

A “Rosy View” of the Past: Positive Memory Biases

Orly Adler and Ainat Pansky

Department of Psychology and the Institute of Information Processing and Decision Making

University of Haifa

Running head: Positive Memory Biases

To appear in T. Aue and H. Okon-Singer (Eds.), *Cognitive Biases in Health and Psychiatric Disorders*. Elsevier.

Abstract

The positivity bias in memory is a prevalent phenomenon. People tend to remember more pleasant than unpleasant events, to remember events more favorably than they actually were, and to view their past through rosy glasses overall. Apparent mainly in autobiographical memory and particularly for self-relevant information, positive memory biases emerge from the operation of powerful mechanisms aimed at maintaining the individual's well-being. In the current chapter, we review these mechanisms and the various techniques by which they operate. Manifestation of the bias in clinical populations, and the manner in which it is reflected in neural activations are described, alongside methodological limitations and directions for future research.

Keywords: emotional memory bias; fading affect bias; emotion regulation; well-being; positive reminiscence; positive memory bias; positivity bias; self-enhancement

A “Rosy View” of the Past: Positive Memory Biases

It is well established that the human memory does not work like a video recording, but is rather a dynamic process of continuous constructions and reconstructions, resulting in recollections which are never the exact reproductions of the initial experiences (Lane, Ryan, Nadel, & Greenberg, 2015; Loftus, 2003; Schacter, 2002; Radvansky, 2017; Schacter, Guerin, & St. Jacques, 2011). With regard to memories for past emotions—whether due to fast attenuation (Levine, Schmidt, Kang, & Tinti, 2012), or because feelings cannot be stored as memory traces to begin with (Robinson & Clore, 2002)—they too need to be reconstructed (Kaplan, Levine, Lench, & Safer, 2016; see Levine, & Pizarro, 2004; Levine, & Safer, 2002; Levine, Safer, & Lench, 2006). In the current chapter, we review the theoretical mechanisms proposed to underlie emotional memory biases, focusing on those inclined toward recollecting positive information. We shall describe the purpose they serve, common methodologies by which they are examined, the mechanisms that underlie their occurrence, the manner by which they are reflected in neural activations, and their manifestations in clinical populations.

A plethora of research has confirmed the existence of positive memory biases, by which people tend to regard their past more favorably than it actually was. For example, college students remembered having more A's on their high school transcripts than they actually had (Bahrnick, Hall, & Berger, 1996; Bahrnick, Hall, & Da costa, 2008), and individuals remembered their medical-test results as better than they really were (Croyle et al., 2006; see Christensen, Wood, & Barret, 2003). Moreover, pleasant life events were found to be better recalled (Mather, 2006; Skowronski, Betz, Thompson, & Shannon, 1991; Walker, Skowronski, & Thompson, 2003b; see Thompson, Skowronski, Larsen, & Betz, 2013), to come to mind more readily (Levine, & Bluck, 2004; Master, Lishman, & Smith, 1983), and to be subjectively judged as more clearly remembered than unpleasant life events (Matlin & Stang, 1978; Walker, Vogl, & Thompson, 1997; see Thompson et al., 2013). With respect to

memory for emotions, the same trend is apparent in the form of the *fading affect bias* (Skowronski, Walker, Henderson, & Bond, 2014; Walker et al., 1997, 2003b)—a well-documented phenomenon according to which affect associated with unpleasant past events fade in memory faster than affect associated with pleasant past events. Thus, comparisons between participants' reports at event occurrence and upon event recall revealed a larger emotional-intensity drop for the unpleasant than for the pleasant events (Landau & Gunter, 2009; Ritchie et al., 2015; Ritchie, Skowronski, Hartnett, Wells, & Walker, 2009; Walker et al., 1997). Certainly, it is possible that one of the contributors to the advantage of positive over negative recollections is merely their larger base rate in people's memory, with positive experiences occurring about twice as frequently as negative experiences (Walker et al., 2003b). However, as we discuss extensively below, profound and sophisticated mechanisms are more likely to underlie peoples' tendency to view their past through rosy glasses.

Although the comprehension that memory is prone to errors may be disturbing, positive memory biases actually reflect adaptive processes which operate in the service of maintaining well-being (Nørby, 2015; Schacter et al., 2011). Thus, by retaining the intensity of positive emotions for a longer time, the fading affect bias preserves the pleasantness and minimizes the unpleasantness of life events, thereby functioning as a healthy mechanism (Ritchie et al., 2015; Walker et al., 2003b). Re-experiencing past events in a manner that reinforces a positive sense of self enhances positive self-identity, which is also crucial for maintaining well-being (Conway, 2005; Greenwald, 1980; Holland & Kensinger, 2010; Loftus, 1982; see also Ross, 1989; Ross & Wilson, 2003; Schacter et al., 2011; Wilson & Ross, 2003). Indeed, older adults, who commonly report better moods than young adults, show enhanced memory for positive as compared to negative past experiences (Mather & Carstensen, 2005; see Reed, Chan, & Mikels, 2014), and are more likely to falsely recognize positive items as having been seen before (Fernandes, Ross, Wiegand, Schryer, 2008; Piguet,

Connally, Krendl, Huot, & Corkin, 2008). Among young adults, there is a correlation between the probability of wrongly recalling positive life events and life satisfaction (Koo & Oishi, 2009). Taken together, not surprisingly, the growing field of positive psychology, which focuses on the positive subjective experience (Lyubomirsky, Sheldon, & Schkade, 2005; Seligman & Csikszentmihalyi, 2000), views positive memory retrieval and positive self-reflection among the interventions aimed at bringing about enhanced well-being (Burton & King 2004; Seligman, Steen, Park, & Peterson, 2005; see Duckworth, Steen, & Seligman, 2005).

Despite the burgeoning literature with regard to positive memory biases, a considerable amount of studies has shown the opposite pattern of superior memory for negative information (Charles, Mather, & Carstensen, 2003). In their review, Baumeister, Bratslavsky, Finkenauer, and Vohs (2001) concluded that because negative materials evoke more conscious activity and receive deeper operations than positive materials, negative memories are better recalled than positive ones. One explanation for this apparent memory discrepancy could be that emotional valence has different impacts on memory over time. More specifically, as negative stimuli hold survival-relevant information, when facing a negative event, people immediately activate coping processes for dealing with this information, which in turn enhance the memory for the event (Pratto & John, 1991). Yet, in order to maintain well-being, people activate opponent processes that minimize the impact of the event (the mobilization-minimization hypothesis: Taylor, 1991; see also Toyama, Katsuhara, Sakurai, & Ohira, 2014; Walker, et al., 2003b). Thus, due to adaptive functions, there exists an immediate superiority for negative memories that diminishes with time. An alternative account for the contradictory findings is that any apparent advantage for positive memories is bogus. Given that the assessment of an autobiographical memory is commonly performed by the rememberer himself, and not by an extrinsic observer, such a judgment

might be prone to personal motivations (for the potential underlying mechanisms, see section below on Major Theories in the Field). In other words, people may believe they remember positive events better than they really do (Levine & Bluck, 2004). In any case, both possible explanations imply that Baumeister et al.'s (2001) suggestion of negative memory superiority may be appropriate for experimental studies which mostly use objective tools and short retention intervals between encoding and retrieval of the stimuli, but is unwarranted in the domain of autobiographical memory, which is relatively long-term and subjectively measured. Indeed, memory bias for positive information is mostly demonstrated in the domain of autobiographical memory research (Kensinger & Schacter, 2008). Yet, because autobiographical memory is unique, exceptional, and often unverifiable, the conditions driving distortions of autobiographical content are difficult to manipulate or control using experimental methodologies (Baird et al., 2008). With the understanding that examining the implications of extreme emotional experiences in the laboratory setting is quite challenging, we turn next to review the main methods used to study autobiographical memory biases.

Methods Used to Investigate the Bias

One of the more prevalent modes to elicit autobiographical memories in the laboratory is the word-cued memory technique designed by Galton (1879), in which the participants are presented with cue words (e.g. car, love), one at a time, and are asked to report a specific personal life event in response to each word (Crovitz & Schiffman, 1974; Galton, 1879; see Rubin, 2002; Rubin & Wenzel, 2004). Variations of the paradigm employ criteria (e.g. positive vs. negative; Berntsen, 2002; Bohanek, Fivush, & Walker, 2005; Ritchie et al., 2015), or lifetime periods (e.g., the first week of classes in college; Holland, Tamir & Kensinger, 2010; Ritchie et al., 2015) as retrieval cues. This common technique permits gauging both objective measures (e.g., retrieval latencies of negative vs. positive events and recent vs. remote episodes) and subjective measures (e.g., ratings of emotions, confidence in accuracy,

vividness) for autobiographical memories (Brewer, 1996). One obvious drawback of this technique is that the researcher has no access to what had actually occurred in the past, rendering the accuracy assessment and age determination of the reported memories impossible.

These drawbacks are overcome in a different method, the diary paradigm, in which the participants are asked to record everyday events and to rate their affiliated feelings as they are being experienced. At a later time, the participants are asked to recount their memory for some of these events and feelings (Barclay & Wellman, 1986; Burt, Kemp, & Conway, 2003; Kemp, Burt, & Furneaux, 2008; Mill, Realo, & Allik, 2016; Stone, & Broderick, 2007; Todd, Tennen, Carney, Armeli, & Affleck, 2004; Wirtz, Kruger, Scollon, & Diener, 2003). The comparison between the online reports and the retrospective accounts constitute a measure of reconstruction and has been conceptualized as the *Memory-Experience Gap* (Miron-Shatz, Stone, & Kahneman, 2009)—the discrepancy between emotions as they are experienced and emotions as they are remembered.

Another popular technique for examining the relationship between memory and emotion is mood induction (Blaney, 1986; Bower, 1981; Singer & Salovey, 1988). After exposing participants to positive, negative, or neutral stimuli like music (Miranda & Kihlstrom, 2005; Västfjäll, 2001), pictures (Buchanan 2007) or videos (Fitzgerald et al., 2011), the participants are asked to retrieve either autobiographical information or items studied in an earlier phase of the experiment. Comparing the retrieval latencies or the amount of remembered events in the different affective states may shed light on the impact of emotion on memory.

In other methodologies that are in extensive use in the domain of autobiographical memory, participants are asked to recall unique, emotional, public events (*flashbulb memories*; Brown & Kulik, 1977), or to perform guided interviews about events from the

participants' lives (Levine, Svoboda, Hay, Winocur, & Moscovitch, 2002; Ritchie et al., 2015). Also, recent years have witnessed an upsurge of studies combining neuroimaging technologies with behavioral methodologies such as those mentioned above, in order to elucidate the neural networks engaged during remembering (Bonnici & Maguire, 2018; Cabeza & St. Jacques, 2007; Josselyn, Köhler, & Frankland, 2015; Moscovitch, Cabeza, Winocur, & Nadel, 2016). Acknowledging the integral methodological obstacles in autobiographical memory research, we next present major theories in the field and the mechanisms they propose to underlie positive memory biases. It is important to note that biases may potentially occur at either the encoding, the storage or the retrieval stage of the memory. In many studies, the precise stage in which the bias occurs is not specified. Yet, in the cases in which it is, we will point it out.

Major Theories in the Field

Since long-ago, theoreticians have addressed peoples' inclination to view their pasts over-favorably. For example, in his theoretical framework of repression, Freud proposed a set of defense mechanisms, postulated to inhibit the recollection of self-threatening events, sometimes to the extent of becoming inaccessible, as if forgotten (Freud, 1957). In contemporary psychological theories, the notion of the 'self' as a cornerstone of positive biases in memory, is also salient. In fact, in order to maintain well-being, preserving a positive view of the self is considered to be fundamental (D'Argembeau & Van der Linden, 2008; Davidson, 2004; Rathbone, Holmes, Murphy, & Ellis, 2015; Sedikides, & Alicke, 2012; Sedikides, Gaertner, & Cai, 2015). Indeed, people mostly possess positive schemas of themselves, portraying themselves as worthwhile, competent, warm, moral, attractive, and loveable (Alicke & Sedikides, 2009; Sedikides & Gregg, 2008). Thus, various techniques may be employed in the name of self-protection, self-enhancement, and self-consistency, each of which may result in a positive memory bias (Alicke & Sedikides, 2009; Libby & Eibach,

2007; Ritchie, Sedikides, & Skowronski, 2017; Skowronski, 2011). Next, we shall review these mechanisms and techniques, as well as the variables that may moderate their operation (see Figure 1).

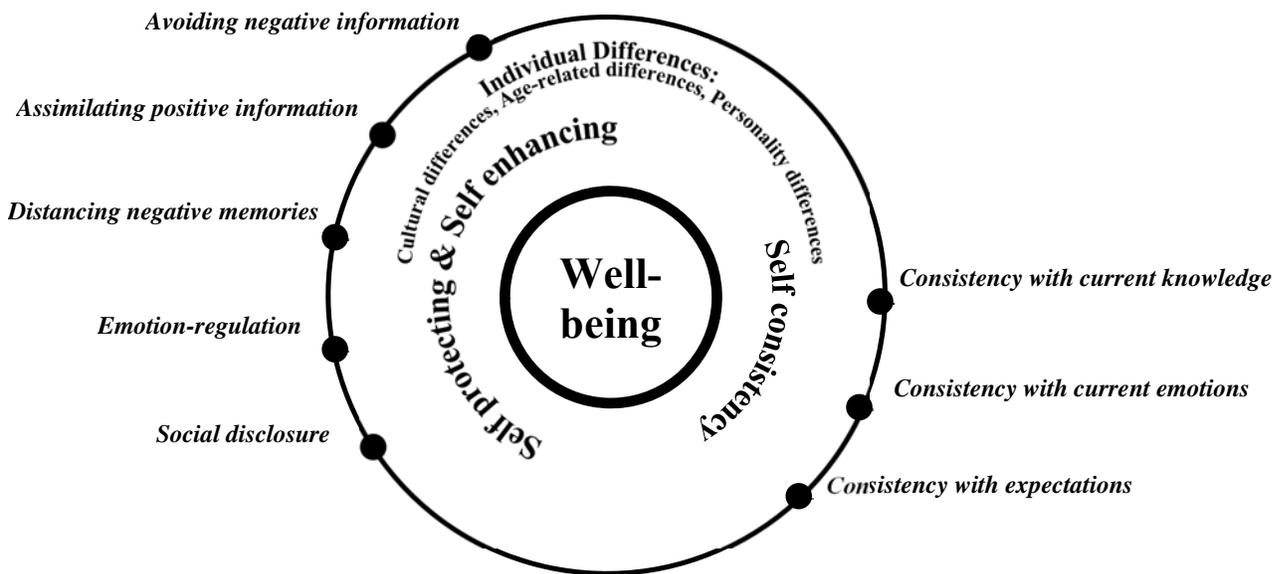


Figure 1: Moderated by individual differences, the following techniques (in italics) are employed in the name of self protecting, self enhancing, and self consistency mechanisms that underlie positive memory biases in support of well-being.

Self-Protecting and Self-Enhancing Mechanisms

Before reviewing the manners by which the self-protective and self-enhancing mechanisms are employed, we wish to assert that the emergence of the positivity bias does not depend merely on the event's valence, but also on the extent to which the event is relevant to oneself. When the information is not self-relevant, the bias will not be apparent (Skowronski, 2011; Skowronski et al., 1991; see Holland & Kensinger, 2010).

Avoiding negative information and assimilating positive information. As mentioned above, people commonly possess favorable schemas of themselves (Alicke & Sedikides, 2009; Sedikides & Gregg, 2008). In order to preserve or even enhance positive self-evaluations, different processing modes may be employed when encoding negative or

positive information. More specifically, it has been suggested that negative information often leads to attention narrowing in order to enable item-specific processing (Schwarz, 1990; Wegner & Vallacher, 1986). By contrast, positive information, was proposed to elicit a gist-processing mode in reference to activated stored schemas (Clore et al., 2001; see also the assimilation approach; Fiedler, 2001). Because, as stated, self-schemas are mostly positive, pleasant events are more likely to be readily assimilated into one's collection of personal experiences that form one's autobiographical memory (Holland & Kensinger, 2010; Matlin & Stang, 1978). This integration with existing knowledge provides the positive information with more elaboration, more retrieval routes, and superior recall (the *mnemonic neglect model*; Green, Pinter, & Sedikides, 2005; Pinter, Green, Sedikides, & Gregg, 2011). To illustrate, following short and long presentation durations of negative and positive feedbacks, not only did participants demonstrate poorer memory for the negative feedbacks compared to the positive ones, but their memory performance seemed to depend on a valence-duration interaction. Specifically, whereas twice as many positive feedbacks were recollected in the long-duration condition than in the short-duration condition, memory for the negative feedbacks was not affected by presentation duration. Most importantly, a recall advantage of positive feedbacks was evident only in the long-duration condition, whereas in the short-duration condition better recall was evident for the negative feedbacks (Sedikides & Green, 2000, 2009). The authors interpreted these results as suggesting that negative information entails a superficial mode of processing which requires minimal resources (e.g., time)¹. These findings have also been taken to indicate that self-protecting mechanisms operate already at the stage of memory encoding, as was evident in the effect of presentation duration.

¹ Notably, this interpretation is inconsistent with Baumeister et al.'s (2001) view that deep operations are engaged in the processing of negative stimuli (mentioned above).

Distancing negative memories. Another technique that helps to maintain a positive sense of self is to remember or construe the past in a self-flattering manner (Alicke & Govorun, 2005; Sedikides & Gregg, 2003, 2008). Thus, people tend to perceive flattering past events as recent, and to dissociate themselves from embarrassing events by perceiving them as having occurred further in the past (Ross, Heine, Wilson, & Sugimori, 2005; Ross & Wilson, 2002). In their study, Ross and Wilson (2002) had students report the past-semester course in which they had received either their best grade or their worst grade, and to rate their subjective distance from that course (i.e. “feels like yesterday”, “feels far away”). The results showed that the students felt farther from courses in which they obtained lower grades, even though the actual retention interval in the two conditions was comparable. Thus, by distancing a failure event, one can render it less relevant to one's current self.

Emotion-regulation strategies. In order to counteract negative feelings when facing unpleasant experiences, people may execute different emotion-regulation strategies. They may choose to suppress their emotional expressions when encoding the event, to suppress their thoughts when recollecting it, to deliberately retrieve positive memories, to reappraise an event in order to change its meaning, and so forth (see Gross, 1998). The effectiveness of each emotion-regulation strategy on the emotional outcome may vary (see Webb, Miles, & Sheeran, 2012), and so does their potential for causing positive memory biases. Thus, whereas retrieving memories (as in positive reminiscence) strengthens their traces and thereby enhances them (Roediger & Karpicke, 2006), expressive suppression was found to impair the memory for the event, and thereby reduce its recalled negativity (Dillon, Ritchey, Johnson, & LaBar, 2007; Richards & Gross, 1999). Engaging in reappraisal may entail a positive memory bias as it involves the construction of the unpleasant event in less negative terms. To illustrate, Levine et al. (2012) compared the emotional reports of students before and after taking the final-year exam. Their findings revealed that compared to other emotion-regulation

strategies, students who engaged in reappraisal to cope with the stressful pre-exam period, demonstrated a positive memory bias in later remembering (i.e., having felt more positive and less negative emotions than they had reported originally).

Social disclosure. People claim to share their memories with others for many reasons: to maintain the memory of the event, to re-experience its associated emotion, to better understand it, or simply for the purpose of social communication (Walker, Skowronski, Gibbons, Vogl, & Ritchie, 2009). Whatever their conscious rationale may be, the self-protective-enhancive mechanisms that are constantly at work are likely to yield a positivity bias. To illustrate, unpleasant memories tend to be recounted less or with minimized negative elements (Mather, 2006; Skowronski et al., 1991; Skowronski & Walker, 2004). As rehearsed information is strengthened whereas omitted information is left non-rehearsed and consequently less memorable (Roediger & Karpicke, 2006), scarcely recounting the negative information may lead to the loss of the negative content and to the reinforcement of the positive content. Indeed, retrieving a past experience with a certain perspective was found to create a particular schema that guides the subsequent memory of the experience to be consistent with that schema (Alba & Hasher, 1983; Anderson & Pichert, 1978; Tversky & Marsh, 2000). Furthermore, even when unpleasant experiences are recounted, this generally entails expressions of support and new perceptions, whereas recounting pleasant experiences commonly entails expressions of joy and praise. Hence, social disclosure is most likely to alter the rememberer's affective response to the recalled event (Skowronski & Walker, 2004), and to reinforce the fading affect bias (mentioned above). Indeed, stronger fading affect bias effects were found for frequently-disclosed compared to infrequently-disclosed experiences (Skowronski, Gibbons, Vogl, & Walker, 2004).

Self-Consistency

Apart from preserving a positive sense of self, owning a coherent and a stable record of the self over time is also vital for the maintenance of well-being (Greenwald, 1980; Conway, 2005). Thus, when changes in knowledge or feelings are marked, people tend to modify their retrieved memories in order to bring them to better accord with the present (Bahrick et al., 2008; Holland & Kensinger, 2010; Levine, 1997; Levine, Lench, & Safer, 2009; Levine & Safer, 2002; Ross, 1989; Ross, Blatz, & Schryer, 2008; Toggia, Read, Ross, & Lindsay, 2017; Wilson & Ross, 2003).

Consistency with current knowledge. As people turn to their current knowledge in order to infer what they had thought and felt in the past, acquiring post-event information may lead to a distortion of the memory for the original event. For example, Safer, Levine, and Drapalski (2002) compared between students' affective-reports before and after taking an exam. They found that students who learned that they had done well on the exam before the retrospective report underestimated how anxious they had felt prior to the exam, compared to those who recalled their pre-exam emotions before learning their grade (Safer et al., 2002).

Consistency with current emotions. Changes in one's feelings toward something or someone else may also produce memory distortion. For example, McFarland and Ross (1987) found that participants who became more favorable of their dating partners over time, recalled having evaluated them a month earlier more positively than they actually did, compared to participants who became less favorable of their partners. Importantly, drawing on current feelings in order to reconstruct memories of past emotions may also lead to the *Mood Congruency Memory* (MCM) effect—the well-replicated finding that one's memory is biased to become congruent in valence with one's current mood (Blaney, 1986; Bower, 1981; Singer & Salovey, 1988). Thus, following a happy (vs. sad) mood induction, more positive memories were recalled (Eich, Macaulay, & Ryan, 1994; Natale & Hantas, 1982; Teasdale, Taylor, &

Fogarty, 1980), and the latency to retrieve them was shorter (Lloyd & Lishman, 1975; Riskind, 1983), compared to negative memories. In addition, a happy (vs. sad) mood induction was found to influence the affect associated with autobiographical memories, such that the memories were rated as more positive (Madigan & Bollenbach, 1982; Snyder & White, 1982). One possibility is that the MCM effect results from spreading activation through a network of emotion nodes that are linked to related memories (the associative network theory; Bower, 1981; see also Blaney, 1986; Forgas, 1995; Rusting, 1998; Singer & Salovey, 1988). Alternatively, the MCM could occur due to the activation of self-schemas which facilitates the retrieval of memories that are congruent with that schema (*schema models*; reviewed by Rusting, 1998). Regardless of its origins, MCM is highly prevalent, with stronger effects of positive affect on mood-congruent retrieval than of negative affect (Brewin, Andrews, & Gotlib, 1993; Rusting, 1998; Singer & Salovey, 1988; see Matt, Vázquez, & Campbell, 1992). This bias asymmetry may be explained by the predisposition of people to regulate negative mood. Reappraising the situation or retrieving pleasant thoughts and memories with the purpose of reducing the sad affect that is experienced may result in mood incongruency, with superior memory for positive information despite the negative mood induction (Holland & Kensinger, 2010; Isen, 1985, 1987).

Consistency with expectations. Another factor which may bias people's evaluations of their past is their anticipation prior to the event occurrence (Holland & Kensinger, 2010; Levine & Safer, 2002). Anderson (1983) has long stated that people's expectancies of an upcoming event may be based in part on the ease or difficulty of imagining that future-event's possible scenarios. In that context, research has shown that compared with negative or neutral simulations, positive simulations of future events are more easily constructed, contain a larger amount of details, and tend to be better recalled over time (D'Argembeau, Renaud, & Van der Linden, 2011; D'Argembeau & Van der Linden, 2004; de Vito, Neroni, Gamboz, Della Sala,

& Brandimonte, 2015; Sharot, Riccardi, Raio, & Phelps, 2007; Szpunar, Addis, & Schacter, 2012; see also Dricu, Kress, & Aue, this volume, chapter 3). As imagining an event in detail creates memory traces for that possible scenario, and these traces are reactivated and assimilated into the memory of that event after its actual occurrence, obtaining a positive expectancy frequently results in a rosy memory (Devitt & Schacter, 2018). To illustrate, in Devitt and Schacter's (2018) study, participants read several neutral plausible events, not before simulating them in either a negative or a positive manner. A subsequent memory test revealed that negative simulations did not impact the memory for the narratives, whereas positive simulations produced a memory bias such that both the narratives themselves (which were neutral) and their affiliated affect were remembered as positive. One may suggest that the privileged position of positive expectations influences the subjective experience of the individual during the event occurrence (e.g., Rasmussen & Berntsen, 2013; Sharot, 2011), yet research has shown that when one expects a positive experience, the recollection of the event may be rosy even when its moment-to-moment report indicates a less favorable experience. For example, in a study that surveyed cyclists before, during, and after a 3-week tour, although their online reports mentioned heavy rain, dull companions, and physical exhaustion, their memories of the tour were generally positive, very much like their prior expectations (Mitchell, Thompson, Peterson, & Cronk, 1997). This phenomenon, of prospects bringing about a more favorable retrospective outlook on the event than when the event occurred, termed by Mitchell and his colleagues (1997) the "rosy view", has been observed in many other activities, like marathons, bicycle tours, and vacations (Mitchell et al., 1997; Sutton, 1992; Wirtz et al., 2003).

Variables that may moderate the bias—individual differences

When reviewing the mechanisms that distort recall in a positive direction, it is important to note the ample evidence indicating that the mechanisms mentioned above do not

necessarily operate independently, but, rather, may interact with another factor—individual differences (Levine & Safer, 2002; see also Holland & Kensinger, 2010).

Cultural differences. In order to maintain well-being, a coherent and consistent sense of self must also comprise coherency with one's social group (Wang, 2016). With the need for a shared sense of reality, people accentuate aspects of the self that typically correspond to norms and values of the group they belong to or wish to belong to (Baumeister & Leary, 2017; Leary & Kowalski, 1990; Siibak, 2009). Memories are thus distorted in accord with cultural values (Oishi, 2002; Wang, 2016). For instance, consistent with the western individualistic value of personal happiness (Markus & Kitayama, 1994, 2010; Oishi, 2002), European-American participants remembered experiencing more pleasant than unpleasant emotions in their daily lives, whereas Japanese and Asian-American participants, whose cultures do not idolize individualism, remembered experiencing an equal number of positive and negative emotions (Markus & Kitayama, 1994; Oishi, 2002). Another study, which compared between online and retrospective reports, showed that although European-American and Asian-American participants did not differ in their daily diary documentation of emotions, European-Americans retrospectively recalled greater satisfaction than Asian-Americans (Oishi et al., 2007). In addition, and in line with Asian's motivation to promote social harmony and maintain positive views of important others, Asian participants were found to remember interpersonal harms as less severe compared to American participants (Song & Wang, 2014).

Age-related differences. Another individual difference that plays a prominent role in this context is age. According to the *socioemotional selectivity theory* (Carstensen, Isaacowitz, & Charles, 1999), as people get older, they commence to view time as limited, and hence prioritize their emotional well-being. Thus, in comparison with young adults, older adults tend to process information in a manner that provides them with more emotional

fulfillment, displaying superior abilities in regulating their emotions than young adults (Carstensen, Pasupathi, Mayr, & Nesselrode, 2000; Holland & Kensinger, 2010; Mather & Carstensen, 2005). Indeed, older adults were found to commonly use positive reappraisals as a coping strategy (Folkman, Lazarus, Pimley, & Novacek, 1987), and demonstrate an attention bias by which they are inclined to attend to positive over negative information (Carstensen, & Mikels, 2005; Mather & Carstensen, 2003, 2005; see Reed et al., 2014). As these emotion-regulating strategies are associated with a reduction in negative emotion and with enhanced recall of positive memories (Levine et al., 2012; Rusting & DeHart, 2000), it should come as no surprise that research shows a greater predisposition for positive memory biases among older adults than among young adults (Mather, 2006; Samanez-Larkin, & Carstensen, 2011). Indeed, older adults are inclined to forget unpleasant events, or the negative feelings associated with them (Berntsen & Rubin, 2002; Levine & Bluck, 1997), and to remember the past more favorably than it actually was (Comblain, D'Argembeau, & Van der Linden, 2005; Kennedy, Mather, & Carstensen, 2004; Levine & Bluck, 1997; Wagenaar & Groeneweg, 1990). In more controlled laboratory experiments, older adults (versus young adults) were found to remember a higher proportion of positive stimuli and a lower proportion of negative stimuli (Charles et al., 2003; Mather & Carstensen, 2003; Mather, Knight, & McCaffrey, 2005), and to falsely endorse more positive than negative items related to those they had studied earlier (Fernandes et al., 2008; Piguet et al., 2008). As a matter of fact, older adults' predisposition to reconstruct their memory positively may thus account for the well-documented association between age and increased subjective well-being (Charles & Carstensen, 2010; Carstensen & Mikels, 2005; Reed et al., 2014).

Personality differences. Individual differences in personality traits may also moderate the reconstructions of memories. To illustrate, participants who scored high on self-esteem measures were found to recall more positive autobiographical memories than lower

self-esteem participants (Christensen et al., 2003; see Robinson & Clore, 2002). In MCM studies, participants with high self-esteem demonstrated mood-incongruent recall, retrieving positive memories following a sad induction (Smith & Petty, 1995). Extraversion was also found to be associated with emotional memory biases, as people high in extraversion demonstrated enhanced recall of positive memories (Denkova, Dolcos, & Dolcos, 2012; Mayo, 1983), and increased mood-congruent recall for positive information (Rusting, 1999). In fact, the link between extraversion and the positivity bias is very commonsensical. Extraverts are regularly orientated toward positive experiences (Larsen & Ketelaar, 1991), and are characterized by high levels of positive affectivity (Barrett, 1997; Morrone, Depue, Scherer, & White, 2000)—a trait which is correlated with short latencies to retrieve positive autobiographical memories (MacLeod, Andersen, & Davies, 1994).

To summarize, the positive memory bias is a widespread phenomenon, with ubiquitous documentation throughout the memory literature of positive reconstructions and fading affect biases. Nonetheless, it is important to note that, as the prime goal of the self is to maintain well-being, the tendency to remember the past in an overly positive manner characterizes situations in which the emotional event was successfully coped with and no longer elicits distress. By contrast, when recalling ongoing situations with which the individual is still coping, the memory seems to be biased toward exaggerating past negativity, so as to perceive improvement over time (Levine & Safer, 2002; Ross, 1989; Wilson & Ross, 2003). To illustrate, psychotherapy patients who failed to improve well-being exaggerated their pre-therapy distress, whereas those who improved the most underestimated their pre-therapy distress (Safer & Keuler, 2002). Widows and widowers who were still mourning five years after the deaths of their spouses, exaggerated their earlier level of distress, whereas those who had succeeded to proceed with their lives under-estimated it (Safer, Bonanno, & Field, 2001).

Brain Regions Involved in the Emergence of the Bias

There is ample evidence that memories are not stored within a single region of the brain, but rather, involve a distributed network of activations, mainly in the prefrontal cortex, the amygdala, and sensory cortices within the occipital and temporal lobes, with the hippocampus serving as the system's "hub" (see Cabeza & St. Jacques, 2007; Josselyn et al., 2015; Moscovitch et al., 2016).

The amygdala has been long recognized as a key element of the neural basis of emotion (Klüver & Bucy, 1939; see Cardinal, Parkinson, Hall, & Everitt, 2002; Kragel & LaBar, 2016). People with amygdala lesions show deficits in emotional learning (Bechara et al., 1995), in the perception of emotions (e.g., in facial expressions; Adolphs, Tranel, Damasio, & Damasio, 1994; Young et al., 1995), and in the memory for emotional events (Cahill, 2000). Indeed, as one of the most extensively connected subcortical regions of the brain, with links to numerous cortical and subcortical regions (Amaral, 2003; Amaral, Price, Pitkanen, & Carmichael, 1992; LeDoux, 2000), the amygdala has a significant role in all the stages of memory. Not only is the amygdala involved in the encoding (Kensinger & Corkin, 2004; Mickley, Steinmetz, & Kensinger, 2009; see Dolcos et al., 2017), and consolidation (McGaugh, 2004; McIntyre, McGaugh, & Williams, 2012) of emotional experiences, it is also a dominant player in the retrieval of emotional memories (Denkova, Dolcos, & Dolcos, 2013b; Dolcos, LaBar, & Cabeza, 2005; see Dolcos et al., 2017). Importantly, damage to the amygdala has been found to selectively impair the memory of unpleasant (but not pleasant) events. As shown by Buchanan and colleagues (Buchanan, Tranel, & Adolphs, 2005), compared to patients who suffered from damage only to the hippocampus, patients whose damage included the hippocampus and the amygdala recalled less negative pre-damage events. Moreover, these patients described pre-damage autobiographical memories in fewer negative (but not fewer positive) words, and rated their negative (but not their positive)

autobiographical memories as less intense and less vivid. The authors suggested that due to its involvement in the neural circuitry necessary for the vivid recollection of unpleasant emotional events, the amygdala contributes to the emergence of positive memory biases (Buchanan et al., 2005).

In addition to the large focus on the amygdala's involvement in emotional autobiographical memories, intriguing findings have associated the activation of distinct brain regions with the valence of memories (but see Lindquist, Wager, Kober, Bliss-Moreau, & Barrett, 2012). More specifically, circuits involving temporal and posterior regions, like the amygdala, are more activated during the encoding and the recollection of negative events (as mentioned above), whereas circuits involving frontal and parietal regions, like the prefrontal cortex, are more activated during the encoding and the recollection of positive events (Denkova, Dolcos, & Dolcos, 2013a; Mickley Steinmetz, Addis, & Kensinger, 2010; Piefke, Weiss, Zilles, Markowitsch, & Fink, 2003; Ritchey, LaBar, & Cabeza, 2011; see Dolcos et al., 2017). Importantly, the prefrontal cortex is related to executive functions (Friedman, & Miyake, 2017; Shimamura, 2000), and is strongly associated with self-referential processing (Delgado et al., 2016; Roy, Shohamy, & Wager, 2012). Thus, enhanced activation of the prefrontal cortex during positive recollection may result from one employing self-referential processing modes in order to refer positive experiences to one's concept of self (Holland & Kensinger, 2010; Tsukiura & Cabeza, 2008). This suggestion supports the notion that people tend to reconstruct their autobiographical memory in a manner that enhances their positive sense of self (Conway, 2005; Greenwald, 1980; Ross, 1989). We shall next briefly review brain-activity patterns that were suggested to correspond to some of the self-protection, self-enhancement, and self-consistency techniques that we described in this chapter as resulting in positive memory biases.

Converging evidence from neuroimaging research has supported Rusting and DeHart's (2000) suggestion, according to which the MCM effect (mentioned above) arises from the mood experienced during memory retrieval activating similar brain networks that were engaged during the encoding of that memory (Rusting & DeHart, 2000). Specifically, the ease of retrieving a memory consistent with one's current mood has been associated with neural correlates within the limbic system (Buchanan, 2007; Haas & Canli, 2008). With regard to the retrieval facilitation of positive memories, enhanced activity within the anterior cingulate in response to positive mood was proposed to be involved (Lewis, Critchley, Smith, & Dolan, 2005). Interestingly, Lewis et al. (2005) further showed that regardless of retrieval success, when stimulus valence matched the state of mood at retrieval, activity was greater in regions associated with the attempt to retrieve, such as the dorsolateral prefrontal cortex. These findings support the notion that affect guides the search process for the solicited memory (Buchanan, 2007; Lewis et al., 2005). Dissociable neural activities were also found to reflect different emotion regulation strategies. For example, when encoding a negative stimulus, increased connectivity between the hippocampus and the prefrontal cortex was associated with reappraisal (Hayes et al., 2010), whereas decreased connectivity between the hippocampus and the prefrontal cortex was associated with suppression (Binder et al., 2012). These opposing neural patterns correspond to the memory enhancement and memory impairment commonly manifested following reappraisal and suppression, respectively (Ahn et al., 2015; Dillon et al., 2007; Dunn, Billotti, Murphy, & Dalgleish, 2009; Kim & Hamann, 2012; Liu, Cui, & Zhang, 2015). Furthermore, when suppressing a negative memory while it is being retrieved, inhibition of the visual cortex was exhibited, followed by inhibition of the amygdala and the hippocampus by prefrontal cortex regions (Depue, Curran, & Banich, 2007). Deliberate positive-remembrance, on the other hand, was associated with activity in the striatum (Speer, Bhanji, & Delgado, 2014), which is regularly involved in reward processing

(Delgado, Jou, LeDoux, & Phelps, 2009; Haber & Knutson, 2010; O’Doherty, 2004; Tamir & Mitchell, 2012).

Individual differences, proposed to moderate emotional memory biases, are also reflected in particular neural activations. Thus, age-by-valence interactions during encoding may underlie the positivity effect in older adults' memory (see Dolcos et al., 2017; Samanez-Larkin, & Carstensen, 2011). Specifically, studies have demonstrated that, during the encoding of negative events, older adults display reduced connectivity between the amygdala and the hippocampus, and enhanced connectivity between the amygdala and the prefrontal cortex, compared to young adults (Murty et al., 2009; St. Jacques, Dolcos, & Cabeza, 2009). During the encoding of positive events, older adults exhibit greater positive modulation of the medial temporal lobe by the PFC and an enhanced connectivity within PFC regions, compared to young adults (Addis, Leclerc, Muscatell, & Kensinger, 2010; Waring, Addis, & Kensinger, 2013). Furthermore, older adults, and not young adults, who showed greater connectivity between the amygdala and the prefrontal cortex at rest, also remembered more positive than negative stimuli in a subsequent memory recognition test (Sakaki, Nga, & Mather, 2013). Taken together, these findings corroborate with the *posterior–anterior shift in aging* model (Davis, Dennis, Daselaar, Fleck, & Cabeza, 2007), which posits among older adults there is a decline in the involvement of posterior regions compensated by greater engagement of the prefrontal cortex. In addition, these findings converge with the neural activity that characterizes the efficient emotion regulation strategies that older adults were found to employ (discussed above).

Another individual difference that we mentioned above as associated with emotional memory biases is personality. For example, extraverts' tendency to display positive memory biases (Haas, & Canli, 2008) was associated with their heightened amygdala activity during the encoding of positive information (Canli et al., 2001; Canli, Sivers, Whitfield, Gotlib, &

Gabrieli, 2002; Dolcos et al., 2017). Furthermore, high scores in extraversion are correlated with low levels of epinephrine acting upon the amygdala (Miller, Cohen, Rabin, Skoner, & Doyle, 1999), and with high levels of cortisol produced by the adrenal gland (LeBlanc & Ducharme, 2005). As stress hormones are thought to impact the consolidation of emotional memories (e.g. Bryant, McGrath, & Felmingham, 2013), the rosy memory extraverts usually pertain could also arise from their characteristic stress-induced levels of hormones (Haas, & Canli, 2008).

To summarize, numerous neuroimaging studies that have investigated interactions between cognition and affect have provided evidence for brain circuits underlying emotional memory biases, pointing to enhanced activity in the prefrontal cortex regions and reduced activity in the amygdala regions during the encoding and the retrieval of negative information as possible contributors to the formation of positive biases of memory.

Similarities and Differences between Healthy and Clinical Populations

As discussed extensively above, memory biases for positive information are prevalent in the general population. People distort their memories to form a positive view of the past, with the goals of enhancing self-evaluation and maintaining well-being. Indeed, positive correlations were found between the magnitude of the fading affect bias and the extent to which the self is more positive, stable, and secure (Ritchie, Sedikides, & Skowronski, 2016; Ritchie, Skowronski, Cadogan, & Sedikides, 2014). It should thus come as no surprise that, with regard to clinical and sub clinical populations, memory is commonly biased in the opposite direction. For example, in dysphoria, memory is commonly biased toward negative information (Gotlib et al., 2004; Koster, De Raedt, Leyman, & De Lissnyder, 2010; Matt et al., 1992; Walker, Skowronski, Gibbons, Vogl, & Thompson, 2003a). Negative memory biases are considered a hallmark feature in cognitive models of depression and posttraumatic stress disorder (LeMoult & Gotlib, 2018; Lin, Hofmann, Qian, & Li, 2015; Nolen-Hoeksema,

2000; Rubin, Berntsen, & Bohni, 2008; Schacter, 2002; Williams & Moulds, 2007; see Denkova et al., 2012). Although the findings with regard to anxiety are ambiguous and inconsistent (Mathews & MacLeod, 1994; Zlomuzica et al., 2014), increased levels of anxiety are associated with reduced affective fading for both positive and negative events (Walker, Yancu, & Skowronski, 2014). Even narcissists, although characterized by self-enhancing tendencies thought to spur positive memory reconstructions, were found to be prone to a disruption of the fading affect bias, manifesting the fading of positive affect instead of negative affect (Ritchie, Walker, Marsh, Hart, & Skowronski, 2015). Finally, with regard to the manic disorder, one would expect this illness to be associated with a positively biased memory. After all, according to the DSM-5 (American Psychiatric Association, 2013), mania is characterized by states of abnormal elevated moods. Indeed, previous studies have shown positive attention biases among bipolar patients in manic episodes (Elliott et al., 2004; Murphy et al., 1999). Yet, in the few studies that have examined positive memories among bipolar participants, no positivity bias was apparent in either the vividness of the memories or their affective impact, compared to healthy participants (Gruber, Harvey, & Johnson, 2009; Gruber, 2011). It is important to note, though, that the bipolar participants in these studies were in a euthymic state (i.e., neither in a manic, a depressed, nor a mixed-mood state). Indeed, difficulties in examining patients during a manic state could be the reason for the dearth in empirical investigations in this area (Henry, Weingartner, & Murphy, 1971).

An exceptional disorder in this context is pathological gambling, of which cognitive biases are considered one of the foundations, with gamblers regularly manifesting superior recollection of their winning experiences than of their losing experiences (Ciccarelli, Griffiths, Nigro, & Cosenza, 2017; Goodie & Fortune, 2013; Wagenaar, 1988; see Fortune & Goodie, 2012). This may sound equivalent to people's general tendency of remembering more pleasant than unpleasant events (Walker et al., 2003b), but it seems that, in this case,

additional processes contribute to an enhancement of the positive memory bias. It has been suggested that gamblers are inclined to store their gambling memories as a string of wins and losses (Rachlin, 1990), which they tend to reassess after every win. Appearing as a vague series of losses followed by a vivid win, and in correspondence with the *peak-and-end effect*, by which the most intense or the final moments of an experience disproportionately bias recall (Fredrickson, 2000), the string may be misinterpreted as a representation of success. In addition to this memory storage deficit, pathological gamblers tend to apply common heuristics to a greater extent than the normal population. To illustrate, basing win probabilities on the ease of retrieving winning events from memory (the *availability heuristic*; Tversky & Kahneman, 1973), may be not only inappropriate to apply in chance events such as gambling (Baboushkin, Haroon, Derevensky, & Gupta, 2001), but may also be based on an initial misperception of the recalled gambling episodes as success representatives (Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997). In fact, considering the *consistency with expectation* technique (mentioned above, Holland & Kensinger, 2010; Levine & Safer, 2002), the mere anticipation for a positive experience such as a win, could perhaps in itself positively bias the memory of the gambling strings, which might keep gamblers captured in a cognitive loop. Indeed, the degree of a gambler's optimism was found to be positively related to the degree to which the gambler overestimated the success of past gambling experiences (Gibson & Sanbonmatsu, 2004).

Another maladaptive behavior that is strongly related to positive memory biases is alcoholism. As previously discussed, having emotions associated with negative events fading from memory faster than emotions associated with positive events, the fading affect bias clearly serves to improve one's well-being (Walker et al., 2003b). Nonetheless, because just like for any other event, negative emotions associated with drinking episodes (e.g., hangovers, violence, arguments) quickly fade too, the fading affect bias may also serve to encourage

future alcohol consumption or even alcohol abuse. Indeed, Gibbons and colleagues (2013) found that alcoholism is a variable that may moderate positive memory biases. Whereas participants who consume alcohol at low levels demonstrated a greater fading affect bias for ordinary past events than for past drinking events, heavy alcohol consumers showed the opposite pattern, with a greater fading affect bias for drinking events than for events not involving alcohol. The authors suggested that for low-frequency drinkers, an alcohol event is so exceptional that the negative emotions associated with it may be retained for a while and eventually fade nearly at the same rate as the positive emotions associated with that episode. For heavy consumers, on the other hand, drinking episodes regularly serve to abolish unpleasant feelings (Labouvie & Bates, 2002), thus the negative emotions associated with alcohol events fade even more quickly, resulting in a larger positive memory bias than the regular one characterizing daily-non-alcohol events.

To summarize, given their strong association with well-being, positive memory biases are most prevalent in the general population. By contrast, within clinical populations, for whom well-being is frequently impaired, distortions of memory toward a positive direction are found in a very limited number of disorders (such as pathological gambling and alcoholism).

Summary, Limitations, and Future Directions

In the current chapter, we reviewed the mechanisms that underlie the prevalent phenomenon of positivity bias in memory. We described how by means of self-protecting, self-enhancing, and preserving self-consistency, people's recollections frequently depict a much rosier past than it really was. Thus, with the prime goal of maintaining well-being, and attuned by individual differences, people turn to social support, selectively recount only the positive aspects of experiences, reappraise negative situations, subjectively distance themselves from unflattering events, and even turn to current feelings or prior expectations in

order to reconstruct the memories of past events and of their affiliated emotions (McFarland & Ross, 1987; Ross & Wilson, 2002; Rusting & DeHart, 2000; Safer et al., 2002; Skowronski et al., 2004). It goes without saying that, as autobiographical memory plays an important role in the construction of personal-identity (Wilson & Ross, 2003), the memory advantage for positive information is especially strong when the information is self-relevant (Holland & Kensinger, 2010).

As we mentioned before, memory biases for positive information were mostly exhibited in the context of autobiographical memory (Kensinger & Schacter, 2008), which is unique by its nature, exceptional, and often unverifiable. Because the conditions driving distortions of autobiographical content are difficult to manipulate or control in experimental settings (Baird et al., 2008), various paradigms (e.g., cue-word, mood-induction, and diary paradigms) were designed in an attempt to deal with possible artifacts. In addition, findings from studies that have integrated neuroimaging with behavioral methods revealed the neural networks (mainly those including the prefrontal cortex and the amygdala) involved in the positivity bias of memory. We are certain that this avenue of research will continue to flourish in the future and will contribute additional important insights.

Another avenue of research that we hope will advance in the near future is the validation of the emotional change associated with positive memory biases using physiological measures of arousal (e.g., GSR), in addition to the self-report data and brain correlates of valence. This line of research is suitable for examining events experienced in the laboratory, regarding which such somatovisceral responses can be collected both at encoding and at retrieval (in contrast to spontaneous autobiographical events experienced outside the lab that allow the collection of somatovisceral responses only at retrieval). In fact, in a research project currently conducted in our lab (Adler & Pansky, in preparation), we are

taking this approach in our investigation of the emotional attenuation involved in recounting a negative memory compared to retrieving it covertly, or not retrieving it at all.

The emphasis on one's well-being as an adaptive motivational engine that directs the reconstruction of memories, and the rarity of positive biases within clinical populations, directly concerns the growing field of positive psychology. Positive psychology, which concentrates on one's well-being instead of on illness, aims for understanding and fostering the factors that allow the individual to flourish (Seligman & Csikszentmihalyi, 2000). Toward these aims, positive psychology theoreticians have developed various interventions in which people can intentionally engage and thereby enhance their positive emotions (Duckworth et al., 2005; Seligman et al., 2005). One of these elevating activities is retrieving positive memories. To illustrate, in one study, in contrast to participants who were asked to recall their memories every night for one week with no specific instructions, participants who were asked to recall positive episodes that had occurred to them on the same day, were found to be happier and less depressed at one-month, three-month, and six-month follow-ups, compared to how they had felt before the retrieval exercise (Seligman et al., 2005). Considering the previously discussed effect of strengthening certain memory traces through rehearsal, it would be of great interest to examine whether positive memory biases contribute to the improvement in well-being that was apparent following positive-psychology interventions.

In fact, by virtue of modern technology, people today are commonly engaged in intentional positive reminiscence. For example, in their study, Good and colleagues (Good, Ancient, Postolache, Socianu, & Afghan, 2013) demonstrated that, among Facebook activities, looking back on one's photos and wall posts are the most frequent and have the strongest mood-improving influence, compared to updating status, using messenger, or even playing games. Indeed, since mobile phones have become so widespread, people are constantly documenting their feelings, thoughts, and photos of their experiences. When

reviewed at a later point in time or shared via social networks, these posted texts and photo collections could be an effective means by which to support reminiscing. Yet, an asymmetry was found with regard to the valence of the content that people are inclined to capture and post, with a positive-content predominance. For example, on Facebook, positive posts are twice more frequent than negative posts (Kramer, Guillory, & Hancock, 2014). On Twitter, positive emojis are used three times more often than negative emojis (Novak, Smailović, Sluban, & Mozetič, 2015). Positive posts are also retweeted more often than the negative ones (Gruzd, Doiron, & Mai, 2011). Research has also revealed that people are inclined to post especially attractive versions of themselves by selecting photos in which they think they look good or are having fun (Siibak, 2009; Strano, 2008). This should come as no surprise, as Spence and Holland (1991) have long noted that family albums have a strong bias towards conveying an overly positive impression of family life, showing its members at happy times (Frohlich, Kuchinsky, Pering, Don, & Ariss, 2002). Undoubtedly, this selective documenting and posting, alongside the social support that social-networks bring about, resemble the aforementioned recounting techniques that people regularly employ. Thus, considering the previously discussed findings with respect to social disclosure (Roediger & Karpicke, 2006; Skowronski & Walker, 2004; Tversky & Marsh, 2000), together with the fact that archived content may stabilize memory in the manner in which it was posted, there is reason to expect that, paradoxically, despite the veracity that is attributed to documentation, it will eventually result in a positive bias of memory. Furthermore, as correlations between posting positive content and well-being were found (Kramer, 2010; Schwartz et al., 2016), it would be interesting to examine whether the positivity bias in memory plays a mediating role in the relationship between documentation and well-being. Given the immense and ever-growing involvement of social media in today's (and tomorrow's) world, we believe that this type of research has a huge potential for yielding both theoretical and applied contributions.

To conclude, and as Bernstein and Loftus (2009) have stated, given that they are based on inherently reconstructive processes, all of our memories are, in essence, false to some degree. Indeed, positive biases in recollections are extremely prevalent. Given that the main mechanisms that underlie these biases are self-protection, self-enhancement, and self-consistency, the common human tendency to view life through rosy glasses mainly reflects an adaptive feature—an indicator of psychological health and well-being.

References

- Addis, D. R., Leclerc, C. M., Muscatell, K. A., & Kensinger, E. A. (2010). There are age-related changes in neural connectivity during the encoding of positive, but not negative, information. *Cortex*, *46*, 425-433.
- Adolphs, R., Tranel, D., Damasio, H., & Damasio, A. (1994). Impaired recognition of emotion in facial expressions following bilateral damage to the human amygdala. *Nature*, *372*, 669-672.
- Ahn, H. M., Kim, S. A., Hwang, I. J., Jeong, J. W., Kim, H. T., Hamann, S., & Kim, S. H. (2015). The effect of cognitive reappraisal on long-term emotional experience and emotional memory. *Journal of Neuropsychology*, *9*, 64-76.
- Alba, J. W., & Hasher, L. (1983). Is memory schematic? *Psychological Bulletin*, *93*, 203-231.
- Alicke, M. D., & Govorun, O. (2005). The better-than-average effect. *The Self in Social Judgment*, *1*, 85-106.
- Alicke, M. D., & Sedikides, C. (2009). Self-enhancement and self-protection: What they are and what they do. *European Review of Social Psychology*, *20*, 1-48.
- Amaral, D. G. (2003). The amygdala, social behavior, and danger detection. *Annals of the New York Academy of Sciences*, *1000*, 337-347.
- Amaral, D. G., Price, J. L., Pitkänen, A., & Carmichael, S. (1992). Anatomical organization of the primate amygdaloid complex. In J. P. Aggleton (Ed.), *The amygdala: Neurobiological aspects of emotion, memory, and mental dysfunction*. (pp. 1-66). New York: Wiley-Liss.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.
- Anderson, C. A. (1983). Imagination and expectation: The effect of imagining behavioral scripts on personal influences. *Journal of Personality and Social Psychology*, *45*, 293-305.

- Anderson, R. C., & Pichert, J. W. (1978). Recall of previously unrecalable information following a shift in perspective. *Journal of Verbal Learning and Verbal Behavior*, *17*, 1-12.
- Baboushkin, H. R., Hardoon, K. K., Derevensky, J. L., & Gupta, R. (2001). Underlying cognitions in gambling behavior among university students. *Journal of Applied Social Psychology*, *31*, 1409-1430.
- Bahrnick, H. P., Hall, L. K., & Berger, S. A. (1996). Accuracy and distortion in memory for high school grades. *Psychological Science*, *7*, 265-271.
- Bahrnick, H. P., Hall, L. K., & Da Costa, L. A. (2008). Fifty years of memory of college grades: Accuracy and distortions. *Emotion*, *8*, 13-22.
- Barclay, C. R., & Wellman, H. M. (1986). Accuracies and inaccuracies in autobiographical memories. *Journal of Memory and Language*, *25*, 93-103.
- Barrett, L. F. (1997). The relationships among momentary emotion experiences, personality descriptions, and retrospective ratings of emotion. *Personality and Social Psychology Bulletin*, *23*, 1100-1110.
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, *5*, 323-370.
- Baumeister, R. F., & Leary, M. R. (2017). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. In B. Laursen & R. Zukauskienė (Eds.), *Interpersonal Development* (pp. 57-89). London: Routledge.
- Bechara, A., Tranel, D., Damasio, H., Adolphs, R., Rockland, C., & Damasio, A. R. (1995). Double dissociation of conditioning and declarative knowledge relative to the amygdala and hippocampus in humans. *Science*, *269*, 1115-1118.

- Berntsen, D. (2002). Tunnel memories for autobiographical events: Central details are remembered more frequently from shocking than from happy experiences. *Memory & Cognition*, *30*, 1010-1020.
- Berntsen, D., & Rubin, D. C. (2002). Emotionally charged autobiographical memories across the life span: The recall of happy, sad, traumatic and involuntary memories. *Psychology and Aging*, *17*, 636-652.
- Bernstein, D. M., & Loftus, E. F. (2009). How to tell if a particular memory is true or false. *Perspectives on Psychological Science*, *4*, 370-374.
- Binder, J., Dominique, J. F., Friese, M., Luechinger, R., Boesiger, P., & Rasch, B. (2012). Emotion suppression reduces hippocampal activity during successful memory encoding. *Neuroimage*, *63*, 525-532.
- Blaney, P. H. (1986). Affect and memory: A review. *Psychological Bulletin*, *99*, 229-246.
- Bohanek, J. G., Fivush, R., & Walker, E. (2005). Memories of positive and negative emotional events. *Applied Cognitive Psychology*, *19*, 51-66.
- Bonnici, H. M., & Maguire, E. A. (2018). Two years later—Revisiting autobiographical memory representations in vmPFC and hippocampus. *Neuropsychologia*, *110*, 159-169.
- Bower, G. H. (1981). Mood and memory. *American psychologist*, *36*, 129-148.
- Brewer, W. F. (1996). What is recollective memory? In D. C. Rubin (Ed.), *Remembering our past: Studies in autobiographical memory* (pp. 19— 66). Cambridge, England: Cambridge University Press.
- Brewin, C. R., Andrews, B., & Gotlib, I. H. (1993). Psychopathology and early experience: a reappraisal of retrospective reports. *Psychological Bulletin*, *113*, 82-98.
- Brown, R., & Kulik, J. (1977). Flashbulb memories. *Cognition*, *5*, 73-99.
- Bryant, R. A., McGrath, C., & Felmingham, K. L. (2013). The roles of noradrenergic and glucocorticoid activation in the development of intrusive memories. *PLoS One*, *8*, e62675.

- Buchanan, T. W. (2007). Retrieval of emotional memories. *Psychological Bulletin*, *133*, 761-779.
- Buchanan, T. W., Tranel, D., & Adolphs, R. (2005). Emotional autobiographical memories in amnesic patients with medial temporal lobe damage. *Journal of Neuroscience*, *25*, 3151-3160.
- Burt, C. D., Kemp, S., & Conway, M. A. (2003). Themes, events, and episodes in autobiographical memory. *Memory & Cognition*, *31*, 317-325.
- Burton, C. M., & King, L. A. (2004). The health benefits of writing about intensely positive experiences. *Journal of Research in Personality*, *38*, 150-163.
- Cabeza, R., & St Jacques, P. (2007). Functional neuroimaging of autobiographical memory. *Trends in Cognitive Sciences*, *11*, 219-227.
- Cahill, L. (2000). Emotional modulation of long-term memory storage in humans: Adrenergic activation and the amygdala. In J. Aggleton (Ed.), *The amygdala: A functional analysis*, (pp. 425–445). New York: Oxford University Press.
- Canli, T., Sivers, H., Whitfield, S. L., Gotlib, I. H., & Gabrieli, J. D. (2002). Amygdala response to happy faces as a function of extraversion. *Science*, *296*, 2191.
- Canli, T., Zhao, Z., Desmond, J. E., Kang, E., Gross, J., & Gabrieli, J. D. E. (2001). An fMRI study of personality influences on brain reactivity to emotional stimuli. *Behavioral Neuroscience*, *115*, 33–42.
- Cardinal, R. N., Parkinson, J. A., Hall, J., & Everitt, B. J. (2002). Emotion and motivation: the role of the amygdala, ventral striatum, and prefrontal cortex. *Neuroscience & Biobehavioral Reviews*, *26*, 321-352.
- Carstensen, L. L., Isaacowitz, D. M., & Charles, S. T. (1999). Taking time seriously: A theory of socioemotional selectivity. *American Psychologist*, *54*, 165-181.

- Carstensen, L. L., & Mikels, J. A. (2005). At the intersection of emotion and cognition: Aging and the positivity effect. *Current Directions in Psychological Science, 14*, 117-121.
- Carstensen, L. L., Pasupathi, M., Mayr, U., & Nesselroade, J. R. (2000). Emotional experience in everyday life across the adult life span. *Journal of Personality and Social Psychology, 79*, 644-655.
- Charles, S. T., & Carstensen, L. L. (2010). Social and emotional aging. *Annual Review of Psychology, 61*, 383-409.
- Charles, S. T., Mather, M., & Carstensen, L. L. (2003). Aging and emotional memory: the forgettable nature of negative images for older adults. *Journal of Experimental Psychology: General, 132*, 310-324.
- Christensen, T. C., Wood, J. V., & Barrett, L. F. (2003). Remembering everyday experience through the prism of self-esteem. *Personality and Social Psychology Bulletin, 29*, 51-62.
- Ciccarelli, M., Griffiths, M. D., Nigro, G., & Cosenza, M. (2017). Decision making, cognitive distortions and emotional distress: a comparison between pathological gamblers and healthy controls. *Journal of Behavior Therapy and Experimental Psychiatry, 54*, 204-210.
- Clore, G. L., Wyer, R. S., Dienes, B., Gasper, K., Gohm, C. & Isbell, L. (2001). Affective feelings as feedback: Some cognitive consequences. In L. L. Martin & G. L. Clore (Eds.), *Theories of mood and cognition: A user's handbook* (pp. 27-62). Mahwah, NJ: Erlbaum.
- Comblain, C., D'Argembeau, A., & Van der Linden, M. (2005). Phenomenal characteristics of autobiographical memories for emotional and neutral events in older and younger adults. *Experimental Aging Research, 31*, 173-189.
- Conway, M. A. (2005). Memory and the self. *Journal of Memory and Language, 53*, 594-628.
- Crovitz, H. F., & Schiffman, H. (1974). Frequency of episodic memories as a function of their age. *Bulletin of the Psychonomic Society, 4*, 517-518.

- Croyle, R. T., Loftus, E. F., Barger, S. D., Sun, Y. C., Hart, M., & Gettig, J. (2006). How well do people recall risk factor test results? Accuracy and bias among cholesterol screening participants. *Health Psychology, 25*, 425-432.
- D'Argembeau, A., Renaud, O., & Van der Linden, M. (2011). Frequency, characteristics and functions of future-oriented thoughts in daily life. *Applied Cognitive Psychology, 25*, 96–103.
- D'Argembeau, A., & Van der Linden, M. (2004). Phenomenal characteristics associated with projecting oneself back into the past and forward into the future: Influence of valence and temporal distance. *Consciousness and Cognition, 13*, 844–858.
- D'Argembeau, A., & Van der Linden, M. (2008). Remembering pride and shame: Self-enhancement and the phenomenology of autobiographical memory. *Memory, 16*, 538–547.
- Davidson, R. J. (2004). Well-being and affective style: Neural substrates and biobehavioural correlates. *Philosophical Transactions of the Royal Society of London. Series B: Biological Sciences, 359*, 1395–1411.
- Davis, S. W., Dennis, N. A., Daselaar, S. M., Fleck, M. S., & Cabeza, R. (2007). Que PASA? The posterior–anterior shift in aging. *Cerebral Cortex, 18*, 1201-1209.
- Delgado, M. R., Beer, J. S., Fellows, L. K., Huettel, S. A., Platt, M. L., Quirk, G. J., & Schiller, D. (2016). Viewpoints: dialogues on the functional role of the ventromedial prefrontal cortex. *Nature Neuroscience, 19*, 1545–1552.
- Delgado, M. R., Jou, R. L., LeDoux, J., & Phelps, L. (2009). Avoiding negative outcomes: tracking the mechanisms of avoidance learning in humans during fear conditioning. *Frontiers in Behavioral Neuroscience, 3*, 33.
- Denkova, E., Dolcos, S., & Dolcos, F. (2012). Reliving emotional personal memories: Affective biases linked to personality and sex-related differences. *Emotion, 12*, 515-528.

- Denkova, E., Dolcos, S., & Dolcos, F. (2013a). The effect of retrieval focus and emotional valence on the inferior frontal cortex activity during autobiographical recollection. *Frontiers in behavioral neuroscience*, 7, 192.
- Denkova, E., Dolcos, S., & Dolcos, F. (2013b). The effect of retrieval focus and emotional valence on the medial temporal lobe activity during autobiographical recollection. *Frontiers in Behavioral Neuroscience*, 7, 109.
- Depue, B. E., Curran, T., & Banich, M. T. (2007). Prefrontal regions orchestrate suppression of emotional memories via a two-phase process. *Science*, 317, 215-219.
- de Vito, S., Neroni, M. A., Gamboz, N., Della Sala, S., & Brandimonte, M. A. (2015). Desirable and undesirable future thoughts call for different scene construction processes. *The Quarterly Journal of Experimental Psychology*, 68, 75–82.
- Devitt, A. L., & Schacter, D. L. (2018). An Optimistic Outlook Creates a Rosy Past: The Impact of Episodic Simulation on Subsequent Memory. *Psychological Science*, 29, 936-946.
- Dillon, D. G., Ritchey, M., Johnson, B. D., & LaBar, K. S. (2007). Dissociable effects of conscious emotion regulation strategies on explicit and implicit memory. *Emotion*, 7, 354–365.
- Dolcos, F., Katsumi, Y., Weymar, M., Moore, M., Tsukiura, T., & Dolcos, S. (2017). Emerging directions in emotional episodic memory. *Frontiers in psychology*, 8, 1867.
- Dolcos, F., LaBar, K. S., & Cabeza, R. (2005). Remembering one year later: role of the amygdala and the medial temporal lobe memory system in retrieving emotional memories. *Proceedings of the National Academy of Sciences*, 102, 2626-2631.
- Dricu, M., Kress, L., & Aue, T. (2019). Positive expectancy biases. In T. Aue & H. Okon-Singer (Eds.), *Cognitive Biases in Health and Psychiatric Disorders* (pp. ??-??). ???: Elsevier.

- Duckworth, A. L., Steen, T.A., & Seligman, M.E.P. (2005). Positive psychology in clinical practice. *Annual Review of Clinical Psychology, 1*, 629–651.
- Dunn, B. D., Billotti, D., Murphy, V., & Dalgleish, T. (2009). The consequences of effortful emotion regulation when processing distressing material: A comparison of suppression and acceptance. *Behavior Research and Therapy, 47*, 761-773.
- Eich, E., Macaulay, D., & Ryan, L. (1994). Mood dependent memory for events of the personal past. *Journal of Experimental Psychology: General, 123*, 201-215.
- Elliott, R., Ogilvie, A., Rubinsztein, J. S., Calderon, G., Dolan, R. J., & Sahakian, B. J. (2004). Abnormal ventral frontal response during performance of an affective go/no go task in patients with mania. *Biological Psychiatry, 55*, 1163-1170.
- Fernandes, M., Ross, M., Wiegand, M., & Schryer, E. (2008). Are the memories of older adults positively biased?. *Psychology and Aging, 23*, 297-306.
- Fiedler, K. (2001). Affective states trigger processes of assimilation and accommodation. In L. L. Martin & G. L. Clore (Eds.), *Theories of mood and cognition: A user's guidebook* (pp. 85-98). Mahwah, NJ: Erlbaum.
- Fitzgerald, D. A., Arnold, J. F., Becker, E. S., Speckens, A. E., Rinck, M., Rijpkema, M., Fernández, G., & Tendolkar, I. (2011). How mood challenges emotional memory formation: an fMRI investigation. *Neuroimage, 56*, 1783-1790.
- Folkman, S., Lazarus, R. S., Pimley, S., & Novacek, J. (1987). Age differences in stress and coping processes. *Psychology and Aging, 2*, 171-184.
- Forgas, J. P. (1995). Mood and judgment: the affect infusion model (AIM). *Psychological Bulletin, 117*, 39-66.
- Fortune, E. E., & Goodie, A. S. (2012). Cognitive distortions as a component and treatment focus of pathological gambling: a review. *Psychology of Addictive Behaviors, 26*, 298-310.

- Fredrickson, B. L. (2000). Extracting meaning from past affective experiences: The importance of peaks, ends, and specific emotions. *Cognition and Emotion, 14*, 577-606.
- Freud, S. (1915). Repression. *Standard Edition, 14*, 141-158. London: Hogarth Press. 1957.
- Friedman, N. P., & Miyake, A. (2017). Unity and diversity of executive functions: Individual differences as a window on cognitive structure. *Cortex, 86*, 186-204.
- Frohlich, D., Kuchinsky, A., Pering, C., Don, A., & Ariss, S. (2002). Requirements for photoware. In *Proceedings of the 2002 ACM conference on Computer supported cooperative work* (pp. 166-175). New York: ACM Press.
- Galton, F. (1879). Psychometric experiments. *Brain, 2*, 149-162.
- Gibbons, J. A., Toscano, A., Kofron, S., Rothwell, C., Lee, S. A., Ritchie, T. D., & Walker, W. R. (2013). The fading affect bias across alcohol consumption frequency for alcohol-related and non-alcohol-related events. *Consciousness and Cognition, 22*, 1340-1351.
- Gibson, B., & Sanbonmatsu, D. M. (2004). Optimism, pessimism, and gambling: The downside of optimism. *Personality and Social Psychology Bulletin, 30*, 149-160.
- Good, A., Ancient, C., Postolache, G., Socianu, A., & Afghan, A. (2013). Self-soothing by reviewing favorite memories: an exploration of mobile application prototypes, which facilitate positive wellbeing via reminiscing. In *International Conference on Human-Computer Interaction* (pp. 417-421). Heidelberg: Springer.
- Goodie, A. S., & Fortune, E. E. (2013). Measuring cognitive distortions in pathological gambling: Review and meta-analyses. *Psychology of Addictive Behaviors, 27*, 730-743.
- Gotlib, I. H., Kasch, K. L., Traill, S., Joormann, J., Arnow, B. A., & Johnson, S. L. (2004). Coherence and specificity of information-processing biases in depression and social phobia. *Journal of Abnormal Psychology, 113*, 386-398.

- Green, J. D., Pinter, B., & Sedikides, C. (2005). Mnemic neglect and self-threat: Trait modifiability moderates self-protection. *European Journal of Social Psychology, 35*, 225-235.
- Greenwald, A. G. (1980). The totalitarian ego: Fabrication and revision of personal history. *American Psychologist, 35*, 603-618.
- Gross, J. J. (1998). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74*, 224-237.
- Gruber, J. (2011). Can feeling too good be bad? Positive emotion persistence (PEP) in bipolar disorder. *Current Directions in Psychological Science, 20*, 217-221.
- Gruber, J., Harvey, A. G., & Johnson, S. L. (2009). Reflective and ruminative processing of positive emotional memories in bipolar disorder and healthy controls. *Behaviour Research and Therapy, 47*, 697-704.
- Gruzd, A., Doiron, S., & Mai, P. (2011). Is happiness contagious online? A case of Twitter and the 2010 Winter Olympics. In *Hawaii International Conference on System Sciences*, (pp. 1-9).
- Haas, B. W., & Canli, T. (2008). Emotional memory function, personality structure and psychopathology: a neural system approach to the identification of vulnerability markers. *Brain Research Reviews, 58*, 71-84.
- Haber, S. N., & Knutson, B. (2010). The reward circuit: linking primate anatomy and human imaging. *Neuropsychopharmacology, 35*, 4-26.
- Hayes, J. P., Morey, R. A., Petty, C. M., Seth, S., Smoski, M. J., McCarthy, G., & LaBar, K. S. (2010). Staying cool when things get hot: Emotion regulation modulates neural mechanisms of memory encoding. *Frontiers in Human Neuroscience, 4*, 230.

- Holland, A. C., & Kensinger, E. A. (2010). Emotion and autobiographical memory. *Physics of Life Reviews*, 7, 88-131.
- Holland, A. C., Tamir, M., & Kensinger, E. A. (2010). The effect of regulation goals on emotional event-specific knowledge. *Memory*, 18, 504-521.
- Henry, G. M., Weingartner, H., & Murphy, D. L. (1971). Idiosyncratic patterns of learning and word association during mania. *American Journal of Psychiatry*, 128, 564-574.
- Isen, A. M. (1985). Asymmetry of happiness and sadness in effects on memory in normal college students. *Journal of Experimental Psychology: General*, 114, 388-391.
- Isen, A. M. (1987). Positive affect, cognitive processes, and social behavior. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 203-253). New York: Academic Press.
- Joormann, J., & Siemer, M. (2004). Memory accessibility, mood regulation, and dysphoria: Difficulties in repairing sad mood with happy memories?. *Journal of Abnormal Psychology*, 113, 179-188.
- Josselyn, S. A., Köhler, S., & Frankland, P. W. (2015). Finding the engram. *Nature Reviews Neuroscience*, 16, 521-534.
- Kaplan, R. L., Levine, L. J., Lench, H. C., & Safer, M. A. (2016). Forgetting feelings: Opposite biases in reports of the intensity of past emotion and mood. *Emotion*, 16, 309-319.
- Kemp, S., Burt, C. D., & Furneaux, L. (2008). A test of the peak-end rule with extended autobiographical events. *Memory & Cognition*, 36, 132-138.
- Kennedy, Q., Mather, M., & Carstensen, L. L. (2004). The role of motivation in the age-related positivity effect in autobiographical memory. *Psychological Science*, 15, 208-214.

- Kensinger, E. A., & Corkin, S. (2004). Two routes to emotional memory: Distinct neural processes for valence and arousal. *Proceedings of the National Academy of Sciences, 101*, 3310-3315.
- Kensinger, E. A., & Schacter, D. L. (2008). Memory and emotion. In M. Lewis, J. M. Haviland-Jones, & L. F. Barrett (Eds.), *Handbook of emotions* (pp. 601-617). New York: Guilford Press.
- Kim, S. H., & Hamann, S. (2012). The effect of cognitive reappraisal on physiological reactivity and emotional memory. *International Journal of Psychophysiology, 83*, 348-356.
- Klüver, H., & Bucy, P. C. (1939). Preliminary analysis of functions of the temporal lobes in monkeys. *Archives of Neurology & Psychiatry, 42*, 979-1000.
- Koo, M., & Oishi, S. (2009). False memory and the associative network of happiness. *Personality and Social Psychology Bulletin, 35*, 212-220.
- Koster, E. H., De Raedt, R., Leyman, L., & De Lissnyder, E. (2010). Mood-congruent attention and memory bias in dysphoria: exploring the coherence among information-processing biases. *Behaviour Research and Therapy, 48*, 219-225.
- Kragel, P. A., & LaBar, K. S. (2016). Decoding the nature of emotion in the brain. *Trends in Cognitive Sciences, 20*, 444-455.
- Kramer, A. D. (2010). An unobtrusive behavioral model of gross national happiness. In *Proceedings of the 28th conference on human factors in computing systems* (pp. 287-290).
- Kramer, A. D., Guillory, J. E., & Hancock, J. T. (2014). Experimental evidence of massive-scale emotional contagion through social networks. *Proceedings of the National Academy of Sciences, 111*, 8788-8790.
- Labouvie, E., & Bates, M. E. (2002). Reasons for alcohol use in young adulthood: validation of a three-dimensional measure. *Journal of Studies on Alcohol, 63*, 145-155.

- Landau, J. D., & Gunter, B. C. (2009). "Don't worry; you really will get over it": Methodological investigations of the fading affect bias. *The American Journal of Psychology*, *122*, 209-217.
- Lane, R. D., Ryan, L., Nadel, L., & Greenberg, L. (2015). Memory reconsolidation, emotional arousal, and the process of change in psychotherapy: New insights from brain science. *Behavioral and Brain Sciences*, *38*, 1-64.
- Larsen, R. J., & Ketelaar, T. (1991). Personality and susceptibility to positive and negative emotional states. *Journal of Personality and Social Psychology*, *61*, 132–140.
- Leary, M. R., & Kowalski, R. M. (1990). Impression management: A literature review and two-component model. *Psychological Bulletin*, *107*, 34-47.
- LeBlanc, J., & Ducharme, M. B. (2005). Influence of personality traits on plasma levels of cortisol and cholesterol. *Physiology & Behavior*, *84*, 677-680.
- LeDoux, J. E. (2000). Emotion circuits in the brain. *Annual Review of Neuroscience*, *23*, 155-184.
- LeMoult, J., & Gotlib, I. H. (2018). Depression: a cognitive perspective. *Clinical Psychology Review*.
- Levine, L. J. (1997). Reconstructing memory for emotions. *Journal of Experimental Psychology: General*, *126*, 165-177.
- Levine, L. J., & Bluck, S. (1997). Experienced and remembered emotional intensity in older adults. *Psychology and Aging*, *12*, 514-523.
- Levine, L. J., & Bluck, S. (2004). Painting with broad strokes: Happiness and the malleability of event memory. *Cognition and Emotion*, *18*, 559-574.
- Levine, L. J., Lench, H. C., & Safer, M. A. (2009). Functions of remembering and misremembering emotion. *Applied Cognitive Psychology*, *23*, 1059-1075.

- Levine, L. J., & Pizarro, D. A. (2004). Emotion and memory research: A grumpy overview. *Social Cognition, 22*, 530-554.
- Levine, L. J., & Safer, M. A. (2002). Sources of bias in memory for emotions. *Current Directions in Psychological Science, 11*, 169-173.
- Levine, L. J., Safer, M. A., & Lench, H. C. (2006). Remembering and misremembering emotions. In L. J. Sanna & E. C. Chang (Eds.), *Judgments over time: The interplay of thoughts, feelings, and behaviors* (pp. 271-290). New York: Oxford University Press
- Levine, L. J., Schmidt, S., Kang, H. S., & Tinti, C. (2012). Remembering the silver lining: Reappraisal and positive bias in memory for emotion. *Cognition and Emotion, 26*, 871-884.
- Levine, B., Svoboda, E., Hay, J. F., Winocur, G., & Moscovitch, M. (2002). Aging and autobiographical memory: dissociating episodic from semantic retrieval. *Psychology and Aging, 17*, 677-689.
- Lewis, P. A., Critchley, H. D., Smith, A. P., & Dolan, R. J. (2005). Brain mechanisms for mood congruent memory facilitation. *Neuroimage, 25*, 1214-1223.
- Libby, L. K., & Eibach, R. P. (2007). How the self affects and reflects the content and subjective experience of autobiographical memory. In C. Sedikides & S. Spencer (Eds.), *The self* (pp. 75-91). New York: Psychology Press.
- Lin, M., Hofmann, S. G., Qian, M., & Li, S. (2015). Enhanced association between perceptual stimuli and trauma-related information in individuals with posttraumatic stress disorder symptoms. *Journal of Behavior Therapy and Experimental Psychiatry, 46*, 202-207.
- Lindquist, K. A., Wager, T. D., Kober, H., Bliss-Moreau, E., & Barrett, L. F. (2012). The brain basis of emotion: a meta-analytic review. *Behavioral and Brain Sciences, 35*, 121-143.

- Liu, F., Cui, L., & Zhang, Q. (2015). The influences of reappraisal and suppression instructions on memory for neutral words in negative background. *Neuroreport*, *26*, 1023-1031.
- Lloyd, G. G., & Lishman, W. A. (1975). Effect of depression on the speed of recall of pleasant and unpleasant experiences. *Psychological Medicine*, *5*, 173-180.
- Loftus, E. F. (1982). Memory and its distortions. In A. G. Kraut (Ed.), *The G. Stanley Hall lecture series* (pp. 123–154). Washington, DC: American Psychological Association.
- Loftus, E. F. (2003). Make-believe memories. *American Psychologist*, *58*, 867-873.
- Lyubomirsky, S., Sheldon, K. M., & Schkade, D. (2005). Pursuing happiness: the architecture of sustainable change. *Review of General Psychology*, *9*, 111-131.
- Macleod, A. K., Andersen, A., & Davies, A. (1994). Self-ratings of positive and negative affect and retrieval of positive and negative affect memories. *Cognition and Emotion*, *8*, 483-488.
- Madigan, R. J., & Bollenbach, A. K. (1982). Effects of induced mood on retrieval of personal episodic and semantic memories. *Psychological Reports*, *50*, 147-157.
- Markus, H. R., & Kitayama, S. (1994). A collective fear of the collective: Implications for selves and theories of selves. *Personality and Social Psychology Bulletin*, *20*, 568-579.
- Markus, H. R., & Kitayama, S. (2010). Cultures and selves: A cycle of mutual constitution. *Perspectives on Psychological Science*, *5*, 420-430.
- Master, D., Lishman, W. A., & Smith, A. (1983). Speed of recall in relation to affective tone and intensity of experience. *Psychological Medicine*, *13*, 325-331.
- Mather, M. (2006). Why memories may become more positive as people age. In B. Uttil, N. Ohta, & A. Siegenthal (Eds.), *Memory and emotion: Interdisciplinary perspectives* (pp. 135-158). Malden, MA: Blackwell.

- Mather, M., & Carstensen, L. L. (2003). Aging and attentional biases for emotional face. *Psychological Science, 14*, 409-415.
- Mather, M., & Carstensen, L. L. (2005). Aging and motivated cognition: The positivity effect in attention and memory. *Trends in Cognitive Sciences, 9*, 496-502.
- Mather, M., Knight, M., & McCaffrey, M. (2005). The allure of the alignable: younger and older adults' false memories of choice features. *Journal of Experimental Psychology: General, 134*, 38-51.
- Mathews, A., & MacLeod, C. (1994). Cognitive approaches to emotion and emotional disorders. *Annual Review of Psychology, 45*, 25-50.
- Matlin, M. W., & Stang, D. J. (1978). *The Pollyanna principle: Selectivity in language, memory, and thought*. Cambridge, MA: Schenkman.
- Matt, G. E., Vázquez, C., & Campbell, W. K. (1992). Mood-congruent recall of affectively toned stimuli: A meta-analytic review. *Clinical Psychology Review, 12*, 227-255.
- Mayo, P. R. (1983). Personality traits and the retrieval of positive and negative memories. *Personality and Individual Differences, 4*, 465– 471.
- McFarland, C., & Ross, M. (1987). The relation between current impressions and memories of self and dating partners. *Personality and Social Psychology Bulletin, 13*, 228-238.
- McGaugh, J. L. (2004). The amygdala modulates the consolidation of memories of emotionally arousing experiences. *Annu. Rev. Neurosci., 27*, 1-28. McIsaac, H. K., & Eich, E. (2004). Vantage point in traumatic memory. *Psychological Science, 15*, 248-253.
- McIntyre, C. K., McGaugh, J. L., & Williams, C. L. (2012). Interacting brain systems modulate memory consolidation. *Neuroscience & Biobehavioral Reviews, 36*, 1750-1762.
- Mickley Steinmetz, K. R., Addis, D. R., and Kensinger, E. A. (2010). The effect of arousal on the emotional memory network depends on valence. *Neuroimage, 53*, 318–324.

- Mickley Steinmetz, K. R., & Kensinger, E. A. (2009). The effects of valence and arousal on the neural activity leading to subsequent memory. *Psychophysiology*, *46*, 1190-1199.
- Mill, A., Realo, A., & Allik, J. (2016). Retrospective ratings of emotions: the effects of age, daily tiredness, and personality. *Frontiers in Psychology*, *6*, 2020.
- Miller, G. E., Cohen, S., Rabin, B. S., Skoner, D., & Doyle, W. J. (1999). Personality and tonic cardiovascular, neuroendocrine, and immune parameters. *Brain, Behavior and Immunity*, *13*, 109–123.
- Miranda, R., & Kihlstrom, J. (2005). Mood congruence in childhood and recent autobiographical memory. *Cognition and Emotion*, *19*, 981-998.
- Miron-Shatz, T., Stone, A., & Kahneman, D. (2009). Memories of yesterday's emotions: Does the valence of experience affect the memory-experience gap?. *Emotion*, *9*, 885-891.
- Mitchell, T. R., Thompson, L., Peterson, E., & Cronk, R. (1997). Temporal adjustments in the evaluation of events: The “rosy view”. *Journal of Experimental Social Psychology*, *33*, 421-448.
- Morrone, J. V., Depue, R. A., Scherer, A. J., & White, T. L. (2000). Film-induced incentive motivation and positive activation in relation to agentic and affiliative components of extraversion. *Personality and Individual Differences*, *29*, 199 –216.
- Moscovitch, M., Cabeza, R., Winocur, G., & Nadel, L. (2016). Episodic memory and beyond: the hippocampus and neocortex in transformation. *Annual Review of Psychology*, *67*, 105-134.
- Murphy, F. C., Sahakian, B. J., Rubinsztein, J. S., Michael, A., Rogers, R. D., Robbins, T. W., & Paykel, E. S. (1999). Emotional bias and inhibitory control processes in mania and depression. *Psychological Medicine*, *29*, 1307-1321.
- Murty, V. P., Sambataro, F., Das, S., Tan, H. Y., Callicott, J. H., Goldberg, T. E., Meyer-Lindenberg, A., Weinberger, D. R., & Mattay, V. S. (2009). Age-related alterations in

- simple declarative memory and the effect of negative stimulus valence. *Journal of Cognitive Neuroscience*, *21*, 1920-1933.
- Natale, M., & Hantas, M. (1982). Effect of temporary mood states on selective memory about the self. *Journal of Personality and Social Psychology*, *42*, 927-934.
- Nolen-Hoeksema, S. (2000). The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. *Journal of Abnormal Psychology*, *109*, 504-511.
- Nørby, S. (2015). Why forget? On the adaptive value of memory loss. *Perspectives on Psychological Science*, *10*, 551-578.
- Novak, P. K., Smailović, J., Sluban, B., & Mozetič, I. (2015). Sentiment of emojis. *PloS one*, *10*, e0144296.
- O'Doherty, J. P. (2004). Reward representations and reward-related learning in the human brain: insights from neuroimaging. *Current Opinion in Neurobiology*, *14*, 769-776.
- Oishi, S. (2002). The experiencing and remembering of well-being: A cross-cultural analysis. *Personality and Social Psychology Bulletin*, *28*, 1398-1406.
- Oishi, S., Schimmack, U., Diener, E., Kim-Prieto, C., Scollon, C. N., & Choi, D. W. (2007). The value-congruence model of memory for emotional experiences: An explanation for cultural differences in emotional self-reports. *Journal of Personality and Social Psychology*, *93*, 897-905.
- Piefke, M., Weiss, P. H., Zilles, K., Markowitsch, H. J., & Fink, G. R. (2003). Differential remoteness and emotional tone modulate the neural correlates of autobiographical memory. *Brain*, *126*, 650-668.
- Piguet, O., Connally, E., Krendl, A. C., Huot, J. R., & Corkin, S. (2008). False memory in aging: Effects of emotional valence on word recognition accuracy. *Psychology and Aging*, *23*, 307-314.

- Pinter, B., Green, J. D., Sedikides, C., & Gregg, A. P. (2011). Self-protective memory: Separation/integration as a mechanism for mnemonic neglect. *Social Cognition, 29*, 612-624.
- Pratto, F., & John, O. P. (1991). Automatic vigilance: the attention-grabbing power of negative social information. *Journal of Personality and Social Psychology, 61*, 380.
- Rachlin, H. (1990). Why do people gamble and keep gambling despite heavy losses?. *Psychological Science, 1*, 294-297.
- Radvansky, G. A. (2017). *Human Memory*. Routledge.
- Rasmussen, A. S., & Berntsen, D. (2013). The reality of the past versus the ideality of the future: Emotional valence and functional differences between past and future mental time travel. *Memory & Cognition, 41*, 187-200.
- Rathbone, C. J., Holmes, E. A., Murphy, S. E., & Ellis, J. A. (2015). Autobiographical memory and well-being in aging: The central role of semantic self-images. *Consciousness and Cognition, 33*, 422-431.
- Reed, A. E., Chan, L., & Mikels, J. A. (2014). Meta-analysis of the age-related positivity effect: age differences in preferences for positive over negative information. *Psychology and Aging, 29*, 1-15.
- Ritchie, T. D., Batteson, T. J., Bohn, A., Crawford, M. T., Ferguson, G. V., Schrauf, R. W., Vogl, R. J., & Walker, W. R. (2015). A pancultural perspective on the fading affect bias in autobiographical memory. *Memory, 23*, 278-290.
- Richards, J. M., & Gross, J. J. (1999). Composure at any cost? The cognitive consequences of emotion suppression. *Personality and Social Psychology Bulletin, 25*, 1033-1044.
- Riskind, J. H. (1983). Nonverbal expressions and the accessibility of life experience memories: A congruence hypothesis. *Social Cognition, 2*, 62-86.

- Ritchey, M., LaBar, K. S., & Cabeza, R. (2011). Level of processing modulates the neural correlates of emotional memory formation. *Journal of Cognitive Neuroscience*, *23*, 757-771.
- Ritchie, T. D., Sedikides, C., & Skowronski, J. J. (2016). Emotions experienced at event recall and the self: Implications for the regulation of self-esteem, self-continuity and meaningfulness. *Memory*, *24*, 577-591.
- Ritchie, T. D., Sedikides, C., & Skowronski, J. J. (2017). Does a person selectively recall the good or the bad from their personal past? It depends on the recall target and the person's favourability of self-views. *Memory*, *25*, 934-944.
- Ritchie, T. D., Skowronski, J. J., Cadogan, S., & Sedikides, C. (2014). Affective responses to self-defining autobiographical events. *Self and Identity*, *13*, 513-534.
- Ritchie, T., Skowronski, J. J., Hartnett, J., Wells, B., & Walker, W. R. (2009). The fading affect bias in the context of emotion activation level, mood, and personal theories of emotion change. *Memory*, *17*, 428-444.
- Ritchie, T. D., Walker, W. R., Marsh, S., Hart, C., & Skowronski, J. J. (2015). Narcissism distorts the fading affect bias in autobiographical memory. *Applied Cognitive Psychology*, *29*, 104-114.
- Robinson, M. D., & Clore, G. L. (2002). Belief and feeling: evidence for an accessibility model of emotional self-report. *Psychological Bulletin*, *128*, 934-960.
- Roediger III, H. L., & Karpicke, J. D. (2006). Test-enhanced learning: Taking memory tests improves long-term retention. *Psychological Science*, *17*, 249-255.
- Ross, M. (1989). Relation of implicit theories to the construction of personal histories. *Psychological Review*, *96*, 341-357.

- Ross, M., Blatz, C. W., & Schryer, E. (2008). Social memory processes. In J. Byrne (Series Ed.) & H. Roediger (Vol. Ed), *Learning and memory: a comprehensive reference: Cognitive psychology of memory* (pp. 911–926). Oxford, England: Elsevier.
- Ross, M., Heine, S. J., Wilson, A. E., & Sugimori, S. (2005). Cross-cultural discrepancies in self-appraisals. *Personality and Social Psychology Bulletin, 31*, 1175-1188.
- Ross, M., & Wilson, A. E. (2002). It feels like yesterday: Self-esteem, valence of personal past experiences, and judgments of subjective distance. *Journal of Personality and Social Psychology, 82*, 792-803.
- Ross, M., & Wilson, A. E. (2003). Autobiographical memory and conceptions of self: Getting better all the time. *Current Directions in Psychological Science, 12*, 66-69.
- Roy, M., Shohamy, D., & Wager, T. D. (2012). Ventromedial prefrontal-subcortical systems and the generation of affective meaning. *Trends in Cognitive Sciences, 16*, 147-156.
- Rubin, D. C. (2002). Autobiographical memory across the lifespan. In P. Graf & N. Ohta (Eds.), *Lifespan development of human memory* (pp. 159-184). Cambridge, MA: MIT Press.
- Rubin, D. C., Berntsen, D., & Bohni, M. K. (2008). A memory-based model of posttraumatic stress disorder: evaluating basic assumptions underlying the PTSD diagnosis. *Psychological Review, 115*, 985-1011.
- Rubin, D. C., & Wenzel, A. (2004). Autobiographical memory tasks: Six common methods. In A. Wenzel, D. C. Rubin (Eds.), *Cognitive Methods and Their Application to Clinical Research*. (pp. 215-217). Washington, DC: American Psychological Association.
- Rusting CL. (1998). Personality, mood, and cognitive processing of emotional information: Three conceptual frameworks. *Psychological Bulletin, 124*, 165–196.
- Rusting, C. L. (1999). Interactive effects of personality and mood on emotion-congruent memory and judgment. *Journal of Personality and Social Psychology, 77*, 1073-1086.

- Rusting, C. L., & DeHart, T. (2000). Retrieving positive memories to regulate negative mood: Consequences for mood-congruent memory. *Journal of Personality and Social Psychology, 78*, 737-752.
- Safer, M. A., Bonanno, G. A., & Field, N. P. (2001). "It was never that bad": Biased recall of grief and long-term adjustment to the death of a spouse. *Memory, 9*, 195-203.
- Safer, M. A., & Keuler, D. J. (2002). Individual differences in misremembering pre-psychotherapy distress: Personality and memory distortion. *Emotion, 2*, 162-178.
- Safer, M. A., Levine, L. J., & Drapalski, A. L. (2002). Distortion in memory for emotions: The contributions of personality and post-event knowledge. *Personality and Social Psychology Bulletin, 28*, 1495-1507.
- Sakaki, M., Nga, L., & Mather, M. (2013). Amygdala functional connectivity with medial prefrontal cortex at rest predicts the positivity effect in older adults' memory. *Journal of Cognitive Neuroscience, 25*, 1206-1224.
- Samanez-Larkin, G. R., & Carstensen, L. L. (2011). Socioemotional functioning and the aging brain. In J. Decety & J. T. Cacioppo (Eds.), *The Oxford Handbook of Social Neuroscience* (pp. 507–521). New York, NY: Oxford University Press.
- Schacter, D. L. (2002). *The seven sins of memory: How the mind forgets and remembers*. Boston, MA: Houghton Mifflin.
- Schacter, D. L., Guerin, S. A., & Jacques, P. L. S. (2011). Memory distortion: An adaptive perspective. *Trends in Cognitive Sciences, 15*, 467-474.
- Schwarz, N. (1990). Feelings as Information: Informational and Motivational Functions of Affective States. In E. T. Higgins & E. M. Sorrentino (Eds.), *Handbook of Motivation and Cognition* (pp. 527-561). New York: Guilford.
- Schwartz, H. A., Sap, M., Kern, M. L., Eichstaedt, J. C., Kapelner, A., Agrawal, M., Blanco, E., Dziurzynski, L., Park, G., Stillwell, D., Kosinski, M., Seligman, M., & Ungar, L. (2016).

- Predicting individual well-being through the language of social media. *Pacific Symposium on Biocomputing*, 21, 516-527.
- Sedikides, C., & Alicke, M. D. (2012). Self-enhancement and self-protection motives. In R. M. Ryan (Ed.), *The Oxford handbook of human motivation* (pp. 303-322). Oxford: Oxford University Press.
- Sedikides, C., Gaertner, L., & Cai, H. (2015). On the panculturality of self-enhancement and self-protection motivation: The case for the universality of self-esteem. *Advances in Motivation Science*, 2, 185-241.
- Sedikides, C., & Green, J. D. (2000). On the self-protective nature of inconsistency-negativity management: Using the person memory paradigm to examine self-referent memory. *Journal of Personality and Social Psychology*, 79, 906-922.
- Sedikides, C., & Green, J. D. (2009). Memory as a self-protective mechanism. *Social and Personality Psychology Compass*, 3, 1055-1068.
- Sedikides, C., & Gregg, A. P. (2003). Portraits of the self. In M. A. Hogg & J. Cooper (Eds.), *Sage handbook of social psychology* (pp. 110-138). London, England: Sage.
- Sedikides, C., & Gregg, A. P. (2008). Self-enhancement: Food for thought. *Perspectives on Psychological Science*, 3, 102-116.
- Seligman, M. E., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist*, 55, 5-14.
- Seligman, M. E., Steen, T. A., Park, N., & Peterson, C. (2005). Positive psychology progress: empirical validation of interventions. *American psychologist*, 60, 410-421.
- Sharot, T. (2011). The optimism bias. *Current Biology*, 21, 941-945.
- Sharot, T., Martorella, E. A., Delgado, M. R., & Phelps, E. A. (2007). How personal experience modulates the neural circuitry of memories of September 11. *Proceedings of the National Academy of Sciences*, 104, 389-394.

- Sharot, T., Riccardi, A. M., Raio, C. M., & Phelps, E. A. (2007). Neural mechanisms mediating optimism bias. *Nature*, *450*, 102–105
- Siibak, A. (2009). Constructing the self through the photo selection-visual impression management on social networking websites. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, *3*(1) (article 1).
- Shimamura, A. P. (2000). The role of the prefrontal cortex in dynamic filtering. *Psychobiology*, *28*, 207-218.
- Singer, J. A., & Salovey, P. (1988). Mood and memory: Evaluating the network theory of affect. *Clinical Psychology Review*, *8*, 211-251.
- Skowronski, J. J. (2011). The positivity bias and the fading affect bias in autobiographical memory: A self-motives perspective. In M. D. Alicke & C. Sedikides (Eds.), *Handbook of self-enhancement and self-protection* (pp. 211–231). New York: Guilford Press.
- Skowronski, J. J., Betz, A. L., Thompson, C. P., & Shannon, L. (1991). Social memory in everyday life: Recall of self-events and other-events. *Journal of Personality and Social Psychology*, *60*, 831-843.
- Skowronski, J., Gibbons, J., Vogl, R., & Walker, W. R. (2004). The effect of social disclosure on the intensity of affect provoked by autobiographical memories. *Self and Identity*, *3*, 285-309.
- Skowronski, J. J., & Walker, W. R. (2004). How describing autobiographical events can affect autobiographical memories. *Social Cognition*, *22*, 555-590.
- Skowronski, J. J., Walker, W. R., Henderson, D. X., & Bond, G. D. (2014). The fading affect bias: Its history, its implications, and its future. *Advances in Experimental Social Psychology*, *49*, 163-218.

- Smith, S. M., & Petty, R. E. (1995). Personality moderators of mood congruency effects on cognition: The role of self-esteem and negative mood regulation. *Journal of Personality and Social Psychology*, *68*, 1092-1107.
- Snyder, M., & White, P. (1982). Moods and memories: Elation, depression, and the remembering of the events of one's life. *Journal of Personality*, *50*, 149-167.
- Song, Q., & Wang, Q. (2014). Harmed or not harmed? Culture in interpersonal transgression memory and self-acceptance. *International Journal of Applied Psychology*, *4*, 188–195.
- Speer, M. E., Bhanji, J. P., & Delgado, M. R. (2014). Savoring the past: positive memories evoke value representations in the striatum. *Neuron*, *84*, 847-856.
- Spence, J., & Holland, P. (1991). *Family snaps: The meanings of domestic photography*. London: Virago.
- St. Jacques, P. L., Dolcos, F., & Cabeza, R. (2009). Effects of aging on functional connectivity of the amygdala for subsequent memory of negative pictures: a network analysis of functional magnetic resonance imaging data. *Psychological Science*, *20*, 74-84.
- Stone, A. A., & Broderick, J. E. (2007). Real-time data collection for pain: appraisal and current status. *Pain Medicine*, *8*, S85–S93.
- Strano, M. M. (2008). User descriptions and interpretations of self-presentation through Facebook profile images. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, *2*:article 5.
- Sutton, R. I. (1992). Feelings about a Disneyland visit: Photography and the reconstruction of bygone emotions. *Journal of Management Inquiry*, *1*, 278-287.
- Szpunar, K. K., Addis, D. R., & Schacter, D. L. (2012). Memory for emotional simulations: Remembering a rosy future. *Psychological Science*, *23*, 24–29.
- Tamir, D. I., & Mitchell, J. P. (2012). Disclosing information about the self is intrinsically rewarding. *Proceedings of the National Academy of Sciences*, *109*, 8038-8043.

- Taylor, S. E. (1991). Asymmetrical Effects of Positive and Negative Events: The Mobilization-Minimization Hypothesis. *Psychological Bulletin*, *110*, 67-85.
- Teasdale, J. D., Taylor, R., & Fogarty, S. J. (1980). Effects of induced elation-depression on the accessibility of memories of happy and unhappy experiences. *Behaviour Research and Therapy*, *18*, 339-346.
- Thompson, C. P., Skowronski, J. J., Larsen, S. F., & Betz, A. L. (2013). *Autobiographical memory: Remembering what and remembering when*. New York: Psychology Press.
- Toglia, M. P., Read, J. D., Ross, D. F., & Lindsay, R. C. L. (2017). *The handbook of eyewitness psychology: Volume I: Memory for events*. Psychology Press.
- Todd, M., Tennen, H., Carney, M. A., Armeli, S., & Affleck, G. (2004). Do we know how we cope? Relating daily coping reports to global and time-limited retrospective assessments. *Journal of Personality and Social Psychology*, *86*, 310-319.
- Toneatto, T., Blitz-Miller, T., Calderwood, K., Dragonetti, R., & Tsanos, A. (1997). Cognitive distortions in heavy gambling. *Journal of gambling studies*, *13*, 253-266.
- Toyama, A., Katsuhara, M., Sakurai, Y., & Ohira, H. (2014). Effects of emotional context during encoding: an advantage for negative context in immediate recognition and positive context in delayed recognition. *Psychology*, *5*, 994-1000.
- Tsukiura, T., & Cabeza, R. (2008). Orbitofrontal and hippocampal contributions to memory for face-name associations: The rewarding power of a smile. *Neuropsychologia*, *46*, 2310-2319.
- Tversky, A., & Kahneman, D. (1973). Availability: A heuristic for judging frequency and probability. *Cognitive Psychology*, *5*, 207-232.
- Tversky, B., & Marsh, E. J. (2000). Biased retellings of events yield biased memories. *Cognitive Psychology*, *40*, 1-38.

- Västfjäll, D. (2001). Emotion induction through music: A review of the musical mood induction procedure. *Musicae Scientiae*, *5*, 173-211.
- Wagenaar, W. A. (1988). *Paradoxes of gambling behaviour*. London, UK: Erlbaum.
- Wagenaar, W. A., & Groeneweg, J. (1990). The memory of concentration camp survivors. *Applied Cognitive Psychology*, *4*, 77-87.
- Walker, W. R., Skowronski, J. J., Gibbons, J. A., Vogl, R. J., & Ritchie, T. D. (2009). Why people rehearse their memories: Frequency of use and relations to the intensity of emotions associated with autobiographical memories. *Memory*, *17*, 760-773.
- Walker, W. R., Skowronski, J. J., Gibbons, J. A., Vogl, R. J., & Thompson, C. P. (2003a). On the emotions that accompany autobiographical memories: Dysphoria disrupts the fading affect bias. *Cognition and Emotion*, *17*, 703-723.
- Walker, W. R., Skowronski, J. J., & Thompson, C. P. (2003b). Life is pleasant--and memory helps to keep it that way!. *Review of General Psychology*, *7*, 203-210.
- Walker, W. R., Vogl, R. J., & Thompson, C. P. (1997). Autobiographical memory: Unpleasantness fades faster than pleasantness over time. *Applied Cognitive Psychology*, *11*, 399-413.
- Walker, W. R., Yancu, C. N., & Skowronski, J. J. (2014). Trait anxiety reduces affective fading for both positive and negative autobiographical memories. *Advances in Cognitive Psychology*, *10*, 81-89.
- Wang, Q. (2016). Remembering the self in cultural contexts: A cultural dynamic theory of autobiographical memory. *Memory Studies*, *9*, 295-304.
- Waring, J. D., Addis, D. R., & Kensinger, E. A. (2013). Effects of aging on neural connectivity underlying selective memory for emotional scenes. *Neurobiology of Aging*, *34*, 451-467.

- Webb, T. L., Miles, E., & Sheeran, P. (2012). Dealing with feeling: a meta-analysis of the effectiveness of strategies derived from the process model of emotion regulation. *Psychological Bulletin, 138*, 775-808.
- Wegner, D. M., Vallacher, R. R., (1986). Action identification. In R. M. Sorrentino & E.T. Higgins (Eds.), *Handbook of motivation and cognition: Foundations of social behavior*. (pp. 550-582). New York: Guilford Press.
- Williams, A. D., & Moulds, M. L. (2007). Cognitive avoidance of intrusive memories: Recall vantage perspective and associations with depression. *Behavior Research and Therapy, 45*, 1141-1153.
- Wilson, A., & Ross, M. (2003). The identity function of autobiographical memory: Time is on our side. *Memory, 11*, 137-149.
- Wirtz, D., Kruger, J., Scollon, C. N., & Diener, E. (2003). What to do on spring break? The role of predicted, on-line, and remembered experience in future choice. *Psychological Science, 14*, 520-524.
- Young, A. W., Aggleton, J. P., Hellawell, D. J., Johnson, M., Brooks, P., & Hanley, J. R. (1995). Face processing impairments after amygdalotomy. *Brain, 118*, 15-24.
- Zlomuzica, A., Dere, D., Machulska, A., Adolph, D., Dere, E., & Margraf, J. (2014). Episodic memories in anxiety disorders: clinical implications. *Frontiers in Behavioral Neuroscience, 8*, 1-19.