = 1$.

Effect of condition on anxiety

We ran one GEE model (N participants = 166, n observations = 830) predicting anxiety with time and condition. There were main effects of time, Wald's $\chi^2 = 11.978$, $p = .018$ and condition, Wald's $\chi^2 = 14.212$, $p = .001$ that were qualified by a two-way interaction, Wald's $\chi^2 = 44.184$, $p < .001$. *Within condition comparisons* In the disgust + food (conflict) condition, anxiety only increased from post-film clip to pre-task, $p = .018$ (all other p 's > .355). In the disgust + toy block (no conflict) condition, it marginally increased from early- to mid-film clip, $p = .058$ (all other p 's > .347). In the craving + food (no conflict) condition, it decreased from pre- to early-film clip, $p = .001$ and it increased from post-film to pre-task, $p = .013$ (all other p 's = 1). *Between condition comparisons* Comparisons of each time point across the three conditions indicate that there were no differences at pre-film clip, p 's = 1, and that anxiety was higher in the disgust + food (conflict) and the disgust + toy block (no conflict) conditions than in the craving + food (no conflict)

condition during the early, mid, and post-film clip assessments, all p 's < .009. The disgust conditions did not differ from each other, p 's > .972. During the pre-task assessment, it was higher in the disgust + food (conflict) than in the craving + food (no conflict) condition, $p = .007$. It did not differ between the disgust conditions, $p = .349$. See Fig. 1.

Taken together, these findings suggest that motivational conflict leads to a spike in anxiety immediately prior to a task incompatible with one's current emotional state. After watching a disgust-inducing movie, anxiety only increased when anticipating a task in motivational conflict with disgust (in the disgust + food but not the disgust + toy block condition). When anticipating a mysterious food tasting task, participants in both the disgust + food (conflict) and craving + food (no conflict) showed an increase in anxiety immediately prior to the task. However, anxiety level at that time point was higher in the disgust + food (conflict) relative to the craving + food condition (no conflict).

Effect of condition on ER strategies

We ran two GEE models (N participants = 166, n observations = 830) predicting the use of each of the ER strategies (experiential avoidance, perseverative cognition) with time and condition.

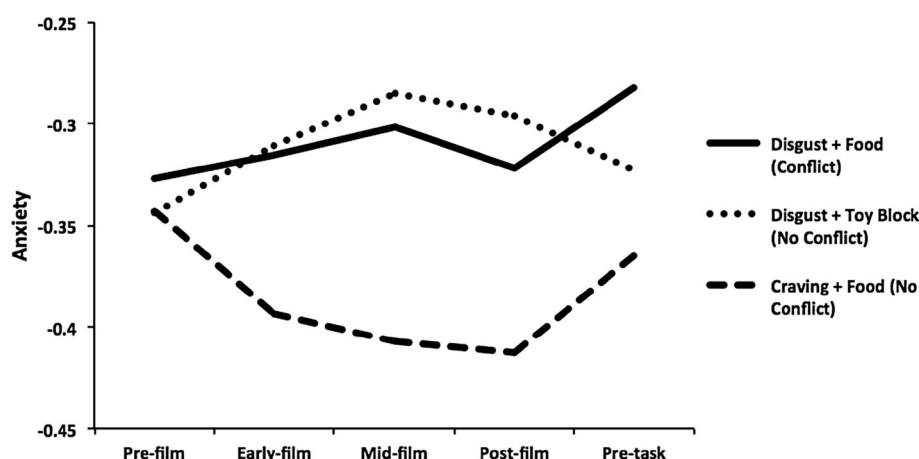


Fig. 1 Predicting anxiety with conflict condition. In the disgust + food (conflict) condition, anxiety only increased from post-film clip to pre-task, $p = .018$ (all other p 's $> .355$). In the disgust + toy block (no conflict) condition, it marginally increased from early- to mid-film clip, $p = .058$. In the craving + food (no conflict) condition, it decreased from pre- to early-film clip, $p = .001$ and it increased from post-film to pre-task, $p = .31$. There were no differences at pre-film clip, all p 's = 1, and anxiety was higher in the

disgust + food (conflict) and the disgust + toy block (no conflict) conditions than in the craving + food (no conflict) condition during the early, mid, and post-film clip assessments, all p 's $< .009$. The disgust conditions did not differ from each other, all p 's $> .972$. During the pre-task assessment, anxiety was higher in the disgust + food (conflict) than in the craving + food (no conflict) condition, $p = .007$. It did not differ between the disgust conditions, $p = .349$

Experiential avoidance

There were main effects of time, Wald's $\chi^2 = 15.294$, $p = .004$ and condition, Wald's $\chi^2 = 11.706$, $p = .003$ that were qualified by a two-way interaction, Wald's $\chi^2 = 47.697$, $p < .001$. *Within condition comparisons* In the disgust + food (conflict) condition, experiential avoidance did not change, p 's $> .294$. In the disgust + toy block (no conflict) condition, it increased from early- to mid film clip, $p < .001$ (all other p 's > 1.69). In the craving + food (no conflict) condition, it decreased from pre-film clip to early film clip, $p = .020$ (all other p 's = 1). *Between condition comparisons* Comparisons of each time point across the three conditions indicate that there were no differences at pre-film clip, p 's $> .657$ or early film, p 's $> .113$, and that experiential avoidance was higher in the disgust + food (conflict) and the disgust + toy block (no conflict) conditions than in the craving + food (no conflict) condition during the mid film clip and pre-task assessments, all p 's $< .006$. During the post-film clip, it was higher in the disgust + toy (no conflict) than in the craving + toy (no conflict) condition, $p < .001$ and marginally higher in the disgust + food (conflict) than in the craving + toy (no conflict), $p = .073$. It did not differ between the disgust conditions at any time points, all p 's $> .181$. See Fig. 2.

Perseverative cognition

There was no main effect of time, Wald's $\chi^2 = 1.646$, $p = .801$ or condition, Wald's $\chi^2 = 4.461$, $p = .107$. However, the two-way interaction was significant, Wald's

$\chi^2 = 35.163$, $p < .001$. *Within condition comparisons* In the disgust + food (conflict) condition, perseverative cognition did not change over time, all p 's = 1. In the disgust + toy block (no conflict) condition, it increased from pre- to early-film clip, $p = .011$ (all other p 's $> .141$). In the craving + food (no conflict) condition, it marginally decreased from pre- to early film clip, $p = .096$ (all other p 's $> .929$). *Between condition comparisons* Comparisons of each time point across the three conditions indicate that there were no differences at pre-film clip, all p 's $> .476$, and that perseverative cognition was higher in the disgust + toy block (no conflict) conditions than in the craving + food (no conflict) condition during the early-mid- and post-film assessments, all p 's $< .028$. The disgust conditions did not differ from each other, p 's $> .164$. There were no differences during the pre-task assessment, p 's $> .235$. See Fig. 3.

Discussion

In this investigation, we found evidence supporting the notion that emotional experiences and their regulation vary as a function of motivational conflict. In line with predictions, we found that our contextual manipulation had an effect on the time course of anxiety, experiential avoidance, and perseverative cognition. Specifically, anticipating a task that posed a motivational conflict with one's current emotional state resulted in (1) an increase in anxiety immediately prior to the incompatible task, and (2) no changes in avoidance or perseverative cognition. In

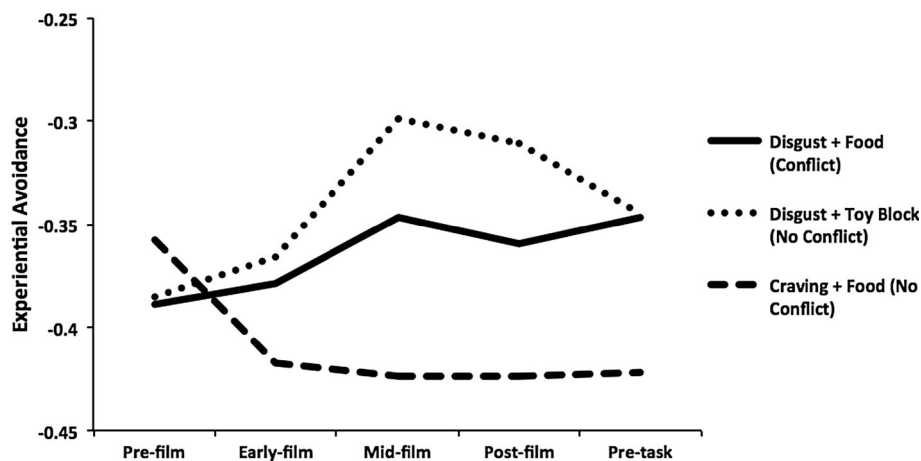


Fig. 2 Predicting experiential avoidance with conflict condition. In the disgust + food (conflict) condition, experiential avoidance did not change, all p 's $> .294$. In the disgust + toy block (no conflict) condition, it increased from early- to mid film clip, $p < .001$. In the craving + food (no conflict) condition, it decreased from pre-film clip to early film clip, $p = .020$. There were no differences at pre-film clip, all p 's $> .657$, and it was higher in the disgust + food (conflict) and the disgust + toy block (no conflict) conditions than in the

craving + food (no conflict) condition during the mid film clip and pre-task assessments, all p 's $< .006$. During the post film clip, it was higher in the disgust + toy (no conflict) than in the craving + toy (no conflict) condition, $p < .001$ and marginally higher in the disgust + food (conflict) than in the craving + toy (no conflict), $p = .073$. It did not differ between the disgust conditions at any time points, all p 's $> .181$

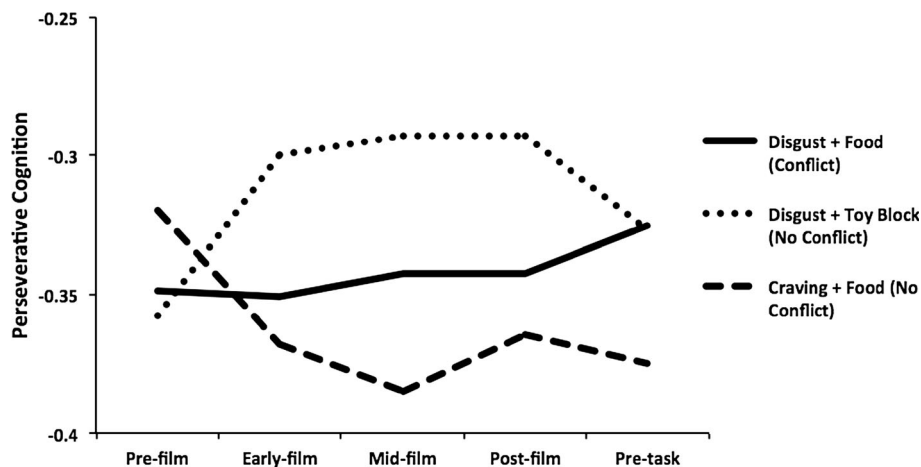


Fig. 3 Predicting perseverative cognition with conflict condition. In the disgust + food (conflict) condition, perseverative cognition did not change over time, all p 's = 1. In the disgust + toy block (no conflict) condition, it increased from pre- to early-film clip, $p = .011$. In the craving + food (no conflict) condition, it marginally decreased from pre- to early film clip, $p = .096$ (all other p 's $> .929$). There

were no differences at pre-film clip, all p 's $> .476$, and it was higher in the disgust + toy block (no conflict) conditions than in the craving + food (no conflict) condition during the early- mid- and post-film assessments, all p 's $< .028$. The disgust conditions did not differ from each other, all p 's $> .164$. There were no differences during the pre-task assessment, all p 's $> .235$

contrast, anticipating tasks that posed no motivational conflict resulted in a different pattern of affective and regulatory trajectories. Watching a disgust eliciting film clip while anticipating a toy block rating task, led to: (1) marginal increases in anxiety during the onset of the disgust-eliciting film clip and (2) significant increases in experiential avoidance and perseverative cognition that accompanied those increases in anxiety. Watching a craving eliciting film clip while anticipating a food tasting task produced: (1) decreases in anxiety throughout the film clip,

and (2) increases in anxiety prior to the task, (3) decreases in experiential avoidance (and marginal decrease in perseverative cognition) early in the film clip. Although both the disgust + food (conflict) and craving + food (no conflict) were marked by a spike in anxiety immediately prior to the food tasting task, importantly, the absolute level of anxiety was higher in the conflict than the no conflict condition. In all, these findings underscore the importance of examining time-based trajectories in order to develop an in-depth understanding of the role of

motivational conflict on the time course of affective processes and their regulation.

Participants in the conflict condition experienced an increase in their anxiety levels only while anticipating the conflict task. Contrary to predictions, they did not experience changes in their anxiety levels during the disgust film clip. Two sets of possibilities emerge to account for this shift in anxiety towards the moments prior to the conflict task. First, it is plausible that participants in this condition simply did not generate a burst of anxiety in response to the film clip because, in comparison to the food tasting, it posed a small threat. That is, watching a disgust-eliciting film clip might have been less idiosyncratically relevant than having to engage in the food tasting while feeling quite disgusted and nauseated. In this respect, motivational conflict might have exerted its influence on the emotion generative process (see Gross and Barrett 2011). Support for this notion comes from the finding that neither experiential avoidance nor perseverative cognition changed during the film clip.

A second possibility is that participants in the conflict condition did generate a strong anxiety response to the disgust-eliciting film clip, but they also experienced a stronger motivation to downregulate it because the “worst was yet to come.” However, unlike those in the no conflict conditions, participants experiencing conflict did not report changes in their use of experiential avoidance or perseverative cognition over the course of the film clip. Perhaps their regulation attempts consisted of the utilization of additional ER strategies (i.e., the repertoire is quite large; e.g., Aldao and Dixon-Gordon 2013; Koole 2009) and/or the enactment of implicit/automatic regulation processes (e.g., Gyurak et al. 2011; Koole and Rothermund 2011). To further examine this possibility, it will be important to conduct a more comprehensive evaluation of ER strategies and to assess implicit regulatory processes. Doing so will be crucial for determining whether the anticipation of motivational conflict has a stronger impact on the generative or regulatory aspects of emotions (Gross and Barrett 2011).

The findings from this investigation also underscore the multi-faceted and complex nature of the process of motivational conflict. Whereas the presence of the disgust film clip resulted in overall higher levels of anxiety, it was the anticipation of the food-tasting task that produced a sharp increase in anxiety levels. In this respect, it will be important for future studies to manipulate the various affective and cognitive components that produce motivational conflict. One avenue for future research will consist of the examination of different emotions (e.g., disgust, anxiety, happiness) in relation to different types of anticipated and executed tasks. More broadly, it will be important to model the less common avoidance–avoidance and approach–approach conflicts.

It is also important to mention that the vast majority of changes in emotional experiences (disgust, desire to eat, anxiety) and the implementation of ER strategies (experiential avoidance, perseverative cognition) primarily took place towards the early phases of the film clip. This provides further support for the notion that emotions and their regulation occur quickly in reaction to stimuli in the environment, and more broadly, it highlights the need for examining time-based trajectories when studying affective and motivational processes.

We see a number of additional future directions stemming from this work. First, we only examined two putatively maladaptive ER strategies, namely avoidance and perseverative cognition. We focused on these two because they have been found to be more strongly and robustly correlated with anxiety than putatively adaptive strategies, such as reappraisal (Aldao et al. 2010). Thus, an important avenue for future research will consist of a more thorough examination of a larger number of strategies that constitute the repertoire, in particular the putatively adaptive strategies. Furthermore, given recent work suggesting that strategies frequently interact with one another in the prediction of mental health, it will be important to examine patterns of interactions among strategies (e.g., Aldao et al. 2014; Yoon and Joormann 2012). Likewise, it will be important to assess emotional experiences and use of ER strategies at higher frequencies in order to run lagged models predicting how the use of a strategy at one time point results in changes in emotions at the next time point.

Second, we used single item prompts with relatively brief descriptions to assess ER strategy use, and participants may have differed in their interpretation of these prompts. However, including a more thorough description and assessment of each ER strategy would have been impractical given the frequent assessment of ER over a relatively short time period. Thus, as investigators continue to utilize this type of paradigm to assess spontaneous use of ER strategies, it will be critical to conduct extensive psychometric work to improve how these processes are assessed. One initial step for doing so will consist of providing participants with descriptions of different ER strategies and asking them to write down examples of how they would implement them. This information could then be used to modify the prompts to ensure that participants are interpreting them in line with how the researchers have operationalized each strategy.

Third, by describing particular strategies to the participants, we may have induced a demand characteristic to utilize those strategies in response to the film clips. Therefore, participants may have been more likely to use these strategies than they would otherwise. Importantly, any possible demand characteristics were constant across conditions, so relative differences between the two

conditions can be interpreted with confidence. That said, it will be of utmost importance for future studies seeking to elucidate the mechanisms underlying emotional experiences and ER choice to adopt a multi-modal approach assessing subjective, physiological, and behavioral processes in tandem. This will be particularly important in light of the development of the National Institute of Mental Health (NIMH)'s Research Domain Criteria (RDoC), which advocates the study of normative and pathological processes by examining activity across multiple units of analyses, such as subjective reports, neurocircuitry, genes, peripheral physiology, and behavior (see Insel et al. 2010).

Fourth, we did not ask participants to rate the extent to which they thought their disgust would interfere with the subsequent task. Rather, we inferred this information by examining their readiness to perform that task. In this respect, participants in the conflict condition reported being less ready to perform the task than those in the no conflict conditions. Nonetheless, it will be essential for future studies to assess participants' perceptions of motivational conflict directly. By doing so, investigators will be able to shed more light on the mechanisms underlying the findings presented here and consequently lead to a more nuanced understanding of motivational context and ER.

In all, this study suggests that motivational context can have an important influence on the experience of emotions and the spontaneous use of ER strategies. Specifically, these findings indicate that such influence is particularly pronounced in the temporal trajectories of affective processes, underscoring the importance of modeling affective chronometry (e.g., Davidson et al. 2000; Gross 2015). This study further highlights the usefulness of systematically incorporating a motivational framework in the study of the contextual determinants of the experience of emotions and the use of ER strategies (e.g., Aldao and Mennin 2014; Magen and Gross 2010). We hope that this research inspires future work on ER and context that focuses on the critical constructs of motivational processes and affective chronometry.

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