



# Silver linings in the face of temptations: how mixed emotions promote self-control efforts in response to goal conflict

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## Abstract

Choosing between conflicting goals is a frequent yet difficult problem, especially when temptations are involved because self-control effort is required to overcome them. This study investigated whether experiencing mixed emotions in response to goal conflict can facilitate the necessary self-control effort needed to resist temptations. A sample of 73 individuals participated in an intensive longitudinal study, completing several measures 4 times a day during ten consecutive days, producing over 2500 observations. Results derived from using multilevel structural equation modeling confirmed that mixed emotions mediated the relationship between perceived goal conflict and intentions to resist temptations, over and above the influence of single positive emotions or negative emotions, and trait levels of self-control. Implication of these findings for collaboration and the impact of mixed emotions in more general social dilemmas are explored.

**Keywords** Mixed emotions · Self-control · Temptations · Goal conflict

## Introduction

Most people face an uphill struggle to achieve their long-term goals, in both work life (Latham et al. 2010) and personal life (e.g., Norcross et al. 1989). In part, this happens because people tend to privilege short-term goals in spite of more relevant, meaningful long-term goals, which leads to repeated self-control failures (Baumeister and Heather-ton 1996). Self-control failures have been associated with several negative outcomes, including poor performance and unethical behavior at work (Ariely and Wertenbroch 2002; Gino et al. 2011). This study investigates whether experiencing a mixture of emotions can contribute to a more efficacious response to goal conflict decisions that involve temptation.

Research has previously established that certain cognitive strategies can positively influence people's ability to resist temptations and favor long-lasting goals. For example, high cognitive load can reduce the influence of short-term goals

on behavior (Van Dillen et al. 2013). Similarly, the capacity to consciously inhibit impulsive responses or direct attentional control toward long-term goals can facilitate impulsive control (Hofmann et al. 2009). Contrasting with these previous cognitive-based approaches, recent theory has focused on control as part of an emotion process in which emotion alerts individuals of the need to self-control and energizes its execution (Inzlicht et al. 2014, 2015).

The present research adopts an emotion-driven conception of self-control to suggest that mixed emotions, in particular, positively influence people's efforts to resist temptations. Mixed emotions correspond to affective experiences characterized by the co-activation of emotions of opposite valence, such as feeling happiness and sadness (Larsen and McGraw 2011; Larsen et al. 2001; Schimmack 2001). Some authors have also studied mixed emotions as an individual difference, in which some individuals are more prone to experience positive and negative emotions simultaneously (Rafaeli et al. 2007; Wilt et al. 2011).

Different theoretical models of mixed emotions have suggested that experiencing mixed emotions facilitates the integration of complex information in a given moment (Cacioppo et al. 2004; Oatley and Johnson-Laird 1996; Zautra 2003). This assertion is consistent with recent research showing that individuals experiencing mixed emotions when making predictions about weather or

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general knowledge were more accurate compared to people experiencing positive or negative emotions alone (Rees et al. 2013). Evidence has shown that mixed emotions arise from goal conflicts (Berrios et al. 2015, 2018), and managing temptations has been in turn conceptualized as a form of goal conflict resolution (Mischel 1974; Mischel et al. 1989). Thus, it is postulated that mixed emotions may promote self-control efforts during conflict resolution by allowing consideration of differently valenced information.

## Goal conflict and self-control

Researchers have construed self-control dilemmas as conflicts between two motives or goals ever since the classic studies of willpower (Mischel 1974; Mischel et al. 1989). Scholer and Higgins (2010) argued that although goal conflict observed during self-control dilemmas often corresponds to one high-order, meaningful goal (e.g., lose weight) colliding with a low-order temptation (e.g., eat chocolate), other instances of goal conflict can also demand self-control efforts. For example, a small business owner's goal to complete the company's annual accounting report may collide with a valued immediate goal such as getting home in time to eat dinner with the children. In accordance with this account, Fujita (2011) defined a dual-motive conceptualization of self-control that involves the prioritization of long-term goals over proximal competing motivations, rather than the effortful inhibition of impulses.

Recent interpretations of self-control dilemmas have understood that the critical feature when facing temptations is managing and addressing the inherent conflict with other goals (Hofmann and Van Dillen 2012; Myrseth and Fishbach 2009; Scholer and Higgins 2010). Critically, the two-stage model of self-control (Myrseth and Fishbach 2009) argues that the first stage involved in successfully regulating behavior is the identification of goal conflict. Conflict identification further depends on whether individuals see their desires as a potential impediment to the achievement of other goals, in which case it becomes a temptation (Myrseth and Fishbach 2009). Perceiving a desire, such as wanting a rest, is not tempting in isolation from another goal; whereas perceiving it as impeding a work goal involves conflict identification and increases the probability of displaying self-control strategies and pursuit of the work goal (Fishbach and Converse 2011). Hofmann and colleagues (Hofmann et al. 2012) have found that the perception of goal conflict is a signal that recruits self-control resources (i.e., resistance), which in turn, helps individuals to prevent self-indulgence in the presence of immediate desires.

## Goal conflict, mixed emotions and self-control

Previous research has shown that mixed emotions are elicited following the perception of goal conflict (Berrios et al. 2015, 2018). For example, in one study Berrios and colleagues (2015, Study 2) asked a group of participants to recall a recent event involving conflicting goals (e.g., trying to complete a grant application, while wanting to get home earlier because of a daughter's birthday), whereas another group recalled an event where personal goals facilitated each other (e.g., trying to lose weight, while wanting some salad). Results showed that participants recalling conflicting goals reported greater levels of mixed emotions, compared to people recalling facilitating goals. Other studies have revealed that mixed emotions are commonly experienced during social dilemmas, which represent a form of goal conflict (Schniter et al. 2015).

Given that previous research has shown that perception of goal conflict is also a key step for exerting effective self-control efforts (Hofmann and Van Dillen 2012), the question therefore arises as to what role mixed emotions might play in self-control efforts. Theory and empirical research converge in suggesting that the processing of complex information, such as conflicting motives or social dilemmas, demands particular emotional responses exceeding common characterization of affect between positive and negative emotions (Berrios et al. 2015, 2018; Schniter et al. 2015). Therefore, investigating whether mixed emotions can help people to deliver more efficacious decisions in response to goal conflict that involves temptation represents a relevant question in the study of the relationship between goal-directed behavior and emotions.

When goal conflict occurs, a decision is required to choose between the alternative courses of action that would achieve the competing goals. People often consult their emotions when deciding about which course of action to pursue because emotions motivate individuals to follow actions that will attain desired ends or avoid undesirable ones (Frijda 1988; Schwarz and Clore 2003; Zeelenberg et al. 2008). The influence of affective experiences on decisions seems to largely depend on the characteristics of the situation. People facing complex events, demanding high levels of cognitive processing, are more likely to be influenced by their affect when making a decision (Forgas 1995). Conflicting goals represent complex events which demand elaboration of multiple stimuli at once and are therefore amenable to affective influence.

If affective experiences carry useful information that assist individual's decision-making (Schwarz and Clore 1983; Schwarz and Clore 2003), and mixed emotions arise from goal conflict (Berrios et al. 2015, 2018), it

is plausible that mixed emotions may provide information that helps individuals exert self-control to resist temptations.

The idea that emotion-related constructs may be related to self-control is not new, although the evidence is inconsistent. For example, some studies have shown that the negatively valenced emotions of pride and guilt predict self-control efforts (Hofmann and Fisher 2012), and that negative self-conscious emotions (e.g., regret, shame) are associated with higher levels of actual resistance in response to delayed-cost dilemmas (e.g., eating something tasty but unhealthy; Giner-Sorolla 2001). Other authors have shown that positive affect improves self-control (Aspinwall 1998; Raghunathan and Trope 2002); whilst Wegener and Petty (1994, 2001) found that positive affect undermines self-control.

Attempts to reconcile these discrepancies have suggested that emotions provide a signal to adopt or reject an accessible goal depending on whether they are associated with a high or low order goal (Fishbach and Labroo 2007). Thus, positive affect should promote self-control when high-order goals are accessible (e.g., try to have a healthier life-style), but not when low-order goals are accessible (e.g., try to choose salad instead of a burger). Other approaches have suggested that people actively down-regulate the pleasant emotions elicited in the presence of temptations to reduce the impact of the temptations on behaviors (Hofmann et al. 2009; Metcalfe and Mischel 1999). Using an alternative regulatory explanation, the *affect alarm model* (Inzlicht and Legault 2014) suggests that the distress arising from goal conflict signals the presence of temptation and initiates efforts to reduce the unpleasant feeling.

Contrasting with the aforementioned approaches, we suggest that it may be the experience of mixed positive and negative emotions—rather than whether they are positive or negative or regulated—that is critical in explaining the influence of emotions on self-control efforts. Preliminary evidence that mixed emotions may be involved during the resolution of self-control dilemmas has emerged from the field of consumer behavior. Research has shown that purchasing unwanted items can elicit mixed emotions (Mukhopadhyay and Johar 2007), and that impulsive and prudent consumers experience mixed emotions after engaging in self-indulgent behavior (eating a chocolate cookie; Ramanathan and Williams 2007). However, this research has only shown that mixed emotions can result from yielding to temptations, but until now research has not investigated how mixed emotions may be involved in promoting self-control efforts.

## The present research

The current research sought to determine whether mixed emotions play a role in self-control. Mixed emotions are seen as an affective experience that is elicited by the presence of

conflicting goals (Berrios et al. 2015, 2018), and as such may signal the need for self-control. One circumstance in which self-control is required in response to goal conflict occurs when an immediate desire is identified as conflicting with an active valued goal and therefore becomes a temptation. Taking into account previous conceptualizations relating goal conflict identification and self-control (Fishbach and Converse 2011; Fujita 2011; Hofmann et al. 2012; Hofmann and Van Dillen 2012; Myrseth and Fishbach 2009), we hypothesized that (H1) mixed emotions will mediate the association between goal conflict identification and efforts to resist temptations.

Most of the theoretical frameworks anticipating an association between goal-conflict and self-control suggest the influence of goal conflict perception on self-control during episodes involving self-control dilemmas (Fishbach and Converse 2011; Fujita 2011; Hofmann et al. 2012; Hofmann and Van Dillen 2012; Myrseth and Fishbach 2009). Moreover, current evidence linking goal-conflict and mixed emotions has been based on the experience of mixed emotions in-the-moment (e.g., Berrios et al. 2015). Consequently we expect H1 to apply to occasions on which goal conflict and mixed emotions are experienced, rather than to individual differences in their experience.

This hypothesis was therefore studied using an experience sampling design involving 73 participants who completed measures of goal conflict, mixed emotions, and self-control effort four times a day for 10 consecutive days. Both the procedure and analysis implemented are further explained in the following section.

## Method

### Participants

Seventy-three undergraduate and postgraduate students (58 female,  $M_{age} = 20.5$  years;  $SD = 3.6$  years) took part in the study. Participants were recruited from a list of student volunteers in exchange for £10 (\$14) in cash, and from an online research participation system in exchange for course credits. Potential volunteers were informed that the study aimed to understand how people manage their desires and personal goals, and how these influence their emotions and daily activities. No participants dropped out of the study before completing the experience sampling.

### Measures

#### Baseline questionnaire measures

Participants completed a questionnaire containing a number of validated scales during an orientation meeting.

**Psychological well-being scale (PWB; Ryff 1989)** This scale measured the extent to which individuals perceived their lives to be meaningful, worthwhile, in balance with their needs, and as having positive relations with other people. The PWB operationalizes psychological well-being along six dimensions: autonomy (e.g., “Being happy with myself is more important to me than having others approve of me”), environmental mastery (e.g., “In general, I feel I am in charge of the situation in which I live”), personal growth (e.g., “In my view, people of every age are able to continue growing and developing”), positive relations with others (e.g., “I feel like I get a lot out of my friendships”), purpose in life (e.g., “I have a sense of direction and purpose in life”), and self-acceptance (e.g., “In general, I feel confident and positive about myself”). Each dimension was assessed using 9-items. All of the items were measured on a 6-point Likert-format scale ranging from strongly disagree (1) to strongly agree (6). Overall, the subscales had good internal reliability indices (autonomy:  $M = 3.92$ ;  $SD = 0.70$ ;  $\alpha = 0.77$ ; environmental mastery:  $M = 4.20$ ;  $SD = 0.75$ ;  $\alpha = 0.83$ ; personal growth:  $M = 4.89$ ;  $SD = 0.58$ ;  $\alpha = 0.77$ ; positive relations:  $M = 4.56$ ;  $SD = 0.79$ ;  $\alpha = 0.82$ ; purpose in life:  $M = 4.59$ ;  $SD = 0.73$ ;  $\alpha = 0.79$ ; self-acceptance:  $M = 4.19$ ;  $SD = 0.90$ ;  $\alpha = 0.86$ ), as did the overall psychological well-being construct which included all of the items ( $M = 4.39$ ;  $SD = 0.55$ ;  $\alpha = 0.93$ ).

**Brief self-control scale (SC; Tangney et al. 2004)** This scale measured individuals’ tendency to exert control over their own behavior when facing a broad range of self-control dilemmas (e.g., impulse control, control over thoughts). Participants evaluated the extent to which each of the 13-items reflected how they typically are (e.g., “I wish I had more self-discipline”;  $M = 3.12$ ;  $SD = 0.53$ ;  $\alpha = 0.82$ ). All of the items were measured on a 5-point Likert-format scale ranging from *not at all* (1) to *very much* (5).

### Experience sampling measures

**Desires (temptations)** Participants were asked to indicate whether they had experienced a desire over the last 30 min (Yes/No format). A desire was defined as an immediate need or impulse that emerges suddenly in the mind and is not related to current activities. Following the recommendations of Hofmann et al. (2012), participants who indicated experiencing a desire were provided with a list including 10 desire domains: eating, taking substances—such as coffee, sexual desire, use of media—such as Facebook, spending, social contact, leisure, hygiene/maintenance—such as sports, study/work, and sleep. Participants could choose up to three desires on every occasion (using a Yes/No format) and then had to rate the strength of the chosen desires on a scale ranging from *not at all* (1) to *irresistible* (5). Participants were also asked to indicate the extent to which they

tried to resist this/these desire/s, using a single item (“*How much have you tried to resist this/these desire/s?*”) on a scale ranging from *not at all* (1) to *very much* (6). Resistance was measured after measuring mixed emotions.

**Conflicting goals scale** This scale was based on Emmons and King’s (1988) instrumentality matrix. The scale comprised three items which evaluated the extent to which recent activity/activities (or desire/s) over the last 30-min had been in conflict with an important goal (e.g., “[*this/these desire/s (activity/ies)*] had harmful effects over a goal you’ve been trying to achieve”; “[*this/these desire/s (activity/ies)*] have been competing for your time or resources to accomplish a goal”; “[*this/these desire/s (activity/ies)*] have been in conflict with a goal important for you”;  $M = 2.22$ ;  $SD = 1.08$ ). All of the items were measured on a 5-point Likert-format scale ranging from *not at all* (1) to *very much* (5). The longitudinal reliability of this scale (using the coefficient omega; Shrout and Lane 2012) was very good ( $\omega = 0.83$ ).

Participants who reported a degree of goal conflict greater than 1 on the goal conflict scale were asked to indicate the type of goal or goals (if more than one) that were in conflict with the desire/s (or activity/activities, if no desire was reported). Following the recommendations of Hofmann et al. (2012), they chose up to three goals (in a Yes/No format) from a list of seven goal categories: health—such as healthy eating, abstinence/restraint—such as not drinking, achievement—such as academic achievements, social—such as moral integrity, time use—such as reducing procrastination, relaxation—such as reducing stress, and energizing—such as trying to wake yourself up. After they chose the relevant goal/s from the list, participants rated the importance of the chosen goal/s using a scale ranging from *not at all important* (1) to *very important* (5).

**Subjective measure of mixed emotions** On each occasion participants completed a subjective measure of mixed emotions (Berrios et al. 2015). This measure included four items designed to measure the extent to which participants had experienced mixed emotions over the last 30-min (e.g., “*I experienced contrasting emotions (positive and negative emotions)*”;  $M = 2.59$ ;  $SD = 0.98$ ). All of the items were measured on a 5-point Likert-format scale ranging from *not at all* (1) to *very much* (5). The longitudinal reliability was very good ( $\omega = 0.81$ ).

**Affect** Finally, participants completed a short measure of state positive and negative affect (Larsen & Diener, 1985). Participants were requested to report the extent to which they were experiencing four positive affect adjectives (PA: happy, joyful, pleased, enjoyment;  $M = 2.76$ ;  $SD = 1.15$ ) and five negative affect adjectives (NA: depressed, unhappy, frustrated, angry, and worried;  $M = 1.77$ ;  $SD = 0.89$ ) at the very moment that they were completing the scale. Each dimension showed good longitudinal reliability (PA:  $\omega = 0.87$ ; NA:  $\omega = 0.79$ , respectively). All of the items were measured on

a 6-point Likert-format scale ranging from *not at all* (1) to *extremely* (6).

## Procedure

Participants attended an orientation meeting where they were informed about the aims of the study. All participants consented to participate in the study and completed the set of baseline questionnaires previously described. Participants also received oral and written instructions about the specific details of the study, including the procedures that they would need to follow during the study, and what to do in case of problems or queries. The meaning of desires and goals was explained to prevent potential misunderstandings derived from idiosyncratic interpretations of these concepts. These explanations were accompanied by some examples to ensure understanding of the concepts. Participants were asked to start the experience sampling period on the first Monday following the day of the meeting. They received a unique identification number which they provided each time they completed a questionnaire.

**Experience sampling protocol** Participants used their own cell phones during the experience sampling period of ten consecutive days. Every day, they received four text messages during a time interval of ten waking hours. This number of messages per day is consistent with recent experience sampling studies investigating goal conflict in the context of self-control efforts (Hofmann et al. 2012). Following the recommendations of Hektner et al. (2007), this time interval was divided into four blocks. Thus, using an online application, text messages were set to be delivered at a random time within four 150 min intervals starting at 10 a.m., with the added criterion that there had to be at least 1 h in-between texts. Each text message contained a web-link which took participants to an online questionnaire.

When participants accessed the online questionnaire, they were asked to indicate whether they had experienced a desire over the last 30 min. If so, they completed the desires measure. If not, they evaluated the degree of importance of the activities that they had performed over the last 30-min using three items (e.g., “...something that benefits you or others in the long run”), on a scale ranging from *not at all* (1) to *very much* (6). This was done to equate the length of the questionnaire regardless of whether or not participants had experienced a desire.

Participants then completed the conflicting goals scale. If they had reported a desire, the scale was phrased to ask about conflict between their immediate desires and a relevant goal; whereas if they did not report a desire, the scale was phrased to ask about conflict between their current goals. Next, participants completed the subjective measure of mixed emotions. At this point, those participants who had reported experiencing a desire indicated the extent to which

they tried to resist the desire/s. Those participants who had reported a degree of goal conflict greater than 1 on the goal conflict scale were then asked to report on the content and importance of the goals. Finally, participants completed the state affect measure. On average, participants took 7 min to complete each experience sampling questionnaire.

**Response details** If a participant left a questionnaire unanswered or started the questionnaire (entered his/her unique number) but did not complete any question until the next text was sent, the response was marked as missing. Responses were coded as valid when the participant completed the majority of the questionnaire within the corresponding time block and when the next questionnaire response was separated from the current one by at least 1 h. However, to ensure that a sufficient number of questionnaires were completed per participant, the participant was invited to extend his/her participation for up to one day if s/he completed less than 30% of the questionnaires throughout the study. In order to obtain a satisfactory response rate throughout the study, the participants received text messages every day after the last time block ended (between 20:00 and 21:00 h) to remind them to keep completing the questionnaires.

On average, participants completed 90% of the questionnaires embedded in the text messages sent every day. The remaining 10% of the questionnaires were either not responded to at all or remained uncompleted. Response rates for individual participants varied between 60 and 100% of the total number of questionnaires expected for each day. Overall, participants provided a total of 2619 observations. This constitutes adequate power for an intensive longitudinal study (Bolger et al. 2012).

## Data analysis

The mediation analysis was conducted using Multilevel Structural Equation Modelling (MSEM; Preacher et al. 2011, 2010). A mediational model using MSEM was preferred because it allows unbiased estimation of indirect effects, preventing conflation resulting from using hierarchical data where both level-1 and level-2 effects are present. In this model, separate level-2 and level-1 models of the hypothesized model were estimated as latent variables to account for measurement errors, preventing conflation between level-2 and level-1 components of the main effects. Separating and estimating direct and indirect effects for each level, reduces biases that result when alternative approaches are used (i.e., MLM using raw data or centered versions of the variables). This decreases the probability of committing type-II errors and provides more accurate confidence intervals (Preacher et al. 2010, 2011). These analyses were conducted using *Mplus 8* (Muthén and Muthén 2012).

We implemented a sensitivity analysis using *Mplus* (Muthén 2011), incorporating relevant covariates in the

model. We followed Imai et al.' (2010a, b) to conduct the sensitivity analysis. Although sensitivity analysis cannot currently be combined within the MSEM framework separating the level-1 and level-2 effects, it provides an additional commensuration of the potential biases present when testing a mediation. Further details are provided in the corresponding Results section.

## Results

To assess whether fluctuations in mixed emotions experience mediated the relationship between goal conflict and efforts to resist temptations, a multilevel structural equation model (MSEM) using maximum likelihood was specified, including goal conflict (GC) and mixed emotions (ME) as predictors of efforts to resist temptations (RT). In this analysis, the between components were separated from the within components by creating random intercepts and slopes for each association (i.e.,  $GC \rightarrow RT$ ;  $GC \rightarrow ME$ ;  $ME \rightarrow RT$ ) using the observed scores of each variable. The model also involved the estimation of separate residual variances for each component at both levels. Thus, the estimation of the lower-level mediation parameters was calculated as follows: the paths  $GC \rightarrow RT$ ,  $GC \rightarrow ME$ ,  $ME \rightarrow RT$  equaled the estimates of the means of the corresponding slopes; the indirect effect equaled the multiplicative term between the paths  $a_w$  and  $b_w$  plus the covariance between the slopes of  $a_b$  and  $b_b$ .

Findings using this mediational model demonstrated that occasions where higher goal conflict was perceived were associated with greater efforts to resist temptations,  $\beta_{cw} = 0.33$ ,  $SE = 0.05$ ,  $p < 0.01$  [95% CI 0.26/0.41]. The results showed that occasions where greater goal conflict was reported were positively and significantly associated with greater levels of mixed emotions,  $\beta_{aw} = 0.16$ ,  $SE = 0.03$ ,  $p < 0.01$  [95% CI 0.12/0.20], and showed that stronger experiences of mixed emotions were positively associated with greater efforts to resist temptations,  $\beta_{bw} = 0.13$ ,  $SE = 0.04$ ,  $p < 0.01$  [95% CI 0.07/0.20]. More importantly, the effect of goal conflict on effort to resist temptation was mediated by the experience of mixed emotions because the indirect effect of goal conflict on effort to resist temptation via mixed emotions was significant,  $\beta_{c'w} = 0.03$ ,  $SE = 0.01$ ,  $p < 0.01$  [95% CI 0.01/0.05], with an 8% mediated effect. The fit of the mediation model was good, with a deviance significantly better than the null model,  $-2\Delta LL = 112.7$  (2),  $p < 0.01$ . These results indicated that the elicitation of mixed emotions in response to goal conflict was a proximal predictor of self-control efforts, which supported hypothesis 1.

Trait self-control and affect variables were introduced into the previous model as control variables; the interaction between PA and NA was also included in the model to examine the possibility that it is the interaction between positive

and negative affect what drives the influence on self-control efforts. As shown in Table 1 (column labelled as "RT as DV"), the results revealed a non-significant effect of trait self-control on efforts to resist temptations ( $p = 0.51$ ). This model also incorporated within-person centered versions of positive affect (PA) and negative affect (NA) at level-1 to examine the influence of occasions when participants experienced greater PA or NA on efforts to resist temptations. Results demonstrated that PA did not predict greater efforts to resist temptations on a given occasion ( $p = 0.47$ ), whereas occasions when participants experienced higher levels of NA positively predicted greater efforts to resist temptations,  $\beta = 0.09$ ,  $SE = 0.04$ ,  $p < 0.05$  [95% CI 0.01/0.16]; the interaction between PA and NA was not associated with self-control efforts ( $p = 0.07$ ). Importantly, the indirect effect of the mediational model remained significant,  $\beta_{c'w} = 0.02$ ,  $SE = 0.01$ ,  $p < 0.05$  [95% CI 0.01/0.04], as well as the effect of mixed emotions on efforts to resist temptations,  $\beta_{bw} = 0.11$ ,  $SE = 0.04$ ,  $p < 0.01$  [95% CI 0.05/0.18]. As shown in Table 1, the fit of the mediational model including the three additional variables was good and the entire model explained  $R^2 = 0.19$  of the variance at level-1. In order to facilitate the visualization of the entire model (i.e., including the mediation and controlling variables), a summary is shown in Fig. 1, incorporating all of the main effects tested.

Given that the analytical framework allows us to disentangle mediation occurring both at level-1 and at level-2, we tested whether a model involving the same variables used in the previous model but at level-2 (i.e., as individual differences variables) would account for the same mediation effect of mixed emotions on the relationship between goal-conflict perception and self-control efforts. Results in this regard do not support a mediation. Although, it was found that average levels of goal conflict identification was associated with individual differences in self-control efforts,  $\beta = 0.34$   $SE = 0.05$ ,  $p < 0.01$  [95% CI 0.27/0.42], and that average levels of mixed emotions were associated to self-control efforts, too,  $\beta = 0.64$   $SE = 0.18$ ,  $p < 0.01$  [95% CI 0.34/0.94], the indirect effect at the between-level of analysis was not statistically significantly different from zero,  $\beta = -0.14$   $SE = 0.15$ ,  $p = 0.11$  [95% CI -0.10/0.49].

## Sensitivity analysis

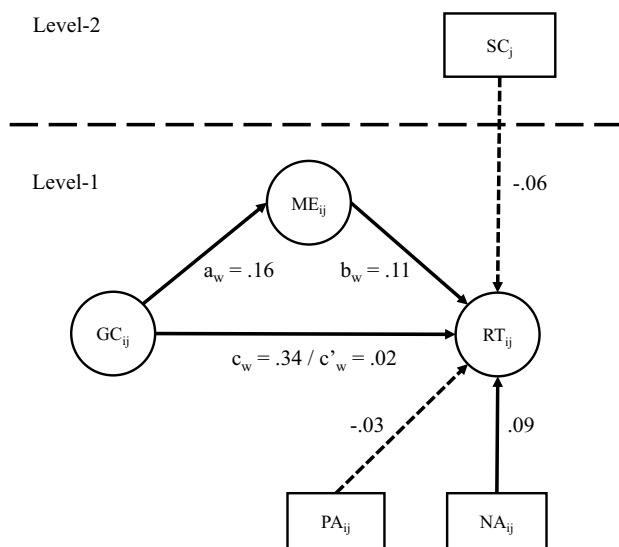
We tested residual correlations between the mediator mixed emotions and the dependent variable, self-control efforts, within a range between  $-0.7$  and  $0.7$ , to observe the robustness of the indirect and direct effects (see Fig. 2). In this analysis we included as covariates PA, NA and the interaction term between both. We also included as covariates trait levels of self-control, age and gender. Mixed emotions, in turn, were also regressed on PA, NA, and the interaction term between PA and NA. In this manner,

**Table 1** Model of the mediating effect of mixed emotions in the relationship between conflicting goals and self-control efforts

Model parameters	RT as DV			RT as DV plus covariates		
	Estimate	SE	<i>p</i> <	Estimate	SE	<i>p</i> <
Level-1						
Intercept	− 0.32	0.54	0.55	− 0.03	0.63	0.99
<i>GC</i> → <i>RT</i>	0.33	0.05	0.01	0.32	0.05	0.01
<i>GC</i> → <i>ME</i>	0.16	0.03	0.01	0.16	0.03	0.01
<i>ME</i> → <i>RT</i>	0.13	0.04	0.01	0.11	0.04	0.01
Indirect effect	0.03	0.01	0.01	0.02	0.01	0.02
PA <sub>-within</sub>				− 0.03	0.04	0.47
NA <sub>-within</sub>				0.12	0.04	0.05
PA <sub>-within</sub> * NA <sub>-within</sub>				0.07	0.04	0.07
Level-2						
<i>GC</i> → <i>RT</i>	0.36	0.05	0.01	0.34	0.05	0.01
<i>GC</i> → <i>ME</i>	0.64	0.18	0.01	0.64	0.18	0.01
<i>ME</i> → <i>RT</i>	0.37	0.24	0.13	0.37	0.25	0.13
Indirect effect (Level-2)				0.24	0.15	0.11
Trait self-control				− 0.06	0.09	0.51
Deviance-2ΔLL(Δdf)	13192.5(27)		0.01	13185.5(30)		0.01
<i>R</i> <sup>2</sup> (approx.) at Level-1	0.18			0.19		
<i>R</i> <sup>2</sup> (S&B) total	0.10			0.08		

*N* = 73, 10 days, 4 observations per day, 1,698 observations

*DV* dependent variable, *SE* standard error, *GC* goal conflict, *ME* mixed emotions, *RT* efforts to resist temptations, *within* within-person centered variable



**Fig. 1** Mediation model including trait self-control (SC) at Level-2 and PA and NA at level-1 as competing predictors. Squares indicate an observed variable whereas circles indicate latent constructs. Subscript “j” indicates a variable measured at level-2, whereas subscript “ij” indicates a variable measured at level-1. Dotted lines indicate no statistically significant effects

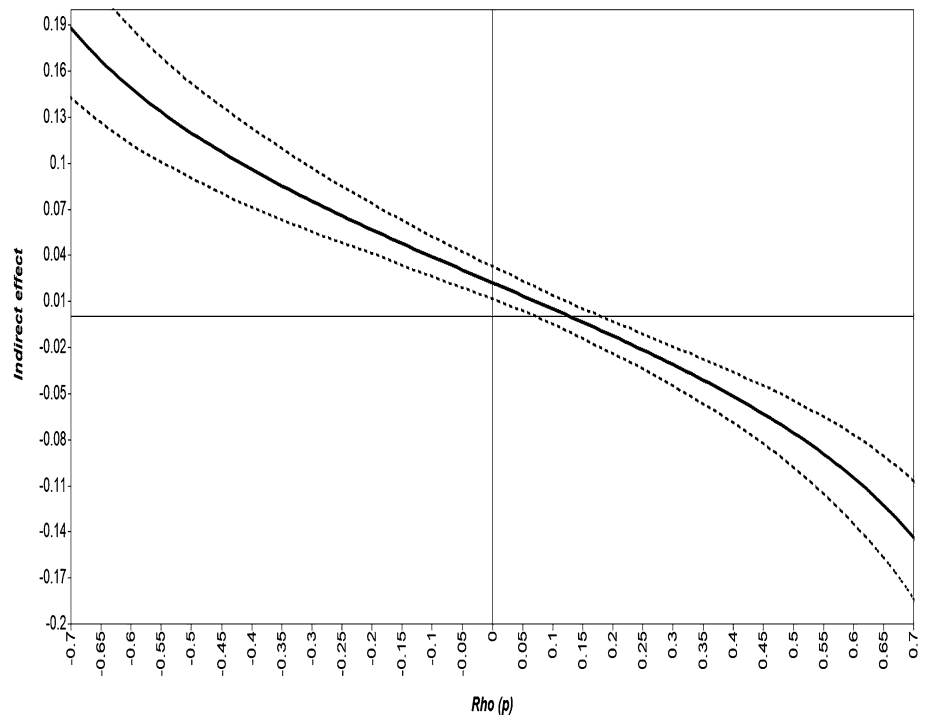
we controlled for all potential alternative contributions that may explain the influence of mixed emotions on

self-control efforts. Bootstrap estimation based on 10,000 resamples, and within-person variables were used, to identify the hypothesized mediation model at level-1.

The sample correlation of the residuals between mixed emotions and self-control efforts for this model was  $\rho = 0.09$ , [95% CI 0.04/0.14]. At  $\rho = 0$  the indirect effect was equal 0.02,  $p < 0.01$  [95% CI 0.01/0.03], whereas the direct effect = 0.34,  $p < 0.01$  [95% CI 0.28/0.40]. At  $\rho = 0.4$  (the lower threshold of the confidence intervals) the indirect effect was equal 0.01,  $p < 0.05$  [95% CI 0.001/0.023], whereas the direct effect = 0.34,  $p < 0.01$  [95% CI 0.29/0.40]. And finally at  $\rho = 0.14$  (the upper threshold) the indirect effect was equal  $-0.01$ ,  $p > 0.05$  [95% CI  $-0.02/0.001$ ], missing the indirect effect.

A broader interpretation can be observed in Fig. 2, where different values of  $\rho$  and the corresponding indirect effect are depicted. Thus, if the hypothetical correlation of the residuals between mixed emotions and self-control is negative, the indirect effect remains robust; whereas the unknown  $\rho$  needs to be lower than 0.05 to result in a statistically significant indirect effect. Given that the true sample value for  $\rho = 0.09$ , it is likely that the mediation effect of mixed emotions on the association between goal conflict and self-control efforts may be trustworthy, although weak, considering that it only covers the lower limit of the defined confidence interval.

**Fig. 2** Sensitivity analysis of the indirect effect of mixed emotions on the relationship between goal conflict and self-control efforts. The dotted lines represent the 95% confidence interval for the mediation effects at each value of  $\rho$ . The solid line represents the estimated average mediation effect at different values of  $\rho$



## Discussion

The present study investigated whether experiencing mixed emotions contributes to greater self-control effort responding for goal conflict decisions that involve temptation. Results supported the hypothesis proposed and indicated that mixed emotions are a meaningful affective response in the face of temptations that may effectively facilitate self-control efforts.

This is the first study to attempt to reconcile divergent evidence on the role of affective experiences in self-control by introducing the contribution of mixed emotions. Previous research has focused on the interaction between positive emotions and individual's goal hierarchy to explain discrepancies in the data linking positive emotions and self-control (Fishbach and Labroo 2007). Other authors have suggested that negative emotions drive efforts to resist temptations (Inzlicht and Legault 2014). In this exploratory study we suggested that one potential path to reconcile these divergent approaches is to consider the influence of mixed emotions on self-control efforts. We did so by observing that a well-established set of theory and data suggesting that goal conflict instigates efforts to resist temptations (Fishbach and Converse 2011; Fujita 2011; Hofmann et al. 2012; Hofmann and Van Dillen 2012; Myrseth and Fishbach 2009) parallels recent studies indicating that goal conflict gives rise to mixed emotions (Berrios et al. 2015, 2018; Schniter et al. 2015). We therefore considered it pertinent to explore the possibility that mixed

emotions may be a meaningful mediator of the association between goal conflict and self-control efforts.

Furthermore, this study found that goal conflict is associated with efforts to resist temptations. As already mentioned, this is consistent with recent theory and research indicating that the identification of goal conflict is a necessary step in exerting self-control (Fishbach et al. 2003; Hofmann et al. 2012; Myrseth and Fishbach 2009), including efforts to resist temptations (Carver and Scheier 1982; Hofmann et al. 2012). Results also showed that mixed emotions were associated with greater efforts to resist temptations, and that mixed emotions mediated the relationship between goal conflict and efforts to resist temptations.

In accordance with theories suggesting that self-control is driven by affective impetus (Hofmann and Fisher 2012; Inzlicht et al. 2014, 2015; Inzlicht and Legault 2014), the present study demonstrated that a proximal predictor of efforts to resist temptations was the experience of mixed emotions elicited from the experience of goal conflict. The findings also demonstrated that the mediating effect of mixed emotions on the relationship between goal conflict and efforts to resist temptations remained significant even after including state-positive affect, state-negative affect, and trait-levels of self-control. A sensitivity analysis also showed that the indirect effect of mixed emotions on the relationship between goal conflict and self-control efforts is partially robust, which suggest that, within certain boundaries, alternative confounders may not overturn the influence of mixed emotions on self-control efforts. Still, given the exploratory nature of this study, further research is needed



to appropriately account for the effect of mixed emotions on self-control efforts.

These findings are relevant for two reasons. First, previous studies have attempted to specify whether positive or negative emotions undermine or facilitate self-control efforts, but results have been inconsistent (Aspinwall 1998; Hofmann and Fisher 2012; Raghunathan and Trope 2002; Wegener and Petty 1994, 2001). Our results show a mediational effect of mixed emotions in the relationship between goal conflict and efforts to resist temptations, which offers a plausible alternative interpretation of previous inconsistent findings and provides evidence for an unexplored path in understanding the relationship between emotions and self-control efforts. The present findings suggest that one potential explanation for the inconsistency observed in previous research linking emotions and self-control efforts is that neither positive emotions nor negative emotions alone are enough when facing temptations, but that instead it is the combination of both valences in the form of mixed emotions that helps individuals to balance the trade-offs of competing goals. Second, these results were observed over and above levels of state-positive affect and state-negative affect, suggesting the unique contribution of mixed emotions in the goal regulation process.

### Future research

Alongside previous theory linking mixed emotions with integration of incongruent streams of information (Cacioppo et al. 2004; Oatley and Johnson-Laird 1996), present findings also suggest that mixed emotions may allow people to balance the benefits and drawbacks of multiple courses of actions, which may explain the influence of mixed emotions on self-control efforts. The consideration of alternative options may help people prioritise meaningful goals, which in turn, motivates attempts to resist temptations. Future studies should more directly investigate whether mixed emotions actually help people to ponder multiple incompatible options, from which people can prioritize relevant courses of action.

The evidence concerning the role of complex emotional experiences instigating greater efforts of self-control in the context of conflicting goals, suggests a novel research avenue to examine how people can balance multiple demands and deal with personal dilemmas. For example, in a recent theorization on ambivalence in organizations, Ashforth and colleagues (2014) suggested that variables, such as role conflicts (e.g., work-family conflicts) and multiple membership (e.g., balancing personal and others' needs within a group), foster increasing levels of organizational complexity and dynamism. Ashforth and colleagues (2014) further suggest that individuals' responses to ambivalence at work can vary greatly, including avoidance, domination, compromise and

holism. Holism is suggested as the response which better integrates multiple possibilities at once, promoting win-win orientations and proactive behaviors at work. Future studies could investigate whether one path through which people implement holism at work is via experiencing greater levels of mixed emotions. In this sense, holism may be understood as a form of self-regulation at work, where people balance between multiple courses of action during conflict.

This idea is consistent with previous research linking the experience of mixed emotions with increasing levels of judgment accuracy (Rees et al. 2013), which is closely related to the idea that holism is a form of exercising wisdom (Ashforth et al. 2014). Thus, future research should investigate whether the experience of mixed emotions during conflict enables more adaptive decisions.

Second, future studies will need an experimental design to appropriately demonstrate the mediational role of mixed emotion in the relationship between goal conflict and self-control efforts. Specific guidelines as suggested by Preacher (2015) may be useful to clarify the genuine contribution of mixed emotion to self-control. For example, a blockage design could be implemented where goal conflict can be manipulated, and the mixed emotions are measured, but adding a manipulation of mixed emotions (presence versus absence) before observing the effect on self-control.

Finally, the findings may illuminate further strategies to enhance collaboration between individuals. Previous research on self-control has shown that perceptions of conflict between selfish and pro-social motivations strengthen collaborative behaviors (Martinsson et al. 2012, 2014). Thus, future research should investigate whether mixed emotions can also mediate the relationship between social dilemmas and collaboration.

### Limitations

This study did not investigate whether efforts to resist temptations actually resulted in improved self-control performance. That is, this study did not explore whether mixed emotions influence actual restraint or self-indulgence. The evidence was limited to efforts to resist temptations. One possibility is that mixed emotions do not directly influence self-control success or failure, but rather they determine the degree of goal-commitment and goal-progress when conflict is detected.

Second, testing a mediational model on experience sampling data required some assumptions concerning causality which may not hold (Stone-Romero and Roposo 2008). In particular, temporal precedence was not supported because all the variables in the mediation analysis were measured at the same time. In order to partially correct this problem, the independent variable and mediator concerned experiences that had occurred within the last 30-min, whereas

the dependent variable concerned current experience at the moment of completion.

Finally, the characteristics of the sample, as well as the limited number of categories of goal and desires, constrain the extent to which these findings can be generalised. The sample mainly consisted of undergraduate and postgraduate students, whose goals and desires reflect the academic nature of their activities. Although there are reasons to believe that similar concerns could be observed at work as they were for study in the current context. For example, the most common self-control dilemma was the conflict between achievement-related goals and leisure.

## Conclusion

To conclude, the present research suggests that mixed emotions help people to display greater self-control efforts in response to goal conflict involving temptation. Mixed emotions appear to help self-control even after controlling for the independent effects of positive and negative affect and the influence of individual differences in self-control, suggesting that mixed emotions may help people maintain or find what is personally meaningful in the face of a self-control dilemma.

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## Compliance with ethical standards

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed consent** Informed consent was obtained from all individual participants included in the study.

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