# TEMPORAL ANCHORING OF POSITIVE REAPPRAISAL

BY

VALERIIA V. VLASENKO

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Approved By:

Christian E. Waugh, Ph.D., Advisor

John V. Petrocelli, Ph.D., Chair

Jamie E. Crockett, Ph.D.

E. J. Masicampo, Ph.D.

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## Contents

## Abstract

In the current work, we provide an overview of extant knowledge about effects of positive reappraisal and conduct two studies that explore a novel differentiation of positive reappraisal. Our framework distinguishes the types of positive reappraisal based on temporal anchoring of one's cognitive change. We suggest that when people engage in positive reappraisal, they can use past, present or future events to change the way they think about a current stressor. In the pilot study and two main studies, we investigated the differences in past-oriented and future-oriented types of reappraisal. We suggested that future-oriented positive reappraisal, due to its relative flexibility, might promote higher generativity and be particularly beneficial for improving current affect compared with past-oriented reappraisal. We also hypothesized that people might be inclined to use future-oriented reappraisals in situations involving dealing with novel negative circumstances while past-oriented positive reappraisals might be most utilized in situations that involve subjectively familiar stressors. The findings demonstrated that people generally tend to use reappraisals that are more future-oriented rather than past-oriented. While participants in Study 1 did not generate significantly more future-oriented reappraisals than past-oriented reappraisals, they reported higher increases in positive affect after using future-oriented reappraisals rather than past-oriented reappraisals. The results of Study 2 indicated that people do tend to use more past-oriented reappraisals in stressful situations that are more familiar to them in comparison to less familiar situations. However, no relationship between the use of future-oriented reappraisals and familiarity of a stressor was detected. Our results suggest that there is a clear distinction between past-oriented and future-oriented types of positive reappraisal, which provides a new dimension for investigating the effectiveness of positive reappraisal.



*Keywords*: reappraisal, positive reappraisal, positive emotions, familiarity, generativity

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## Temporal Anchoring of Positive Reappraisal

There are multiple emotion regulation techniques one can employ in any given situation. The range of responses includes avoidance, distraction, confrontation, rumination, suppression, and others (Peña-Sarrionandia et al., 2015). Among them is also cognitive reappraisal, one of the most widely studied emotion regulation strategies, which involves changing the way we think about a situation in order to change how we feel (McRae, 2016). While this definition encompasses upregulation (i.e. increase) as well as downregulation (i.e. decrease) of positive and negative emotions, the majority of currently available research focuses on the downregulation of negative emotions. This interest is driven by the clinical effectiveness of this emotion strategy (Webb et al., 2012). In the current work, we first review the research on the effects of cognitive reappraisal, paying particular attention to the notion of positive reappraisal, which is cognitive reappraisal that leads to improvement in one's well-being. After that, we present a novel model of categorizing positive reappraisal based on temporal anchoring of one's cognitive change. Finally, we discuss possible benefits of each temporal type of positive reappraisal and conduct two studies to test our predictions.

The efficacy of cognitive reappraisal has been showcased with the use of multiple methodological approaches that include self-report, brain imaging, and psychophysiology. When instructed to downregulate negative affect in response to viewing unpleasant images, participants have demonstrated decreases in startle response and corrugator activity (i.e. "frowning"), the markers of increased negative emotion (Jackson et al., 2000; Ray et al., 2010). In both studies, corrugator activity was increased

in the trials that required the upregulation of negative emotions. The changes in affect have been repeatedly reflected in self-reports of emotional experiences (Lieberman et al., 2011; Ray et al., 2010; Szasz et al., 2011). Participants who employed reappraisal reported their negative affect as less intense in comparison to the passive viewing of negative images (Lieberman et al., 2011) and passive acceptance of an anger-provoking experimental task (Szasz et al., 2011).

In addition to psychophysiological and behavioral studies, event-related potential research further contributes to the body of evidence that establishes cognitive reappraisal as an effective emotion regulation strategy. Late positive potential (LPP), a component enhanced in response to emotional stimuli, has been shown to be sensitive to cognitive reappraisal (Foti & Hajcak, 2008; Hajcak et al., 2010; Hajcak & Nieuwenhuis, 2006). Participants who used reappraisal demonstrated a smaller magnitude of LPP in response to negative images compared to passive viewing. Moreover, the degree of LPP modulation was positively related to a decrease in self-reported emotion intensity (Hajcak & Nieuwenhuis, 2006).

The effectiveness of cognitive reappraisal appears to be carried out through neural mechanisms of cognitive control. Brain imaging studies have repeatedly shown that cognitive reappraisal employs brain areas more generally associated with cognitive control (Beauregard et al., 2001; Goldin et al., 2008; McRae et al., 2009; Ochsner et al., 2002; Ochsner & Gross, 2008). Participants engaged in reappraisal in response to negative images demonstrate heightened prefrontal cortex responses that are accompanied by decreased amygdala and insular responses, the areas involved in emotional responding (Ochsner et al., 2002). A network analysis conducted by Wager et

al. (2008) corroborated these findings. Reappraisal success has been found to be correlated with an increase in prefrontal activity and a decrease in amygdala activity.

There is some evidence that cognitive reappraisal has effects distinct from those of other emotion regulation strategies, such as suppression and distraction. Distraction is a commonly used emotion regulation technique that employs a shift in attention away from an emotionally evocative situation or some emotional aspects of the situation (Peña-Sarrionandia et al., 2015). The comparison between cognitive reappraisal and distraction revealed that both decrease negative affect, decrease amygdala response and increase activation in prefrontal and cingulate regions when they are used to mitigate the response to negative images (McRae et al., 2009). Despite these similarities, reappraisal seems to have an effect that is more long-lasting than the one associated with distraction (Thiruchselvam et al., 2011). Thiruchselvam et al. (2011) used late positive potential (LPP) to compare the effect of these emotion regulation strategies at two time points when participants were exposed to negative images. While both strategies were associated with decreased LPP at the time of first exposure and regulation, upon the second exposure to negative images, participants who used reappraisal at the first time point showed smaller LPP compared to the participants who used distraction. These results might suggest that reappraisal is particularly beneficial for repeating, familiar stressors.

The current evidence suggests that cognitive reappraisal appears to be an emotion regulation strategy that is more instrumental to improving one's well-being than suppression. Suppression is a strategy that is directed at minimizing the behavioral markers of experienced emotion, such as facial expressions and gestures. Szasz et al.

(2011) investigated the roles of reappraisal and suppression in the downregulation of anger. Participants who used a reappraisal strategy during a frustrating experimental task reported lower levels of negative affect compared to participants who used suppression strategy. Compared to suppression, reappraisal appears to have a more profound effect on one's affective change. Additionally, in the long term, the use of suppression is negatively associated with well-being. Gross and John (2003) have demonstrated that people who frequently suppress their emotions report more depressive symptoms and have lower self-esteem. They also tend to be less optimistic and less satisfied with life.

Just as suppression has short- and long-term repercussions, cognitive reappraisal has benefits that are not only apparent at the moment of the stressful event but have more long-lasting effects. People with a tendency to use reappraisal experience and express more positive emotions and less negative emotions compared to those who use reappraisal less. They are more likely to have closer friendships, fewer depressive symptoms, greater life satisfaction, and greater self-esteem; they are also more likely to share their emotions with others (Gross & John, 2003; Nezlek & Kuppens, 2008). McRae et al. (2012) assessed individual differences in reappraisal ability (RA), defined as the ability to employ cognitive reappraisal successfully, and demonstrated that RA positively correlated with the frequency of reappraisal in everyday life and well-being, which was reflected in measures of life satisfaction, positive and negative affect.

While cognitive reappraisal has been established as an effective emotion regulation strategy by multiple studies, it is important to discuss some of the limitations of this tactic to avoid seeing it as a panacea to any kind of emotional distress. Troy (2015) argues that reappraisal does not universally lead to higher resilience; instead, it might be

potentially harmful in some contexts. Troy et al. (2013) established that effects of cognitive reappraisal might depend on the controllability of the situation. For participants who faced uncontrollable stressors, higher reappraisal ability was linked to lower levels of depression. However, the pattern was reversed for participants who faced controllable stressors – higher reappraisal ability was linked to higher levels of depression. Ford and Troy (2019) advocate a conceptual framework that elucidates the potential disadvantages of cognitive reappraisal. They propose that cognitive reappraisal might not be helpful when people are not able to use it successfully (i.e. to achieve their desired increase in well-being), such as when the person lacks the necessary skill. Reappraisal is also not beneficial when it is not functional (i.e. it does not lead to adaptive outcomes) as it was demonstrated by the use of reappraisal in controllable situations (Troy et al., 2013).

While cognitive reappraisal has its limitations, the benefits of cognitive change outweigh the drawbacks as has been showcased by our literature review. As psychological science accumulates more and more knowledge about cognitive reappraisal, it is important to distinguish various types of reappraisal and assess the situations when particular reappraisal strategies are the most effective. Embracing the diversity and complexity of reappraisal approaches is crucial for establishing effective coping interventions. The particular type of cognitive reappraisal we choose to focus on in this review is positive reappraisal.

## Positive Reappraisal

Positive reappraisal is a type of cognitive reappraisal that leads to improvement in one's well-being. Such improvement in individual affect might be reached through the

use of different tactics. While many researchers adhere to a definition of positive reappraisal that includes only upregulation of positive emotions as a regulatory tactic (Folkman & Moskowitz, 2000), others argue that the definition of positive reappraisal is incomplete without including downregulation of negative emotions as well as upregulation of positive emotions (Waugh & McRae, 2020). In this review, we will explore both approaches by initially focusing on the first definition and then moving to the second definition of the concept. Positive reappraisal combines the benefits of cognitive reappraisal and positive emotions. Although the focus in much of the current research on exclusively diminishing the intensity of the negative experience is understandable due to our natural inclination to pay more attention to negative stimuli (Baumeister et al., 2001), upregulation of positive emotions might be a promising tool in establishing one's well-being.

The idea that positive emotions are instrumental to one's well-being is not novel in psychology. In their meta-analytic review, Lyubomirsky et al. (2005) argue that people who frequently experience positive emotions are more likely to have satisfying relationships, better health, higher incomes and longer lives compared with people who experience positive emotions less often. As authors review a range of longitudinal, cross-sectional, and experimental studies, they demonstrate that these effects are often bidirectional with not only positive outcomes influencing one's positive emotions but also positive emotions contributing to the emergence of positive outcomes. The broaden-and-build model of positive emotions is one of the most prominent theories that demonstrates the benefits of positive emotions (Fredrickson, 1998). According to this framework, positive emotions allow for more variability and flexibility in individual

responses to a given situation. Thus, it promotes a wider range of thoughts and actions in response to a stimulus which, in turn, encourages further exploration of one's environment. In the long term, positive emotions contribute to building intellectual, social and mental resources.

Although the benefits of positive emotions have been well-established in the scientific community, a few studies have focused on exploring the beneficial effects of upregulation of positive emotions in response to positive stimuli. A study by Giuliani et al. (2008) used short film clips to generate amusement for the participants who used reappraisal to either increase or decrease the intensity of experienced positive emotion. The results demonstrated that emotional experience, expressive behavior, and physiology (heart rate, respiration, and sympathetic nervous system activation) changed according to the task instruction. For example, instructions to increase amusement were associated with increased respiration rate, sympathetic activation, skin conductance, and self-reported amusement experience. The opposite was true for the instructions that asked participants to downregulate their amusement. Kim and Hamann (2007), in addition to replicating the behavioral results of Giuliani et al. (2008), explored the brain imaging patterns for the regulation of positive emotions. They showed that modulation of positive emotions in response to positive images employed prefrontal regions, such as the dorsomedial prefrontal cortex (DMPFC) and the left orbitofrontal cortex (OFC), that have been previously associated with cognitive regulation of emotions. Positive emotion upregulation was associated with the increased activity in the amygdala and ventral striatum, the latter of which is implicated in reward processes and positive emotional

experiences. Increased activity in the amygdala, in turn, reflects the increase in subjective experience of positive emotions.

Increasing positive emotions might be potentially more advantageous for ameliorating current well-being than simply decreasing negative emotions. A study by McRae et al. (2012) directly compared the effects of increasing positive emotion (i.e. positive reappraisal) vs. decreasing negative emotions by using two measurements of emotional outcome: self-report and skin conductance level (SCL). Participants who were trying to increase positive emotion in response to negative images experienced greater positive emotions and smaller decreases in skin conductance compared to participants who attempted to decrease negative emotion. Hence, compared to decreasing negative emotions, the goal of increasing one's positive emotions brings a greater shift in the valence of emotional experience but a smaller change in arousal. This might be attributed to the fact that sustaining a high level of arousal while experiencing positive emotions might be instrumental to the regulatory goals presented in the study. Once participants change the meaning of stimuli from negative to positive, it might not be necessary to change the arousal of positive emotions, since high-arousal positive emotions are generally perceived as desired in individualist cultures (Lim, 2016; Tsai et al., 2006).

Instead of defining positive reappraisal as reappraisal with the goal of increasing positive emotions, some researchers suggest a definition of positive reappraisal that is characterized by the goal of increasing one's well-being, which includes increasing positive emotions as well as decreasing negative emotions. The Positive Appraisal in the Regulation of Stress (PARS) neuroaffective model ascribes to this definition and proposes a system to navigate the role of positive emotions in the emotion regulation

process (Waugh & McRae, 2020). Further, when talking about positive reappraisal, we will refer to this definition in order to fully represent the reappraisal tactics used in improving one's emotional experience. When people reappraise their experiences using the range of reappraisal strategies, they usually have a goal of feeling better. Since this goal can be attained by either increasing positive emotions or decreasing negative emotions, we decided to follow the PARS definition in our model. The reappraisal goals that cannot be classified within our definition of positive reappraisal include decreasing positive emotions and increasing negative emotions. While such tactics might be instrumental in some situations, they do not align with the goal of increasing one's well-being, which is a key component of the PARS definition.

The PARS model further distinguishes between positive appraisal and positive reappraisal. Appraisal, the necessary component of emotional experience, happens when we perceive the changes in our environment as pertinent to our well-being. This process can happen outside of one's conscious awareness, and appraisals do not always lead to conscious feeling states, which might require higher levels of arousal or intensity. According to the model, positive appraisals are when changes in our environment allow for an increase in expected well-being. Expected well-being refers to one's predictions about their future well-being. Any given stimuli can be appraised as either positive or negative depending on its potential to change one's future well-being. If an appraised stimulus is better than expected for future well-being, it is perceived as positive. For example, one might expect a modest dinner for their birthday but instead end up going to a restaurant with their best friend. On the other hand, if an appraised stimulus is worse than expected, it will be perceived as negative. For instance, one might anticipate a

surprise party from all their friends but instead end up going to a restaurant with their best friend. While the stimulus is the same in both examples – going to the restaurant with a friend – it might be perceived as positive in the first case and as negative in the second one.

It is important to note that the change in expected well-being does not necessarily lead to a change in one's current well-being. Our current well-being is composed of multiple appraisals that pertain to different aspects of our lives. For example, at a given moment our well-being might be influenced by: our situation at work; relationships with our spouses, friends, and children; some upcoming events; and so on. Among this mosaic of powerful influences, the change in expected well-being might not be salient enough to alter our current well-being. However, the change in expected well-being might have other beneficial consequences, such as the increase in motivation and proactive behavior. Stimuli that raise our expected well-being are appraised as positive. While our environment does not always change to allow for positive appraisal, we still can choose to feel better by employing positive reappraisal. Positive reappraisal, therefore, is a form of effortful positive appraisal that is aimed at changing the initial appraisal of the stimuli in order to feel better. This is the definition we will further refer to in this paper when talking about positive reappraisal.

**Previous Categorizations of Positive Reappraisal**

So far, there have been several attempts to differentiate between different types of positive reappraisal, and most of them focus on "external" vs "internal" aspects of a stressful situation, such as whether a cognitive change pertains to the self or

circumstances. Ochsner et al. (2004) examined two types of reappraisal in response to negative stimuli: situation-focused and self-focused. Participants engaged in the downregulation of negative emotion in response to negative images by either distancing themselves from the images (self-focused) or by positively reinterpreting the situation depicted in the image (situation-focused). While the strategies slightly differed in the patterns of neural activation, both tactics were effective as participants reported lower levels of negative affect compared with simply looking at negative images.

Even though both "external" and "internal" types of reappraisal are effective as regulation strategies, each of them might be associated with a unique set of benefits. The study by Witvliet et al. (2010) compared the effects of compassion-focused and benefit-focused reappraisal in response to a specific type of stressor: interpersonal offense. The participants were asked to reflect on a personal episode in which another person hurt them. Then they engaged in benefit-focused reappraisal, which involves thinking about benefits that the individual gained from the experience, and compassion-focused reappraisal, which involves cultivating compassion and mercy towards the offender. Therefore, using compassion-focused reappraisal involved focusing on the other person while using benefit-focused reappraisal involved focusing on the self. The results indicated that both reappraisal strategies were more beneficial for one's well-being than simple rumination about the offense, which was evidenced by physiological measures and self-report. However, each of the reappraisal approaches was also associated with unique outcomes. Compassion-focused reappraisal generated more empathy and forgiveness language. The physiological response demonstrated lower tension under the eye (orbicularis oculi) and cardiac beat-to-beat intervals, the measure indicative of lower

affective arousal. In turn, benefit-focused reappraisal evoked the highest levels of gratitude as was expressed in ratings and writing. It also led to the greatest subjective experience of joy, which was reflected in an increase in cheek muscle activity (zygomatic) associated with smiling.

A meta-analytic study of emotion regulation by Webb et al. (2012) not only corroborated the common "external" vs "internal" view of reappraisal strategies by quantifying the effects of each but also established that combining the two might be the most effective approach for one's coping process. To organize the results of the current research on emotion regulation techniques and reappraisal, in particular, Webb et al. (2012) conducted a meta-analysis that assessed the effect sizes of studies on emotion regulation processes. In their taxonomy of emotion regulation strategies, Webb et al. (2012) distinguish four subtypes of cognitive reappraisal. The first subtype is "reappraise emotional response" (i.e. "internal"). The typical instructions for this subtype would include a request to reinterpret the emotion of interest in a particular way (e.g. reinterpreting feelings as normal, feeling them without judgment). The second subtype is "reappraise emotional stimulus" (i.e. "external'). Participants in the studies that employ this subtype would be asked to reinterpret the emotional stimulus (e.g. seeing benefits or positive outcomes). The third subtype is "reappraise via perspective taking," which involves adopting an objective perspective (i.e. "internal"). For example, participants might be asked to view stimuli as a disengaged observer. Finally, the last subtype is "reappraisal-mixed," which referred to the studies that might involve any of the previously mentioned subtypes, a mixture of the reappraisal strategies. The results of the meta-analysis indicated that all reappraisal techniques had beneficial effects on one's

emotional experience. Reappraising emotional response has a small-sized effect ($d$ = .23) while reappraising emotional stimulus ($d$ = .36) and reappraising via perspective taking ($d$ = .45) had small-to-medium-sized effects. Mixed reappraisal techniques have the largest effect size ($d$ = .89).

Although "external" vs. "internal" approaches to categorization of cognitive reappraisal have been prevalent in the literature, there have also been some attempts to acknowledge the wide diversity of reappraisal techniques. The further exploration of cognitive reappraisal includes research by McRae et al. (2012) that investigated effects of different reappraisal tactics. The eight tactics of reappraisal that were included in the study are the following: explicitly positive, change current circumstances, reality challenge, change future consequences, agency, distancing, technical-analytic-problem solving, and acceptance. The majority of the employed tactics were similarly effective at regulating emotional experience with the exception of reality challenge. When participants were challenging the authenticity of negative stimuli, such as regarding them as not real, they were less successful at increasing positive affect than when they were using other types of reappraisal.

**Temporal Anchoring of Positive Reappraisal**

While previous research on types of positive reappraisal has been successful in regard to distinguishing "external" vs "internal" modes of reappraisal, it largely ignored the temporal aspects of positive reappraisal, with the exception of the study by McRae et al. (2012) where participants reported using reappraisal techniques based on mental time travel, such as "change future consequences." A significant amount of knowledge has

been accumulated regarding the influence of time cognition on emotion regulation, which provides an opportunity to explore the time dimension of cognitive reappraisal. In an attempt to understand the involvement of mental time travel in cognitive change, we propose a novel approach to categorizing positive reappraisal. As thinking about past and future has been shown to affect one's well-being (Strack et al., 1985; Van Boven & Ashworth, 2007), these types of cognition might similarly influence the potency of reappraisal attempts. The model presented in this paper involves the classification of positive reappraisal according to the temporal anchoring of cognitive change. Faced with an emotional challenge, people might choose positive reappraisal as a means of increasing their well-being. Within that process, they might formulate their cognitive alterations based on their past, present, and future. Further in the paper, we investigate the unique characteristics of different types of temporal cognition. We address the potential advantages and disadvantages of each type of positive reappraisal and propose lines of research that would propagate the understanding of temporal dynamics of positive reappraisal. We believe that the use of different temporal types of positive reappraisal might be beneficial depending on the nature of the situation and the regulatory goals.

**Definitions of Past-, Present-, and Future-oriented Reappraisal**

When people utilize past-oriented positive reappraisal to regulate their emotions, they use past events/situations in order to change the way they think about the current situation. For example, if people are currently presented with an unpleasant situation such as financial difficulty, they might improve their affect by remembering the time when things were harder for them (e.g. "At least, it's better than my college years") or someone else (e.g. "This is nothing compared to what my grandparents went through").

When people employ present-oriented positive reappraisal, they use current events in order to change their affective state. People alter their interpretation of the current situation to feel better about it. Using the same situation as above, people might think that while they don't have as much money as they usually do and cannot go out, it might be a good opportunity to use their cooking skills (e.g. "I am enjoying my time cooking for myself"). Alternatively, they might appreciate the time they otherwise would spend at bars (e.g. "I am enjoying my evening with the book").

When people engage in future-oriented reappraisal, they use future events to change current affective state. People might imagine a future where a current problem does not have an emotional weight it currently possesses. For example, again in the situation of financial difficulty, they might think about the time in the future when they get a raise. Some other examples would include imagining inviting all your friends to a restaurant on a payday or simply telling yourself that this situation will eventually come to an end. Alternatively, people might think that the current situation might benefit their personal development and make them a more conscientious consumer (e.g. "This will make me a better person" or "Things happen for the best").

## Past-oriented Reappraisal

### Past-oriented Cognition

Past-oriented cognition is the most widely studied type of cognition in cognitive psychology. Psychological research commonly distinguishes between two types of memories: short-term and long-term. The difference between the two lies in the time the information is stored in human memory. Short-term memories exist for seconds and

minutes while long-term memories can "survive" decades. In turn, there are also two types of long-term memory. Episodic memory refers to the memory of the personal experience (e.g. remembering what you had for dinner last night) and semantic memory refers to the common knowledge about the world (e.g. remembering what team won World Series in 2013) (Tulving, 1972).

Semantic memory plays an important role in human cognition as it represents the general knowledge we have about people, culture, language, self, etc., (Binder et al., 2009). The majority of our everyday activities rely on semantic knowledge. The uniquely human ability to use language to communicate abstract concepts as well as the ability to recognize objects heavily depend on semantic memory. It is important to note that semantic and episodic memory systems overlap so episodic simulation of past and future events does not solely recruit episodic memory elements (Binder et al., 2009; Burianova et al., 2010). People might remember going on vacation, but they still need a semantic understanding of what vacation, ticket and weather are to successfully reconstruct their memories.

In his seminal work, Endel Tulving defines episodic memory as a "neurocognitive (brain/mind) system, uniquely different from other memory systems, that enables human being to remember past experiences" (Tulving, 2002, p. 1). The three key concepts at the core of episodic memory include self, autonoetic awareness (i.e. "special kind of consciousness that allows us to be aware of subjective time in which events happened"), and subjectively sense time (Tulving, 2002, p. 2). Tulving also argues that episodic memory makes mental travel, an ability claimed to be uniquely human, possible, which allows us to experience the past and future.

The proportions of episodic and semantic memory engaged in a given memory might depend on factors, such as the temporal distance of the event, physical distance to the location, social distance and uncertainty of the event (Trope & Liberman, 2003). The farther in time the event happened, the more likely that more semantic features will be engaged. This means that the event will be remembered in more abstract terms rather than in specific and detailed mental representations typical for episodic memory.

**Using the Past to Feel Better About the Present**

Early in life development, people show awareness of the connection between past events, thoughts, and current emotions. Lagattuta and Wellman (2001) demonstrated that preschoolers are capable of understanding an individual's emotions in terms of thinking about the past. In the experiments, preschool children looked at the stories that were represented on eight laminated cards and listened to the narration of those stories. The characters in the stories were engaged in two connected instances. For example, in one of the stories, a girl was feeling sad when a clown gave her a balloon (Instance 2) because, earlier, a clown broke her doll (Instance 1). The children had to explain the emotions of characters in the story as well as predict how a character with a different experience would react to the events in the story. The results showed that half of the 3-year old children and most 4- and 5-year old children were able to explain that unusual negative reactions of the characters in the story to the seemingly innocuous current events were caused by remembering past negative events. Moreover, the preschoolers of all three ages were able to predict that someone with different past experiences would not experience similar emotions in the current situation. These findings indicate that early in

development people are able to not only experience but also comprehend the nature of thinking about the past and its influence on current affect.

Remembering past events has been shown to have a complex influence on current affect, which depends on the way we think about past experiences. In series of experiments, Strack et al. (1985) investigated how reminiscing about past events influences one's well-being. Participants were asked to describe either positive or negative past events. The precise nature of one's description varied from experiment to experiment: no limitations on one's descriptions, vivid versus pallid descriptions, or "why" versus "how" descriptions. The results of the studies showed that thinking about the past might have a congruent effect on one's current emotional state, such as thinking about past positive events might help someone feel more positive at the moment whereas thinking about negative events might have the opposite effect. However, if thinking about a past event does not evoke an emotional response, then it might serve as a basis for comparison with the present situation. It means that thinking about a positive event in the past might decrease reported happiness while remembering negative events might increase reported happiness. Interestingly, whether thinking about the past influences one's current affect appears to be influenced by one's way of thinking. Participants who described past events more vividly and in more detail were more likely to experience an emotional response. Therefore, thinking about past experiences in concrete and detailed form might make an individual experience affect that is consistent with the initial emotion whereas thinking about past experience in more abstract terms might lead to affect that is contrary to the valence of the initial emotion. The results of this research

demonstrate that how we think about past events, whether we imagine them in more or less detail, is crucial to their influence on our well-being.

The specificity of past-oriented thinking might be compromised in some clinical populations, such as in people with PTSD and dysphoria (Dickson & Bates, 2006; Moore & Zoellner, 2007). Patients with PTSD and depression tend to overgeneralize in their recollection of past events, which means that their ability to access specific details about past events is reduced. In a study by Dickson and Bates (2006), participants were asked to write down specific memories and future events in response to positive and negative word cues. Compared to the control group, patients with dysphoria were less specific in descriptions of their experiences, even more so in regard to pleasant experiences.

It is important to note that people are capable of slightly altering their past experiences in order to serve their current emotional goals, as was demonstrated by Conway and Ross (1984). In their study, they invited undergraduate students to participate in a study program that would allegedly improve their academic skills. Participants rated their study skills prior to the beginning of the program and then recalled these ratings at the end of the program. Participants tended to see their initial skills as lower than they originally rated. No such bias was observed for the waiting list control group. Moreover, 6 months after the end of the program, participants recalled their grades during the semester of the study program as better than they actually were. The downward comparison with our past selves might promote better current well-being due to perceived personal growth.

People are not only able to alter their mental representations of past situations to fit their current goal but are also able to present their past selves in a more negative light in order to promote the image of personal growth. Wilson and Ross (2001) conducted six studies that addressed the mechanisms and influences behind this phenomenon. Although participants tended to evaluate their past selves less favorably than their current selves, they did not evaluate other people's past selves as negatively as their own. Moreover, the participants' tendency to view their past selves negatively depended on temporal distance and the importance of the attribute in question, such as people were more likely to negatively judge their distant selves about the traits they considered important.

While people can alter their mental representations of the past in order to feel better, they might be able to do so more effectively if their representations are based on real events rather than imagined ones as was demonstrated by studies that involved counterfactual thinking. Past-oriented thinking has been differentiated from future-oriented and counterfactual thinking in features such as vividness, clarity, and emotional intensity. In the study by De Brigard and Giovanello (2012), participants shared two negative and two positive memories in response to neutral cues (e.g. "horse"). Then, they also described an event that might happen in the future (i.e. episodic future thinking) as well as an event that could have happened in the past but did not actually take place (i.e. counterfactual thinking). Participants reported higher clarity and vividness for past thinking compared with future and counterfactual thinking. They also reported that emotional intensity was higher for past and future thinking in comparison with counterfactual thinking.

The research by De Brigard and Giovanello (2012) indicated that past-oriented reappraisal might have unique benefits compared with other types of reappraisal in our model as it supposedly provides the highest level of detail to influence one's emotional response. However, it might lack flexibility as has been demonstrated by counterfactual thinking – individuals' ratings of subjective probability are the lowest for outcomes different from the ones that actually happened (De Brigard & Giovanello, 2012). When participants imagined past events that did not happen, they rated their emotional intensity as lower compared with future and past real events. Therefore, while detailed simulations of past events might influence current affect, they might not always be substantially altered to fit current emotional goals, which was demonstrated by lower intensity and probability of counterfactual thinking. Past-oriented reappraisals might be best suited for situations that involve some level of subjective familiarity. If people perceive a current situation as somewhat familiar, they might be able to refer to a related event in the past in order to regulate current emotions. However, this might be much more challenging for situations that are perceived as novel since there is no precedent for dealing with these situations in the past.

The use of past event simulations in positive reappraisal presents a range of potential outcomes associated with this type of temporal anchoring. As the research discussed in this section demonstrated, relating to one's past experiences might have a significant impact on one's current well-being. Moreover, the more detailed the mental representation is, the more pronounced the affective change can be. It is important to note the relative "rigidity" of our autobiographical memories. While we have some ability to alter mental representations of a past event in order to promote personal growth, this

faculty is limited as was demonstrated by the studies that involved thinking about events that didn't actually happen. This might suggest that past-oriented reappraisal strategy might be a good fit for situations that are subjectively familiar but not for situations that are seen as novel.

## Future-oriented Reappraisal

### Future-oriented Cognition

Analogous to the exploration of the role of episodic memory in the past-oriented reappraisal, in this section, I will discuss the role of episodic future thinking in future-oriented reappraisal. Episodic future thinking is defined as the "capacity to imagine or simulate experiences that might occur in one's personal future" (Schacter et al., 2015, p. 41). The story of episodic future thinking is much more recent in comparison with past thinking. However, a considerable amount of knowledge has been gathered that establishes a common system underlying both phenomena. Some of the evidence comes from the studies with amnesiac patients, such as K.C., who not only was unable to remember any of his personal experiences but also was incapable of imagining future events (Hassabis et al., 2007; Klein et al., 2002). The bilateral hippocampal damage in a group of amnesiac patients discussed by Hassabis et al. (2007) rendered it impossible to fully and coherently simulate new imagined experiences.

Neuroimaging studies with healthy adults comprise a significant body of literature that indicates a common network for thinking about the past and the future (Addis et al., 2007, 2009; Buckner & Carroll, 2007; Hassabis & Maguire, 2007; Okuda et al., 2003; Viard et al., 2011). For instance, an fMRI study by Viard et al. (2011) revealed a bilateral

parieto-fronto-temporal network, including medial temporal areas, that was common for thinking about the past and future. However, further analysis revealed that the episodic nature of past events was dependent on activation in the right hippocampus (associated with episodic recollection) and visuo-spatial areas (involved in the retrieval of the spatial context of the events) whereas the episodic nature of future events was dependent on the inferior frontal and lateral temporal gyri (linked to semantic retrieval). The engagement of regions involved in semantic retrieval might suggest that since people might lack the definite autobiographical markers for the future events in their lives, they might use their common knowledge about the world to fill in the gaps in their prospection. Such attributes of thinking about the future might bring unique benefits to future-oriented positive reappraisal, such as the ability to construct reappraisals for unprecedented situations. Indeed, research has shown that the use of episodic and semantic memory in episodic future thinking depends on the familiarity of simulated future events. Wang et al. (2016) observed that people tend to use significantly more semantic memory when imagining novel future events compared with familiar future events. Therefore, while the construction of future events primarily relies on episodic memory, the proportional use of semantic memory depends on the individual availability of episodic elements along with the novelty of the simulated situation.

**Using the Future to Feel Better about the Present**

The ability to create detailed simulations of future events has been linked to improvement in emotion regulation and problem-solving. Taylor et al. (1998) conducted a series of studies that underscored the importance of process-oriented future simulations for effective regulation of behavior. In preparation for upcoming examinations, students

who used mental stimulations focused on the process rather than outcomes, such as thinking about studying for the exam instead of simply getting an A, began studying earlier and spent more hours doing it. They also had higher grades compared to the control group. In the follow-up study, researchers investigated the possible mediators for this effect. The results indicated that process simulation alleviated anxiety, which consequently improved academic performance. Process simulation also encouraged planning which in turn contributed to better exam grades.

Future-oriented thinking appears to promote self-regulating behaviors that might be important for one's long-term well-being. For example, vivid episodic future-oriented thinking might be crucial for decision making that involves future rewards. When faced with a possibility of delayed reward, people tend to engage in delay discounting, which is the "tendency to discount the value of a potential reward as a function of temporal distance to its delivery in the future" (Bar, 2010, p. 4). In their study, Peters and Büchel (2010) investigated whether engagement of future-oriented thinking would weaken the effects of delay discounting. In the experiment, participants were presented with various reward options as well as episodic cues for future events. The participants demonstrated that the effect of future-oriented thinking on delay discounting was stronger when they imagined future events more vividly. Across two parts of the study, high-imagery participants decreased their discount rate by 16% while low-imagery subjects did not.

Individual differences in the ability to generate future events might be indicative of one's tendency to resist immediate rewards, which is central to one's self-regulation. Noël et al. (2017) investigated the ability to imagine future events in people with

disordered gambling. Participants in the study simulated future events for different temporal distances. Compared to the control group, people who had problems with gambling created fewer positive and negative future events. They also rated their generated events as less detailed. Sweeney and Culcea (2017) performed a meta-analysis based on 52 studies that attempted to understand the magnitude of the association between the individual future temporal perspective (i.e. "the tendency to think about and value future outcomes") and indicators of health behaviors, such as Body Mass Index (BMI), diet, and exercise (p. 272). The results supported the hypothesis, such as people with the temporal orientation towards future seem to have better indicators of health outcomes. In a group of participants with type II diabetes, the patients who exhibited higher levels of future-oriented thinking were more likely to engage in preventive and safe healthy behaviors (Anubhuti, 2008).

Current research indicates that adequate simulation of positive future events might be an essential part of healthy coping mechanisms. In the longitudinal study that followed a random national sample for three years, future-oriented cognition has been associated with better adjustment following the 9/11 events (Holman & Silver, 2006). Participants who engaged in future-oriented thinking were less likely to have mental health problems and more likely to use active coping strategies. People who were planning and setting goals for their future demonstrated lower distress and higher positive affect over time. A group of people, who were future-oriented but focused on fear of future terrorism, demonstrated the opposite relationship with positive outcomes. Not surprisingly, focusing on future positive events is more beneficial than focusing on negative aspects of the future.

Anticipating future positive events has also been shown to induce positive emotions as well as more adaptive cognitions in experimental design studies. Monfort et al. (2015) designed a series of studies that investigated the effects of anticipating future positive events on coping with a stressor. All participants in the studies were asked to prepare a speech that would be judged, but some participants were assigned to see funny cartoons at the end of the experiment while the others were promised to see images that were not funny. The results demonstrated that participants who expected to see funny cartoons experienced an increase in positive emotions prior to the stressor (i.e. speech) as well as after the stressor, which was related to the regulation of negative affect associated with the stressor. Participants who anticipated positive future events were also more likely to engage in more adaptive cognitions regarding the stressor, such as focusing on preparing for the speech rather than focusing on one's emotions about the speech.

Not only the ability to imagine future events but the ability to imagine them vividly might have crucial effect on current affect. In their study, D'Argembeau and Van der Linden (2006) demonstrated that participants with more vivid imagery were able to experience more intense emotions while thinking about future events compared with participants with less vivid imagery. Interestingly, no such relationship between vividness and current affect was observed for mental simulation of past events. The systematic meta-analysis by Hallford et al. (2018) also revealed that decreased levels of specificity and detail in episodic future thinking are associated with psychopathology, such as depression, bipolar disorder and schizophrenia.

Imagining future episodic events, especially positive events, has been demonstrated to be more challenging among various clinical populations that might

struggle with effective emotion regulation. For instance, parasuicidal patients have difficulty envisioning future positive events but no difficulty with thinking about future negative events (MacLeod et al., 1993). Dysphoric individuals are less specific in describing both positive and negative past and future events, but it takes much longer for them to think about positive past and future events (Dickson & Bates, 2006). Anxious and depressed individuals judge negative future events as more likely to happen and give more reasons for them to happen (MacLeod et al., 1997). The opposite is true for positive events – participants saw them as less likely to happen and gave fewer supporting reasons for their occurrence.

One of the factors that might contribute to the effectiveness of future-oriented simulation in the coping process is optimistic bias, or human prepotency to overestimate the probability of future positive events (Schacter & Addis, 2007; Sharot, 2011; Weinstein, 1980). People generally underestimate the likelihood of being in an accident, getting a disease, or getting divorced. A large majority of the population (approximately 80%) is reported to show optimism bias, and this effect is consistent across age, gender, and race (Sharot, 2011). The reason why people are predisposed to overestimate the likelihood seems to lie in human readiness to update their beliefs in response to newly available positive information but not negative. To test this hypothesis, Sharot et al. (2011) asked participants to estimate the likelihood of various aversive events, such as burglary, in their lives. After the initial appraisal of the likelihood, participants were provided with accurate statistics about the issue of interest. As hypothesized, participants were more likely to update their predictions if newly available information was more optimistic than their initial guess but not otherwise. Therefore, future-oriented positive

reappraisal might be the strategy particularly suitable for increasing one's expecting well-being that might in turn increase current well-being, if, for example, the intensity or arousal is sufficient enough.

Studies comparing past-oriented and future-oriented thinking show that thinking about future events might be more emotionally evocative than thinking about similar past events (Caruso, 2010; Caruso et al., 2008; Van Boven & Ashworth, 2007). For example, Van Boven and Ashworth (2007) demonstrated that participants report more intense emotions during anticipation of positive and negative events than during retrospection of the same events. People also tend to view future events as more positive than past events (Berntsen & Bohn, 2010; Berntsen & Jacobsen, 2008; Rasmussen & Berntsen, 2013). Moreover, while people tend to recall mixed events from their past, they tend to anticipate positive events in their future (Newby-Clark & Ross, 2003). Such affective asymmetry in thinking about the past and future might potentially contribute to differential effects of past-oriented and future-oriented reappraisal on current affect.

Unlike past-oriented reappraisal, future-oriented reappraisal might be uniquely suited for coping with novel experiences. Brown et al. (2002) conducted research on worry among pregnant women. Participants were asked to mentally simulate the situation where they go into labor and are able to arrive at a hospital on time, which is the desired outcome. Women who provided a more coherent simulation of future events reported higher subjective probabilities for a successful outcome and less worry. Apart from underscoring the ability of future-oriented cognition to enhance current well-being, this study demonstrates a unique feature of future-oriented reappraisal, namely its flexibility. Since future-oriented reappraisal is not strictly limited by our past or present

autobiographical events, it might allow for greater variability of possible simulated events than past-oriented reappraisal. Such flexibility might promote the ability to come up with a higher number of possible unique situational outcomes, which we refer to as generativity. While people are able to imagine multiple unique counterfactual events in the past, people might be less motivated to do so due to lower credibility of such mental simulation. However, imagining variety of future events might be more instrumental due to probability of such events to actually happen. Faced with the novel experience, such as the birth of the first child, we might not be able to find a similar experience in our past or have difficulty seeing benefits in the present. The relative flexibility of future-oriented cognition might give future-oriented reappraisal an advantage in subjectively novel circumstances.

## Present-oriented Reappraisal

In the studies reported in this work, we were primarily interested in reappraisal that spans time, so we were aiming to investigate the unique characteristics of past-oriented and future-oriented types of temporal cognition. However, in this section, we will provide a short overview of present-oriented reappraisal in order to present a complete model of temporal anchoring of positive reappraisal. Unlike the past or future, the present has been a much more elusive concept in the research literature since the operationalization of the present, its clear differentiation from past and future, presents a methodological challenge. However, we choose to include the present-oriented reappraisal into our model as it represents a unique strategy of positive reappraisal distinct from past-oriented and future-oriented reappraisal. We define present-oriented reappraisal as a positive reappraisal strategy that involves finding current benefits in the

present situation as well as in the present self but does not include focusing on appraisals associated with future benefits or past situations.

Thinking about the present self is a mechanism discrete from thinking about past and future selves. In a brain imaging study that involved thinking about past, present, and future selves, participants displayed brain patterns indicative of higher activity in the medial prefrontal cortex during thinking about current selves compared with thinking about distant selves (D'Argembeau et al., 2010). As extant evidence indicates that the medial prefrontal cortex is a region involved in self-referential activity (Gusnard et al., 2001), these findings suggest that people might have a stronger association with their current selves compared with distant past and future selves.

Present-oriented reappraisal is commonly performed through the process of finding benefits in the current situation. Benefit finding has been associated with a range of positive outcomes among various clinical populations. Pakenham (2005) assessed benefit finding and measures of positive and negative outcomes among patients with multiple sclerosis. The participants' responses suggest that benefit finding has a strong effect on positive outcomes that include life satisfaction, positive affect, and dyadic adjustment (i.e. the measure of couple satisfaction). In addition, the family relations growth dimension of benefit finding had a buffering effect on participants' distress. Another study by Cruess et al. (2000) investigated the effects of 10-week cognitive behavioral stress management in a population of women that were in treatment for stage I or II breast cancer. The participants who went through the intervention demonstrated decreased levels of cortisol, the stress hormone, compared with the control group. The results of statistical analysis indicate that the effect of the intervention on cortisol levels

had been mediated by enhanced benefit finding. In a sample of mothers of acutely ill newborns, benefit finding during infant's hospitalization predicted better mood 6 and 18 months later (Affleck et al., 1991). Moreover, the mother's benefit finding predicted the child's developmental score 18 months later.

In comparison with past-oriented and future-oriented reappraisal, present-oriented reappraisal has the smallest potential for event alteration. As discussed above, people tend to slightly alter their representations of past events in order to feel better now. Future simulations have even more flexibility to imagine multiple possible future scenarios. As a result, past- and especially future-oriented reappraisal might potentially generate more interpretations for positive reappraisal.

## Goals

In the series of studies presented in this work, we aimed to achieve three goals. Our main goal was to empirically distinguish past-oriented and future-oriented types of positive reappraisal. Our second goal was to test and compare the effectiveness of these two types of reappraisal. Finally, we also aimed to explore some mechanisms that might be different between past-oriented and future-oriented positive reappraisals.

## Hypotheses

Based on theoretical background presented above, we propose two studies that would explore the unique characteristics of past-oriented and future-oriented types of reappraisal. Prior to conducting the two main studies, we also conducted a pilot study to explore general trends associated with past-oriented and future-oriented types of

reappraisal. The goal of the pilot is to compare past relevance and future relevance of reappraisals created in response to current stressors. For Study 1, we hypothesized that due to relative generativity of future cognition, participants would be able to create more future-oriented reappraisals than past-oriented reappraisals in response to current stressors. In accordance with findings by Van Boven and Ashworth (2007) that show that anticipation of events might be more evocative than their retrospection, we also hypothesize that future-oriented reappraisals will have stronger emotional impact on current affect than past-oriented reappraisals, such as it will lead to stronger increase in positive emotions as well as stronger decrease in negative emotions. For Study 2, we hypothesize that participants would create reappraisals that are more past-oriented in response to more subjectively familiar current stressors in their lives. Such cognitive change might allow them to emphasize their ability to cope with the stressor. We also hypothesized that participants would use reappraisals that are more future-oriented in response to less familiar stressors.

## Pilot

In our pilot study, we aimed to understand the distinction between past-oriented and future-oriented types of reappraisals. Participants were asked to report current stressors, create reappraisals for each stressor, and rate past relevance and future relevance of each reappraisal. We aimed to explore the association between past relevance and future relevance as well as to understand whether participants would create reappraisals that are more future- or past-oriented.

### Method

#### *Participants*

Thirty participants (22 females, 8 males) were recruited from the Prolific website (www.prolific.co). The mean of age was 28.50 (*SD* = 9.24) with ethnical/racial representation as follows: 73.3% White/Caucasian, 20% Asian, 3.3% Biracial, 3.3% Unknown/Not willing to answer. In addition, 10% of participants identified as Hispanic/Latino. To participate in the study, the participants had to be residents of the United States over the age of 18 but not older than 64 years old. They also had to be fluent in English. We required participants to have at least a 95% completion and approval rating on the previously completed tasks on the Prolific website.

#### *Reappraisal Task*

First, participants reported 3 stressors they were currently experiencing in their lives. Then, participants were asked to think about the stressor in a different way so that they feel better about it. They generated 3 positive reinterpretations/re-framings for each stressor. After completing reappraisals for all 3 stressors, participants saw each of the reappraisals on a separate screen and answered two additional questions. On the first

question, participants reported relevance of the reappraisal to "past circumstances, experiences, or self" on a scale from 1 (not at all relevant) to 10 (very much relevant). On the second question, participants reported relevance of the reappraisal to "future circumstances, experiences, or self" on a scale from 1 (not at all relevant) to 10 (very much relevant).

### *Procedure*

The participants were redirected from Prolific to the Qualtrics website, where they completed the task online. After electronically signing consent forms, they provided demographic information about their age, gender, race, ethnicity, education level, and family income level. Then participants completed the reappraisal task. After completing the task, they were debriefed and thanked for their participation. Participants received a compensation code that they entered on the Prolific website in order to receive a $3.00 payment for participation.

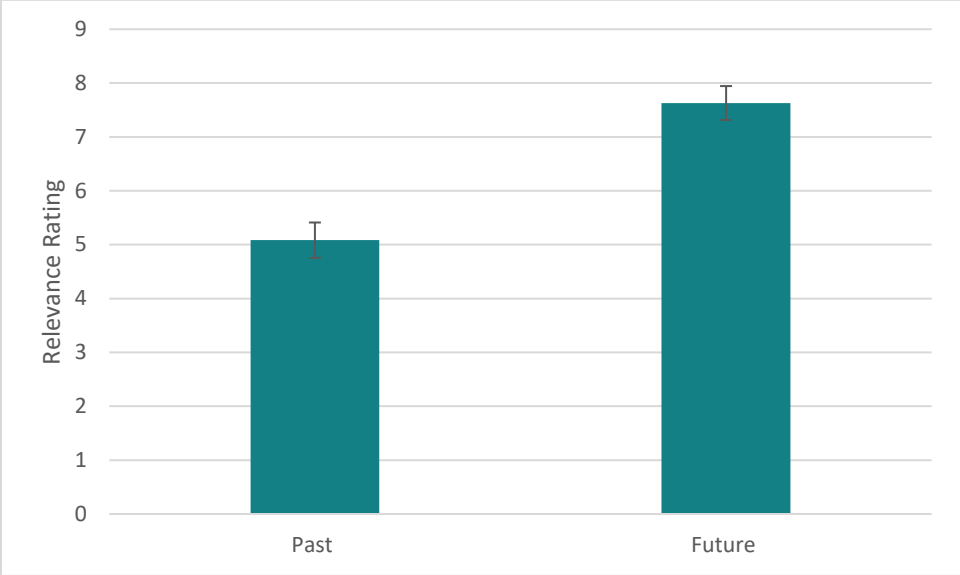
## Results and Discussion

Prior to analyzing the data, we excluded one participant due to having incomplete sentences in the responses. Since one of our exploratory goals was to see what word and tense choices participants would make for their reappraisals, we asked them to provide full sentences in response to our questions. We conducted informal analysis where we separated reappraisals into two groups: one group of reappraisals had past relevance ratings over 5 while another one had future relevance ratings above 5. Then we counted the number of times each unique word was repeated for each group. There was no apparent difference in word and tense use between two groups.

To understand the association between the ratings of past and future relevance, we calculated average past relevance and future relevance scores for each participant. Results of the Pearson correlation demonstrated that there was a significant correlation between past and future relevance of created reappraisals, $r(27) = .39$, $p = .034$. Participants who created reappraisals that were more past-oriented were also likely to create reappraisals that were more future-oriented, which might reflect individual ability to distinguish and navigate past-oriented and future-oriented reappraisals. We also conducted paired samples t-test that yielded that participants created reappraisals that were significantly more future-oriented ($M = 7.63$, $SE = .31$) rather than past-oriented ($M = 5.08$, $SE = 1.77$), $t(28) = 7.19$, $p < .001$ (see Figure 1). Such preference might be potentially explained by people's tendency to overestimate the likelihood of positive future events as well as lesser influence of reality constraints on mental simulation of future events compared with simulation of past events. These factors might make generation of future-oriented reappraisal more accessible. On the other hand, since we hypothesized that people tend to use past-oriented reappraisal for coping with familiar stressors, such tendency might be representative of the fact that most of the current stressors are subjectively unfamiliar. We further try to understand generativity associated with each type of reappraisal in Study 1 while testing the familiarity hypothesis in Study 2.

**Figure 1**

*Average Ratings of Past and Future Relevance*




*Note.* Participants generated reappraisals that were more future- than past-oriented.

## Study 1

In Study 1, participants were prompted to create either past-oriented or future-oriented reappraisals in order to make themselves feel better about current stressors. We aimed to test our generativity hypothesis such as participants would be able to create more future-oriented reappraisals than past-oriented reappraisals in response to current stressors. We also hypothesized that future-oriented reappraisals would be more effective in regulating current affect (decrease negative affect as well increase positive affect) than past-oriented reappraisals. In addition, the final version of our study included an exploratory question about vividness and concreteness of the details in participants' reappraisals. The study was preregistered on the Open Science Framework website (osf.io/usc8f). None of the study information was changed from the preregistered descriptions.

### Method

#### *Participants*

Sixty participants (27 male, 28 female, 3 genderqueer, 1 non-binary) were recruited from the Prolific website. The mean of age was 30.97 (*SD* = 11.91) with ethnical/racial representation as follows: 71.7% White/Caucasian, 11.7% Asian, 6.7% Black/African American, 6.7% Biracial or Multiracial, 1.7% Latino, 1.7% Unknown/Not willing to answer. In addition, 11.7% of participants identified as Hispanic/Latino. To participate in the study, the participants had to be residents of the United States over the age of 18 but not older than 64 years old. They also had to be fluent in English. We required participants to have at least 95% completion and approval rating on previously completed tasks on the Prolific website. For our generativity hypothesis, the sample size

was selected as to achieve 95% power at $\alpha = .05$ (two-tailed) to detect an effect size of .53 from Newby-Clark and Ross's (2003) study comparing generation of past and future events. The calculated sample size was equal to 49 but we added 20% to compensate for potentially missing/faulty data.

To calculate an appropriate sample size for a measure of affect we used the effect size $\eta^2 = .07$ reported by Caruso et al. (2008) for the emotional difference between thinking about past and future events. Aiming to achieve 95% power at $\alpha = .05$, we calculated a sample size equal to 36 people. Therefore, the sample size of 60 people we calculated for generativity measure should have been sufficient to detect the difference in affect between past- and future-oriented types of reappraisal.

***Reappraisal Task***

Before each trial, participants completed an emotionally neutral task in order to come to emotional "baseline' prior to interacting with a stressor. They viewed ten neutral images and chose one of 4 options (e.g. "table," "basket," "airplane," and "calculator") to indicate what is depicted in each image. Participants had 6 seconds to look at each neutral picture and choose the appropriate word to label its content.

The task consisted of 2 trials, each corresponding to a separate stressor. Each trial included the following sequence: (1) rating of affect, (2) reporting of stressor, (3) rating of affect, (4) generation of reappraisals, (5) rating of affect. First, participants provided the measures of their current affect. They rated how positive they were currently feeling on the scale from 1 (not at all) to 10 (very much). Similarly, they rated their negative affect. After that, participants were asked to report one of the stressors they were currently experiencing in their lives. They focused on the stressor and typed a short

description of the stressful event for two minutes. Then, participants reported their positive and negative affect again.

In the generation of reappraisal part of the task, participants were prompted to create as many positive reinterpretations of the current stressor as they could in a 90-second period. For one stressor, participants generated past-oriented reappraisals. They were asked to create reinterpretations of the stressor that relate to past circumstances (how things were), experiences (past events, memories) or self (how you used to be). For another stressor, participants created future-oriented reappraisals. They created reinterpretations that relate to future circumstances (how things will be), experiences (what events will happen) or self (how you will be). We measured the number of reappraisals participants created for each type of reappraisal. One half of the participants created past-oriented reappraisals first. The other half of the participants created future-oriented reappraisals in their first trial. Then, participants focused for 30 seconds on one of the reinterpretations they created. Finally, they reported their current affect again. In addition, at the end of each trial participants indicated which reinterpretation they chose to focus on and rated to what degree this interpretation included concrete and vivid details on a scale from 1 (not concrete and vivid) to 10 (very concrete and vivid).

***Procedure***

The participants were redirected from Prolific to the Qualtrics website, where they completed the task online. After electronically signing consent forms, they provided demographic information about their age, gender, race, ethnicity, education level, and family income level. Then participants completed the experimental task. After completing the task, they were debriefed and thanked for their participation. Participants

received a compensation code that they entered on the Prolific website in order to receive a $3.00 payment for their participation.

## Results

### *Preregistered Exclusions*

Prior to analyzing the data, we excluded two participants who were not able to provide reappraisals for their stressors.

### *Preregistered Data Analysis*

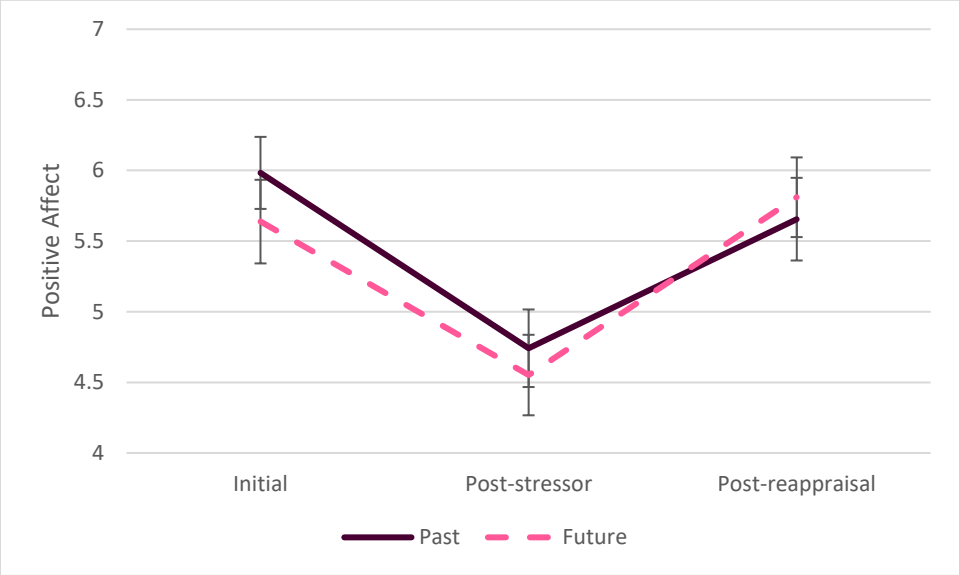
To test the hypothesis that participants would be able to create more future-oriented reappraisals than past-oriented reappraisals in response to current stressors, we conducted paired samples t-test to compare numbers of past-oriented and future-oriented reappraisals. There was no significant difference between number of past-oriented ($M$ = 4.59, $SE$ = .24) and future-oriented ($M$ = 4.84, $SE$ = .27) reappraisals participants created, $t(57) = 1.00$, $p = .322$. To check for a possible order effect, we conducted a 2 (Reappraisal Type: Past, Future) X 2 (Order: Past-Future, Future-Past) ANOVA. There was a significant interaction between Reappraisal Type and Order, $F(1, 56) = 4.09$, $p = .048$, $\eta^2 = .068$, such that participants who generated future-oriented reappraisals first created significantly more future-oriented ($M$ = 5.21, $SE$ = .39) than past-oriented ($M$ = 4.43, $SE$ = .34) reappraisals while participants who generated past-oriented reappraisals first did not create significantly different numbers of future-oriented and past-oriented reappraisals (future-oriented: $M$ = 4.50, $SE$ = .38; past-oriented: $M$ = 4.73, $SE$ = .33). The comparison of only first future-oriented ($M$ = 5.21, $SE$ = .40) and first past-oriented ($M$ = 4.73, $SE$ = .35) reappraisals yielded no significant difference in the number of created reappraisals, $t(56) = .906$, $p = .369$.

We compared participants' reports of affect by conducting repeated measures 2 (Reappraisal Type: Past, Future) X 2 (Time: Post-stressor, Post-reappraisal) X 2 (Order: Past-Future, Future-Past) ANCOVA while controlling for Initial scores of affect. Pair-wise comparisons were conducted to explore significant omnibus effects. Positive and negative affect were analyzed separately. Initial affect scores were standardized prior to running the statistical analysis.

For positive affect, the results demonstrated a significant main effect of Time, $F(1, 54) = 38.17$, $p < .001$, $\eta^2 = .414$, such that participants rated their feelings as more positive after creating reappraisals ($M = 5.74$, $SE = .09$) than after thinking about a current stressor ($M = 4.65$, $SE = .17$). As we hypothesized, there was a significant interaction of Reappraisal Type and Time, $F(1, 54) = 4.42$, $p = .040$, $\eta^2 = .076$. When participants created future-oriented reappraisals, they demonstrated stronger increase in positive affect from Post-stressor ($M = 4.55$, $SE = .18$) to Post-reappraisal ($M = 5.82$, $SE = .14$), $t(54) = 6.70$, $p < .001$, than when participants created past-oriented reappraisals (Post-stressor: $M = 4.74$, $SE = .20$; Post-reappraisal: $M = 5.66$, $SE = .14$), $t(54) = 4.56$, $p < .001$, (see Figure 2).

**Figure 2.**

*Ratings of Positive Affect for Past-oriented and Future-oriented Reappraisals*




*Note.* Participants reported stronger increase in positive emotions after using future-oriented reappraisals.

For negative affect, the analyses yielded a significant main effect of Time, $F(1, 54) = 21.71$, $p < .001$, $\eta^2 = .287$, such that participants rated their feelings as less negative after creating reappraisals ($M = 4.41$, $SE = .11$) than after thinking about a current stressor ($M = 5.40$, $SE = .21$). However, there was not a significant interaction of Reappraisal Type and Time, $F(1, 54) = 1.88$, $p = .177$, $\eta^2 = .034$.

There was no significant main effect of Reappraisal Type for either positive or negative affect (positive: $F(1, 54) = .01$, $p = .939$, $\eta^2 < .001$; negative: $F(1, 54) = .05$, $p = .822$, $\eta^2 = .001$). In addition, there was no significant interaction of Time and Order for either positive or negative affect (positive: $F(1, 54) = .66$, $p = .421$, $\eta^2 = .012$; negative: $F(1, 54) = .34$, $p = .560$, $\eta^2 = .006$) as well as no significant interaction of Reappraisal

Type and Order (positive: $F(1, 54) = .34$, $p = .564$, $\eta^2 = .006$; negative: $F(1, 54) = .08$, $p = .778$, $\eta^2 = .001$).

***Exploratory Data Analysis***

For our exploratory data analysis, we first compared ratings of concrete and vivid detail for past-oriented and future-oriented reappraisals. There was no significant difference between levels of detail for past-oriented ($M = 6.38$, $SE = 2.37$) and future-oriented ($M = 6.53$, $SE = 2.28$) reappraisals, $t(57) = -.552$, $p = .583$. We also analyzed the association between ratings of concrete and vivid details of used reappraisals and Post-reappraisal affect ratings while controlling for Initial and Post-stressor affect ratings. We conducted four multiple regressions, separately for past- and future-oriented reappraisals as well as for positive and negative affect. The results demonstrated that level of concrete and vivid detail did not predict the effectiveness of past-oriented reappraisals neither for positive nor negative affect (positive: $\beta = .008$, $t(54) = .09$, $p = .930$; negative: $\beta = -.123$, $t(54) = -1.25$, $p = .217$). In contrast, the more vivid and concrete future-oriented reappraisals participants created the more effective those reappraisals were. For positive affect model, the level of concrete and vivid detail was positively associated with Post-reappraisal positive affect while controlling for Initial and Post-stressor affect, $\beta = .275$, $t(54) = 4.36$, $p < .001$. Participants reported higher increase in positive affect for more detailed reappraisals. For negative affect model, the level of concrete and vivid detail was negatively associated with Post-reappraisal negative affect while controlling for Initial and Post-stressor affect, $\beta = -.234$, $t(54) = -3.67$, $p = .001$. Participants reported higher decrease in negative affect for more detailed reappraisals.

## Discussion

We hypothesized that participants would create more future-oriented reappraisals than past-oriented reappraisals due to higher generativity of future simulation. Our hypothesis was not supported by the results of our study, which might indicate that future simulation does not allow for higher number of reappraisal scenarios compared with past simulation. Alternatively, it might be an issue of our operationalization that failed to detect flexibility associated with future thinking. For example, while creating reappraisals based on future events might be associated with higher number of reappraisals, it might also take more time to create those due to abundance of possible scenarios and lack of certainty. Future studies might address such possibility by measuring not only the number of created reappraisals but also the time it takes to create one. In addition, while overall there was no significant difference between the number of past-oriented and future-oriented reappraisals, the analysis of order effect revealed that participants created more future-oriented reappraisals when they created them prior to past-oriented reappraisals. We might speculate that there are two possible mechanisms that power such effect: people tend to create more future-oriented reappraisals and they also tend to create more reappraisals on their first attempt. The interplay of these mechanisms would explain the absence of significant difference between numbers of reappraisals in the condition where people created past-oriented reappraisals prior to future-oriented reappraisals. Future studies might address this issue by implementing between-subject experimental design.

Both future-oriented and past-oriented reappraisals were effective at increasing positive affect after engaging in thinking about a current stressor. However, participants reported higher increase in positive emotions when using future-oriented reappraisals. At

the same time, there was no significant difference between reports of negative affect. We might suggest that such effect might be attributed to optimism bias, our tendency to overestimate the probability of future positive events (Sharot, 2011). As Van Boven and Ashworth (2007) have shown, anticipation of future events tends to be more emotionally evocative than retrospection. While future positive events might not necessarily be better than past events at alleviating the negative burden of the current stressor, they might increase one's positive affect by making the subjective probability of future positive events more salient.

The results of exploratory data analysis revealed that level of concrete and vivid detail in reappraisal might be important for effectiveness of future-oriented reappraisals but not past-oriented reappraisals. As prior research has shown, people tend to create more detailed simulations of real events compared with imagined events. The level of detail might not be important for subjective "realness" or likelihood of past events due to the fact that such events have actually happened. However, it might play a crucial role in future simulation as detailed mental construction of future events might increase the perceived likelihood of such events, which in turn might influence current affect. While likelihood of past events does not appear to be a determining mechanism behind effectiveness of past-oriented reappraisals, there might be other factors that motivate the use of this type of reappraisals. In our next study, we investigated one of such potential factors – familiarity of the experienced stressor.

## Study 2

In Study 2, we investigated whether people are more likely to use reappraisals that are more past-oriented or future-oriented in response to familiar stressors. Participants were asked to report current stressors, rate the familiarity of those stressors, and create positive reappraisals to reinterpret the stressful situation. We hypothesized that participants would create reappraisals that are more past-oriented in response to more familiar stressors. Since future-oriented reappraisals might be particularly suitable for novel stressors, we hypothesized that participants would use reappraisals that are more future-oriented in response to less familiar stressors.

### Method

#### *Participants*

The recruitment procedure was similar to the one described in Study 1. One hundred ten participants (64 female, 41 male, 4 non-binary, 1 agender) were recruited from the Prolific website. The mean of age was 31.00 (*SD* = 10.08) with ethnical/racial representation as follows: 70.0% White/Caucasian, 16.4% Asian, 3.6% Black/African American, 7.2% Biracial or Multiracial, 0.9% American Indian or Alaskan Native, 1.8% Unknown/Not willing to answer. In addition, 11.8% of participants identified as Hispanic/Latino. The sample size was approximated by using the G*Power estimation tool for correlational analysis. We aimed to achieve 90% power at $\alpha = .05$ (two-tailed) to detect a medium effect size of .3.

#### *Reappraisal Task*

First, participants reported 5 stressors they were currently experiencing in their lives. Then, they were asked to rate the extent to which they have experienced each of the

stressors before. They reported familiarity with the stressor on a scale from 1 (never experienced) to 10 (experienced often). Following familiarity rating, participants were asked to think about the stressor in a different way so that they feel better about it. They generated 1 positive reinterpretation/re-framing for each stressor. After completing reappraisals for all 5 stressors, participants saw each of the reappraisals on a separate screen and answered two additional questions. On the first question, participants reported the relevance of the reappraisal to "past circumstances, experiences, or self" on a scale from 1 (not at all relevant) to 5 (very much relevant). On the second question, participants reported relevance of the reappraisal to "future circumstances, experiences, or self" on a scale from 1 (not at all relevant) to 5 (very much relevant).

### *Procedure*

The general procedure is similar to Study 1 except participants completed a different task described above.

## Results

Prior to analyzing the data, we excluded 1 participant who repeated the stressors. We also excluded 5 participants who demonstrated zero variability for their ratings of past and future relevance. Some participants failed to provide stressors or reappraisals for reported stressors but still rated corresponding familiarity as well as past and future relevance. Therefore, we did not include ratings of familiarity, past and future relevance in our analysis if participants did not provide stressors or reappraisals for them. R Studio software was used to conduct this statistical analysis. The model was created and analyzed with lme4 (Bates et al., 2015) and lmerTest (Kuznetsova et al., 2017) in R.

To analyze whether preference for past- or future-oriented reappraisals is associated with subjective familiarity of situation we created two multilevel models (MLM). Past relevance served as a dependent variable in one model while future relevance served as dependent variable in another one. At Level 1, we had stressor-specific variables: familiarity scores of the stressor and scores of past or future relevance of reappraisals. Level 1 variables were nested within participants at Level 2. Familiarity of the stressor was used as a predictor of past and future relevance of reappraisals. At Level 1 we entered person-centered predictor and mean level of that predictor for that person, which allowed us to separate variance for within-subject and between-subject relationships between the predictor and outcome.

As we hypothesized, there was a significant positive slope on Level 1 that reflected positive within-subject association between past relevance and familiarity, such that participants created reappraisals that were higher in past relevance in response to familiar stressors, $\beta = .20$, $t(380.53) = 3.97$, $p < .001$. There was no significant within-subject relationship between future relevance and familiarity, $\beta = -.04$, $t(381.26) = -0.74$, $p = .461$. In order to distinguish past-oriented and future-oriented reappraisals, we also analyzed the relationship between past and future relevance of created reappraisals. Using past relevance as a predictor of future relevance, we detected a significant negative slope that demonstrated negative within-subject association between past relevance and future relevance of reappraisals, $\beta = -.27$, $t(371) = -4.91$, $p < .001$. Such reversed relationship signifies that the higher participants rated their reappraisals on future relevance the lower they rated these reappraisals on past relevance. The between-subject relationship was similar to that found in the pilot. There was a positive relationship between past and

future relevance of reappraisals, β = .15, $t(162.77) = 2.23$, $p = .027$, such that participants who created reappraisals that were more past-oriented also created reappraisals that were more future-oriented. We also conducted a paired-samples t-test to compare future and past relevance of created reappraisals. Similarly to the participants in pilot study, participants in Study 2 created reappraisals that were significantly more future-oriented ($M = 4.02$, $SE = .06$) rather than past-oriented ($M = 3.01$, $SE = .08$), $t(103) = 9.90$, $p < .001$.

**Discussion**

In our last study, we aimed to understand whether familiarity of a stressor would be predictive of the choice of the temporal anchoring of positive reappraisal. As prior research demonstrated, thinking about past events has the strongest emotional impact on current affect when it involves simulation of past events that actually happened (De Brigard & Giovanello, 2012). Focusing on past events that subjectively resemble the current stressor might be particularly beneficial as it underscores one's ability to cope with the stressor. Indeed, as we hypothesized, within-subject effects demonstrated that participants created reappraisals that were more past-oriented in response to more familiar stressors. We also hypothesized that novelty of the experienced stressor would be associated with use of more future-oriented reappraisals. Due to the absence of "reference point" in their past, people might be more motivated to look into the future in unfamiliar situations such as expecting their first child (Brown et al., 2002). However, lower familiarity of the stressor did not predict the use of more future-oriented reappraisals in our study. While past-oriented reappraisals seem to be particularly suited for coping with subjectively familiar stressors, future-oriented reappraisals might also be

used for such situations. Our results also provide evidence for an inverse within-subject relationship between past and future relevance of reappraisals that signifies the propensity of participants to create reappraisals that might be high on future relevance but low on past relevance and vice versa. These findings empirically support the theoretical distinction between past-oriented and future-oriented reappraisals that we established in our model of temporal anchoring of positive reappraisal.

## General Discussion

Affective science has made numerous attempts to categorize different emotion regulation strategies in order to better understand regulatory potentials of various regulatory approaches. In the current work, we proposed a novel model of distinguishing types of positive reappraisal based on temporal anchoring of cognitive change. Within our model, we defined three types of reappraisal depending on whether people base their cognitive change on events of the past, present or future. We refer to those as past-oriented, present-oriented and future-oriented types of positive reappraisal. In the current work, due to our interest in temporal distance, we compared only past-oriented and future-oriented types of reappraisal. In the pilot study and two main studies, we established that there is a clear distinction between past-oriented and future-oriented types of positive reappraisal. We also demonstrated effectiveness of these types of reappraisal as well as some underlying mechanisms that differentiate between the two.

One of the primary questions in our model is whether people have preference for one type of positive reappraisal over the other. The results of our pilot study showed that people tend to use more future-oriented reappraisals than past-oriented reappraisals. Such

proclivity might be potentially explained by optimism bias, people's tendency to overestimate the likelihood of positive future events (Sharot, 2011). Such bias might make future-oriented reappraisals more readily accessible for improving current affect. Moreover, future event simulation is much less bounded by reality constraints than past event simulation (Van Boven et al., 2009). Such characteristics might make future-oriented reappraisal particularly approachable and hence attractive as a way of regulating current affect. Therefore, we suggest that people might be more motivated to use future-oriented reappraisal due to its enhanced flexibility compared with past-oriented and, potentially, present-oriented reappraisals.

We further tried to develop the idea of flexibility through generativity which was operationalized as the number of reappraisals participants would create in the allotted time. As future-oriented thinking is associated with a higher number of possible scenarios due to its flexibility, we would expect a higher number of future-oriented reappraisals than past-oriented reappraisals in response to experimental demands. In Study 1, we, unfortunately, were not able to support our hypothesis that participants would create more future-oriented than past-oriented reappraisal. While we were not able to show a significant difference between the numbers of future-oriented and past-oriented reappraisals, such results might potentially be attributed to the flaws of our experimental design. When we analyzed the data taking into account the order of trials in our survey, we were able to demonstrate that participants created significantly more future-oriented reappraisals only when they generated them prior to generating past-oriented reappraisals. Since there was no significant difference when participants created past-oriented reappraisals first, we suggest that such results might be driven by two effects:

first, people tend to create more future-oriented reappraisals and, second, people tend to create more reappraisals on their first attempt. Future research should address such ambiguity by employing between-subject experimental design. Alternatively, we might speculate that while future-oriented reappraisal is associated with a higher number of created reappraisals, it might take more time to create those due to the effort aimed at generating absolutely new scenarios. In contrast, creating past-oriented reappraisals might take less time but also less flexibility as people already carry the map of past events in their minds. Future studies should clearly distinguish between generativity and effort associated with the creation of past- and future-oriented reappraisals. Moreover, generativity is only one of the ways to measure flexibility, so the results of this study cannot be generalized to all flexibility measures.

While not necessarily more abundant in number, future-oriented reappraisals were more effective at upregulating current positive affect than past-oriented reappraisals. Interestingly, there was no significant difference for downregulation of negative affect. While both types of reappraisal are equally effective at decreasing negative emotions, future-oriented reappraisals allow for a bigger increase in positive emotions. Again, such difference in positive affect might be potentially attributed to optimism bias associated with future event simulation. As we anticipate positive future events, we naturally increase our positive emotions (Monfort et al., 2015) – the effect that is not mirrored in the simulation of past events. Optimism bias might be one of the reflections of flexibility of future-oriented thinking since the lack of reality constraints allows people to make more positive predictions about their future. While our flexibility hypothesis was not directly supported by generativity as measured by the number of created reappraisals, the

importance of flexibility in future thinking might be indirectly demonstrated by other dimensions of this concept. Moreover, optimism bias and the increase in positive affect might be one of the factors that motivate people to use reappraisals that are more future-oriented as was demonstrated by our pilot study.

The level of concrete and vivid detail appears to play an important role in emotion regulation for future-oriented reappraisals but not past-oriented reappraisals. Simulation of past events has been repeatedly shown to have a higher level of vividness and detail than simulation of future events. Such effect is usually attributed to the fact that past simulation is based on real events. As such, effectiveness of past-oriented reappraisals might not be tied to the level of detail in mental simulation since they are largely perceived as real. On the other hand, future-oriented reappraisals may or may not be perceived as real or bound to happen. Prior research has demonstrated that people who evoke more vivid imagery in their simulation of the future also experience more intense emotions in response to the simulated events (D'Argembeau & Van der Linden, 2006). Vividness and concreteness of future-oriented reappraisals might boost the "realness" of anticipated events, which in turn has stronger regulatory effect on current affect. Moreover, as Hallford et al. (2018) demonstrated in their systematic review and meta-analysis, less specific and detailed representations of future events are associated with psychopathology.

In addition, we might speculate that such difference in impact of detail on effectiveness of past- and future-oriented reappraisals might be attributed to the specific mechanisms underlying creation of positive reappraisals. We might assume that most future-oriented reappraisals are positive in valence as people are highly motivated to

imagine bright future for themselves. However, we might suggest that there is less confidence in determining the valence of past events that are used for forming past-oriented reappraisals. Would people focus on positive or negative aspects of the past in order to regulate their current affect? Prior research by Strack et al. (1985) established that the way people think about the past event, particularly, whether they think about it in more or less detail has important influence on current affect. Thinking about the event in more detail makes the event more salient and leads to the change in current affect congruent with the initial emotion (i.e. thinking about good times in the past makes us happier in the present). However, thinking about the event in less detail and using it as a comparison point with the current situation leads to the change in current affect opposite to the initial emotion (i.e. thinking about tough times in the past makes us feel better in the present). It might be that people tend to use mostly negative or negative and positive past events to cope with current stressors while focusing on mostly positive future events. If participants think about negative events in the past in order to reappraise present stressors, they might be motivated not to think about those events in much detail as that would be counterproductive to their regulatory goal. Such formulation would also explain why our results did not demonstrate significant difference in detail between past-oriented reappraisal and future-oriented reappraisal – the finding different from the majority of research on past and future thinking that shows higher level of detail for autobiographical memories (D'Argembeau & Van der Linden, 2006; De Brigard & Giovanello, 2012). We suggest that such a discrepancy might be attributable to the unique regulatory goals that separate positive reappraisal from general retrospection. However, this formulation is

speculative and should be empirically tested. Future studies might aim at assessing the valence of events participants use to create their reappraisals.

Within our framework of positive reappraisal, we suggest that familiarity of stressor might influence the type of generated reappraisal. In Study 2, we investigated whether participants would prefer to use reappraisals that are more past-oriented in response to subjectively familiar stressors. Our hypothesis was partially supported as familiarity was positively associated with past relevance of created reappraisals. There was no significant relationship between familiarity and future relevance of created reappraisals. As participants face subjectively familiar stressors, they might be motivated to look back in time in order to underscore their ability to cope with the stressor. Based on research by Brown et al. (2002), we expected to see the association between novelty (low familiarity) of the stressor and use of the future-oriented reappraisals. However, our pilot study demonstrated that people generally tend to make reappraisals that are more future-oriented than past-oriented. Such preference might explain why we were able to only see association between familiarity and past relevance of reappraisals. Our results suggest that while people generally prefer future-oriented reappraisals (which could be due to their higher effectiveness at upregulating positive emotions as was shown in Study 1), they might override that preference and use future-oriented as well as past-oriented reappraisals in subjectively familiar situations in order to accentuate their coping ability. To further explore the relationship between familiarity and temporal aspects of positive reappraisal, future studies might explore the effect of familiarity as potential moderator of effectiveness of positive reappraisals.

In conclusion, in the series of studies, we were able to establish a new approach to categorizing positive reappraisal by comparing past- and future-oriented types of reappraisal. There appears to be a clear distinction between past relevance and future relevance of reappraisals, and people usually create reappraisals that are more future-oriented rather than past-oriented. Moreover, we explored effectiveness of each type of reappraisal and showed that while both types of reappraisal are effective at decreasing negative and increasing positive affect, future-oriented reappraisal leads to higher increase in positive emotions. We also explored particular mechanisms that drive the formation of reappraisal, such as familiarity of the stressor, which is associated with reappraisals that are more past-oriented. We also discussed possible explanations of effects observed in our studies and proposed future directions of research.

Understanding different types of emotion regulation strategies is important for theory and practice of psychology. Our novel model of temporal anchoring of positive reappraisal introduces a new dimension to understanding effects of positive reappraisal. In the future, researchers might introduce this new dimension along the established ways of categorizing positive reappraisal, such “internal” vs “external” approach (Webb et al., 2012). The interaction of two such dimensions might provide new information that would further inform the work of mental health professionals. This direction of work will allow us to better understand the fit between the emotional regulation strategy and the characteristics of a stressor in order to achieve personalized and effective emotion regulation.

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## Curriculum Vitae


## VALERIIA VLASENKO

vlasv19@wfu.edu | Winston-Salem, NC


### EDUCATION

| | |
|---|---|
| Psychology M.A., August 2021 | Wake Forest University |
| Psychology A.S | Community College of Aurora |
| AAOT: Psychology | Portland Community College |
| Bachelor's Degree in Political Science | Kuban State University |

### HONORS AND RECOGNITION

- Gordon A. Melson Outstanding Master Student Award Nominee 2021
- Psi Chi Honor Society 2020 - Present
- Phi Theta Kappa Honor Society 2018 - Present
- MyQuest Leadership Program, Community College of Aurora 2018 – 2019
- "Between the pages," published in *Nota Bene* literary anthology 2018
- "In a week," published in *Letter & Line* literary college magazine 2018
- All-Oregon scholar (Academic Team) 2018

### PRESENTATIONS

- Vlasenko, V., Waugh, C. E., (2021, May) *Temporal anchoring of positive reappraisal* [Poster session]. 2021 APS Virtual Convention.
- Waugh, C. E., Vlasenko, V., McRae, K., (2021, April) *Distinguishing the generation and implementation of positive reappraisal* [Oral presentation]. 2021 SAS Annual Conference, Virtual.
- Vlasenko, V. V., Rogers, E. G., & Waugh, C. E. (2021, April). *Affect labeling increases the intensity of positive emotions* [Oral presentation]. 2021 SAS Annual Conference, Virtual.
- Ramchander, N., Aran, Ö., Vlasenko, V., Garcia, S. E., Davis, E. P., & Hankin B. L. (2021, April). *Maternal Anxiety and ERP Responses to Happy, Angry, and Fearful Faces in 7-Month- Olds* [Poster session]. 2021 Society for Research in Child Development Biennial Meeting, Virtual.
- Aran, Ö., Ramchander, N., Garcia, S. E., Hennessey, E. P., Swales, D., Vlasenko, V., Hankin B. L. & Davis, E. P. (2020, October). *Maternal depressive symptoms and infant neural responses to emotional facial expressions* [Oral presentation]. 53rd Annual Meeting of the International Society for Developmental Psychobiology, Virtual.

- Vlasenko, V. V., Rogers, E. G., & Waugh, C. E. (2020, October). *Affect labeling increases the intensity of positive emotions* [Oral presentation]. First-year Project Presentation, Department of Psychology, Wake Forest University, Winston-Salem, NC, United States.
- Vlasenko, V. V., Rogers, E. G., & Waugh, C. E. (2020, June 1–September 1). *Affect labeling increases the intensity of positive emotions* [Poster session]. APS Poster Showcase, Chicago, IL, United States.
- Vlasenko, V. V., Rogers, E. G., & Waugh, C. E. (2020, March). *Affect labeling increases the intensity of positive emotions* [Poster session]. 20th Annual Graduate Student & Postdoc Research Day, Wake Forest University, Winston-Salem, NC, United States. (Event canceled)
- Aran, Ö., Vlasenko, V., Ramchander, N., Garcia, S. E., & Davis, E. P. (2019, October). *Do 7-month-old infants discriminate between emotion faces?* [Poster session] 52nd Annual Meeting of the International Society for Developmental Psychobiology, Chicago, IL, United States.
- Nolan, R.J, Vlasenko, V.V, Hicks, L.M, Davis, E. P. (2019, April). *Exploring the effects of maternal trauma on infant developmental outcomes* [Poster session]. Psychological Science and the Public Good: SEED, Denver, CO, United States.
- Nolan, R.J, Vlasenko, V.V, Hicks, L.M, Davis, E. P. (2019, April). *Exploring the effects of maternal trauma on infant developmental outcomes* [Poster session]. 89th Annual Meeting of the Rocky Mountain Psychological Association, Denver, CO, United States.

## PUBLICATIONS

- Vlasenko, V., Rogers, E., Waugh, C. (2021). *Affect labeling increases the intensity of positive emotions*. Manuscript submitted for publication.