I daydream therefore I am: Investigating associative and narrative processes in daydreaming
and self-concept

by

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Abstract

Daydreaming –also understood as a decoupling of attention from the external environment to internal environment –relates to human experience in a variety of ways (e.g., task performance, emotions, psychological well-being, social connection). In this dissertation, I propose that certain daydreams follow principles of association, such that mental elements should be prompted by unique and salient information from the external environment. In turn, daydreams formed through association should be specific and emotionally intense. I also propose that certain daydreams follow principles of narrative processing, such that mental elements should be prompted by more general self-related information such as goals and life stories. In turn, daydreams formed through narrative processing should be organized in a temporally coherent way, follow a common theme, and elicit meaning-making (i.e., connecting experiences to the self). Because of their more integrative presentation of self-related information, I propose that narrative daydreams will have a greater influence on the self-concept than associative daydreams. Three hundred and six participants across two experiments completed a modified sustained attention task with ten random daydreaming probes. Participants were randomly assigned to either an associative or narrative condition. The manipulation in each condition differed across experiments, yet all manipulations aimed to influence daydream content to be more associative or more narrative, respectively. Associative and narrative daydream elements were then assessed through self-report measures, and by coding written daydream descriptions. Results of exploratory factor analyses revealed an emotional and self-related factor (close to theorized associative daydreams) and a realistic narrative factor for self-rated items, and associative and narrative daydream factors for coder-rated items. Multilevel growth curve analyses of these factors

demonstrated that daydreams did not follow an associative or narrative structure based on condition (as hypothesized), but instead, varied in an idiosyncratic manner over probes. Finally, multiple regression analyses revealed that self-rated realistic narrative daydreams positively predicted increases in self-consciousness and private self-consciousness in both experiments. However, none of the daydream factors were significantly related to self-concept clarity or self-esteem. This suggests that daydreams that follow a narrative sequence may bring about awareness to the self. However, different processes may need to come into play to take the narratives generated through daydreaming and incorporate them into stable evaluations and knowledge of self (i.e., self-esteem and self-concept clarity). Future research and implications are discussed.

Keywords: Daydreaming, Well-being, Self-concept, Association, Narrative processing, Life stories.

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Imagine that you are at home cooking dinner. Your attention is focused on the positioning of your fingers on the knife, because you have just learned a new method of chopping onions from one of your favourite chefs, Jamie Oliver. As you carefully move your hand to avoid cutting yourself, the vapour floating from the onion makes you tear up. You move the back of your hand up to your eyes to wipe the tears blurring your vision. Suddenly, an image of your mother teaching you how to cut onions as a child pops into your mind. For a period of time, you are absorbed by the scene playing out in your imagination and begin to think about how one day, you might also teach your own kids how to cook.

As depicted in the scenario above, most people's ongoing experience continuously shifts from the external to the internal environment. Indeed, individuals spend close to half of their waking lives (Killingsworth & Gilbert, 2010; Klinger, 2009; Klinger & Cox, 1987) immersed in what the current literature calls daydreaming, mind-wandering, or self-generated, task-independent thought (e.g., Giambra, 1989; Klinger, 2009; Klinger, Gregoire, & Barta, 1973; Newby-Clark & Thavendran, 2018; Regis, 2013; Seli, Carriere, & Smilek, 2015; Singer, 1966; Smallwood, 2013; Smallwood & Andrews-Hanna, 2013; Smallwood & Schooler, 2015). Although these different labels each bring a slightly varying conceptualization of what it means for consciousness to be governed by internal elements, all converge on the understanding that a decoupling of attention from the external to the internal environment is involved in generating the daydreaming experience (e.g., Smallwood, 2013; Smallwood & Schooler, 2015). That is, when a person's immediate experience is turned inwards, stimuli from the external environment is no longer the driving force of

consciousness. For the sake of clarity and consistency, I will refer to this phenomenon as daydreaming throughout this dissertation. By using the daydreaming label, I refer to all research that speaks to *perceptual decoupling*, regardless of the labels that were used in any particular research or review article. As such, the definition of daydreaming that I use in this dissertation is that of perceptual decoupling. Although broad, this definition suggests that daydreaming involves any perceptual state that is fully focused on the internal environment as opposed to the external environment (i.e., off task). While this is certainly not the most ideal definition of daydreaming –mainly because of its broadness and focus on linguistic conventions –it is nonetheless appropriate for this research for two reasons.

First, the literature reviewed as part of the theoretical basis for this research combines different ways to interpret perceptual decoupling, sometimes in more specific ways, sometimes not. That is, this literature calls this construct ‘mind-wandering’, ‘task-independent thought’, or ‘daydreaming’, and operationalizes it in slightly different ways depending on the chosen label or sub-definition. My goal here is to combine a literature that is inconsistent in its terminology, yet somewhat content with using different labels to describe a similar phenomenon. As such, adopting a possibly overly broad definition of daydreaming allows for the inclusion of this literature in the understanding and theoretical development of this dissertation. However, I advocate for a more specific definition as research begins to more clearly define the boundaries of this construct.

Second, the manipulation that I use in the two experiments presented in this dissertation (as I will elaborate on in the methods section) relies on the idea of perceptual decoupling, where participants are asked to describe their daydream if their mind was off task. This broader definition is thus consistent with how the construct is manipulated and

measured in the experiments. This also allows room to code for a broader range of mental elements in participants' daydreaming reports, which is important in order to determine if the hypothesized associative and narrative structures are truly present within the mental phenomena that I chose to call daydreaming. Knowing this, the present construct could also be named mind-wandering or task-independent thought and be defined in the same way.

Since people engage in daydreaming often within a day (Killingsworth & Gilbert, 2010; Klinger, 2009; Klinger & Cox, 1987), the time spent absorbed in one's internal world must –to some extent –have an effect on a person's overall experience. Much like bad weather can make someone feel morose, or how a meaningful conversation with a friend can bring about feelings of security and understanding. Indeed, people report more personal growth, purpose in life, and positive emotions when they engage in pleasant and future-oriented daydreams, while achievement-oriented and guilt-attached daydreams are predictive of more depressive symptoms and negative emotions (e.g., Blouin-Hudon & Zelenski, 2016; Franklin et al., 2013; Westgate, Wilson, & Gilbert, 2017; Wilson et al., 2014). Of course, elements in a person's external environment –and even thoughts prior to a particular daydreaming episode –are also associated with daydreaming content (e.g., Poerio, Totterdell, & Miles, 2013). For example, retrieving past autobiographical memories and thinking about one's personal traits and goals predicts more future-oriented daydreams (Baird, Smallwood, & Schooler, 2011; Smallwood et al., 2011; Stawarczyk, Majerus, Maj, Van der Linden, & D'Argembeau, 2011).

Not only is self-related information (internal and external) associated with the temporal orientation of daydreams, but research has also demonstrated that a large proportion of daydreams contain self-related elements (e.g., Andrews-Hanna et al., 2013; Andrews-

Hanna et al., 2010; Andrews-Hanna, Smallwood, & Spreng, 2014; Klinger, 2009; McMillan, Kaufman, & Singer, 2013; Stawarczyk et al., 2011; Stawarczyk, Cassol, & D'argembeau, 2013). The predominance of the self in daydreams may be explained by the fact that self-related information is more easily retrieved than self-unrelated information (Rogers, Kuiper, & Kirker, 1977; Symons & Johnson, 1997). Because of this, external and internal information containing goal relevant cues will be more likely to activate self-related mental elements¹ since these goals represent ongoing actions, values, and desires (Conway, 2005; Conway & Pleydell-Pearce, 2000; Klinger, 2009).

Interestingly, goals, values, and desires make up the self-concept, especially when these are connected and integrated into a coherent whole (e.g., Pebble, Addis, & Tippet, 2013). Specifically, the self-concept involves an abstract understanding of who the self is in relation to the world and to other people (Brewer, 1986; Kihlstrom & Klein, 1997; Damasio, 1999, 2010; Leary & Tangney, 2012; Markus & Wurf, 1987; McAdams, 1996; Neisser, 1988; Singer, 1995). Since daydreams often contain important self-related information, I propose that engaging in daydreaming can allow a person to abstract and connect these self-elements and have an effect on the self-concept (Brewer, 1986; Duval & Wicklund, 1972; Gray-Little, Williams, & Hancock, 1997; Jordan, Spencer, & Zanna, 2003; Kihlstrom & Klein, 1997; Leary & Tangney, 2012; Markus & Wurf, 1987; Marsh, 1986; Marsh & Craven, 2006; Marsh & Hattie, 1996; Marsh & O'Mara, 2008; Moring & Everett, 1990; Neisser, 1988; Singer & Salovey, 1993, 1996; Pebble, Addis, & Tippet, 2013; Rosenberg, 1979; Trapnell & Campbell, 1999; Wicklund & Golwitzer, 1987; Wicklund, 1975, 1978).

¹Mental elements are imaginative segments or representations that have content; that are about or directed at certain objects, persons, or ideas and *represent* them as being a certain way and as having certain characteristics without relying on direct perceptual information from the external environment (e.g., Dorsch, 2014).

Even though the self seems to have a privileged presence in people's daydreams, only a small proportion of research has investigated the relation between daydreaming and self (e.g., Luo, Zhu, Ju, & You, 2016; Vess, Leal, Hoeldtke, Schlegel, & Hicks, 2016; Williams & Vess, 2016). Unfortunately, findings from this limited body of research are discrepant, such that more pleasant and future-oriented daydreams bring about a more intimate sense of self (e.g., McMillan et al., 2013; Singer, 1966; Williams & Vess, 2016), while daydreaming during a sustained attention task in a laboratory leads to a more distanced sense of self (Vess et al., 2016). Furthermore, adolescents who daydream more have also been found to report a less favourable sense of self (Luo et al., 2016).

Such a discrepancy in findings may suggest that defining daydreaming as a uni-faceted construct may not be enough to properly understand its relation to the self-concept. Interestingly, research by Seli, Risko, and Smilek (2016) has demonstrated that daydreaming can be successfully refined into both spontaneous and intentional components. Through their program of research, these authors found that participants reported daydreams that occurred in an uncontrolled manner when probed during an attention task, while at other times, participants reported a more controlled and purposeful shift of attention from the external to the internal environment (Seli, Carriere, & Smilek, 2015; Seli, Risko, and Smilek, 2016).

The work by Seli and colleagues makes an important contribution to the daydreaming literature, mainly by demonstrating that this construct should be operationalized as multi-faceted if we are to properly understand its effect on human experience and more specifically, on the self (i.e., whether the self is perceived, and whether the perceived content of an individual's self-concept is clear, consistent, and stable over time; Campbell, 1990; Campbell & Lavellee, 1993). However, intention may not be the only construct to describe how

daydreams become abstracted into temporally linear and thematically coherent wholes – versus spontaneous and random mental elements.

Knowing this, I argue that daydreaming can be understood as a multi-faceted construct underlined by *associative* and *narrative* processes. On the one hand, narrative processing represents the act of organizing self-related information into coherent stories that are structured in a logical and meaningful manner through time (i.e., from past to present to future; Dorsch, 2012, 2014; McLean, Pasupathi, & Pals, 2007; Pasupathi, 2015; Williams, 2002). Because narrative processing connects these self-related elements together using common goal states and autobiographical memories (Bauer, Tasdemir-Ozdes, & Larkina, 2014; Bluck & Habermas, 2000; Klinger, 2009; Singer & Bluck, 2001), I propose that this process should more closely describe the phenomenon that underlies what has previously been labeled intentional daydreaming. In contrast, I propose that associative daydreams should follow basic rules of association by being retrieved through novel external cues, and by accessing more specific emotional and situational information (e.g., Berntsen, 2010; Conway, 2005). Since this retrieval happens spontaneously, this associative process should more closely describe the phenomenon labeled spontaneous daydreaming by Seli and colleagues. Finally, the second purpose of this dissertation is to investigate how narrative daydreams relate to the self-concept –and more specifically self-concept clarity –over and above associative daydreams. As an explorative measure, I will also investigate how associative and narrative daydreams relate to other aspects of the self-concept, such as self-consciousness and self-esteem.

Daydreaming content and the self

Daydreaming is a complex phenomenon with a broad effect on individual experience, from task performance to well-being (e.g., Andrews-Hanna et al., 2013; Blouin-Hudon & Zelenski, 2016; Klinger, 2009; Klinger & Cox, 1987; Westgate, Wilson, & Gilbert, 2017; Zhiyan & Singer, 1996). Interestingly, Smallwood and Andrews-Hanna's (2013) content regulation hypothesis states that researchers can only fully understand the effect of daydreaming on a person's mental life (e.g., well-being, self-knowledge, emotions) by taking into account the content of these mental episodes (i.e., represented content within the stream of consciousness; Dorsch, 2012, 2014). In this respect, research has demonstrated that the content of daydreams varies on dimensions such as visual and auditory intensity, emotionality, time orientation, concreteness, and goal and self-relevance (e.g., Andrews-Hanna et al., 2013; Andrews-Hanna, Reidler, Huang, & Buckner, 2010; Andrews-Hanna, Smallwood, & Spreng, 2014; Klinger, 2009; Klinger & Cox, 1987; McMillan, Kaufman, & Singer, 2013; Singer, 1966; Stawarczyk, Cassol, & D'argembeau, 2013; Stawarczyk, Majerus, Maj, Van der Linden, & D'Argembeau, 2011). As such, where a person's mental experience falls on these dimensions –along with other predictors such as personality (Blouin-Hudon & Zelenski, 2016; Zhiyan & Singer, 1996), previous mood (e.g., Smallwood & O'Connor, 2011), and environmental characteristics (e.g., Killingsworth & Gilbert, 2010) –determines the effect of daydreaming on a person's mental life.

For example, Blouin-Hudon and Zelenski (2016) found that people who reported experiencing daydreams that contained problem solving, pleasant, highly visual and auditory, and future-oriented mental elements also reported more personal growth, purpose in life, and positive emotions. Conversely, daydreams that contained achievement-oriented, guilt-

attached, hostile, and negative or fearful mental elements were associated with depressive symptoms, negative emotions, and lower psychological well-being. Wilson et al. (2014) have also demonstrated that both daydreaming episodes can lead to negative moods when people are left to daydream in an empty laboratory room with no other external stimuli than the option to administer oneself a small static shock. However, when people are given a ‘thinking aid’, such as listing eight topics that are of interest and enjoyable to them, being asked to sit and think is experienced as more pleasurable than if thought content is not planned prior to the episode (Westgate, Wilson, & Gilbert, 2017). This is in line with the finding that daydreams containing interesting elements are more likely to lead to pleasant moods than uninteresting or neutral mental episodes (Franklin et al., 2013).

While the content of mental episodes can affect subsequent well-being, emotions prior to the initiation of daydreaming can also guide the content and temporal focus of these thoughts (Poerio, Totterdell, & Miles, 2013). For example, Smallwood & O’Connor (2011) demonstrated that participants who underwent a negative mood induction prior to completing a sustained attention task (SART²; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997) reported more past-oriented daydreams. In turn, daydreams focused on the past that also predominantly contain other individuals –as opposed to the self –are more likely to be associated with negative emotions, even if the overall elements of the mental episode are positive. Alternatively, future-oriented daydreams that also contain the self are more likely to be associated with subsequent positive emotions, even when the mental elements are negative in nature (Ruby, Smallwood, Engen, & Singer, 2013).

² The sustained attention task (SART) is a repetitive (and ‘boring’) computer task meant to induce daydreaming. Please see the Methods section for more detailed information on the SART and its use in daydreaming research.

Even with the feedback loop between negative emotions and past-oriented mental episodes, Baird, Smallwood, and Schooler (2011) nonetheless demonstrated that the majority of daydreams in non clinical populations use past-oriented autobiographical memories as an adaptive tool to project into the future in order to anticipate and plan personally relevant goals. Building on these findings, Smallwood et al. (2011) instructed participants to self-reflect by indicating whether traits on a list of thirty-two adjectives applied to them. These authors found that the contents of individuals' daydreams are more likely to be set in the future rather than reflect past-oriented mental episodes. Similarly to this finding, individuals tend to report more future-oriented daydreams when their personal goals are made salient (Stawarczyk, Majerus, Maj, Van der Linden, & D'Argembeau, 2011). These findings thus demonstrate that when the self is made salient –either through past autobiographical memories, traits, or goals –then the content of daydreams seem to be more future-oriented.

What is more, research has established that large proportions of daydreams are self-related (e.g., Andrews-Hanna et al., 2013; Andrews-Hanna et al., 2010; Andrews-Hanna, Smallwood, & Spreng, 2014; Klinger, 2009; McMillan, Kaufman, & Singer, 2013; Stawarczyk et al., 2011; Stawarczyk, Cassol, & D'argembeau, 2013). For example, in a study by Andrews-Hanna and colleagues (2013), participants underwent a thought sampling procedure, where they were instructed to retrieve thirty-six recent daydreams. Once identified, these thoughts were then rated on dimensions such as self-relevance, emotional valence and intensity, goal-relevance, social orientation, and temporal orientation. After completing this task, participants filled out mental health questionnaires to assess their levels of depressive symptoms, emotional experience, and mindfulness. Regardless of mental health

status, individuals in this study rated their daydreams as highly self-relevant and as containing moderate amounts of social elements.

Likewise, research by Poerio, Totterdell, Emerson, and Miles, (2016) demonstrated that daydreaming about the self in relation to social others is associated with positive adjustment during significant life events, such as moving away from home for the first time. In this study, first year and first-semester university students received random experience sampling probes on their smartphones twice daily for a period of twenty-eight days. When probed, participants were instructed to describe their most recent daydream involving social elements (e.g., close or distant others). At the fourteen and twenty-eight day marks, participants were also instructed to complete online questionnaires to assess self-reported loneliness and social adaptation. Results indicated that over one month, individuals' social daydreams contained more positive elements and higher quality relationships as time went on. As an outcome of these socially positive daydreams, participants reported increased feelings of social connection and less loneliness. Similarly, Mar, Mason, and Litvack (2011) found that daydreams containing distant others are more predictive of loneliness and less perceived social support, while thinking of close others predicts greater life satisfaction.

The omnipresence of self-related elements in daydreams could be explained in part by the self-reference effect in memory retrieval. According to this effect, memories pertaining to the self are more easily retrieved than information about self-unrelated events (Rogers, Kuiper, & Kirker, 1977; Symons & Johnson, 1997). This is because stimuli involving the self are perceived as unique and salient, making this information more easily encoded in memory. In turn, this self-biased encoding makes for an extensive repertoire of self-relevant information stored in long-term memory –also known as the self-memory system. From this

system, both implicit and explicit elements of self can be retrieved based on cues from the external and internal environments (Conway & Dewhurst, 1995; Howell & Zelenski, 2017; Klein & Kihlstrom, 1986; Klein & Loftus, 1988; Symons & Johnson, 1997). Of these cues, goal-salient information is especially likely to activate self-related mental elements since goals or current concerns (e.g., Klinger, 2009) represent the ongoing actions, values, and desires of the self (Conway, 2005; Conway & Pleydell-Pearce, 2000).

Importantly, goals, values, desires, and behaviours represent a person's sense of self when these are unified and connected into a coherent and integrated whole through the self-concept (e.g., Pebble, Addis, & Tippet, 2013). The self-concept refers to the conceptual and abstract understanding about *who* the self is (i.e., private self-consciousness; Brewer, 1986; Kihlstrom & Klein, 1997; Leary & Tangney, 2012; Markus & Wurf, 1987; Neisser, 1988), along with emotional and evaluative judgements about this self (i.e., self-esteem; e.g., "I am" statements), perceptual and sensory representations of the physical body (e.g., what it *feels* like to be the self), motivations and goals (e.g., what the self aspires to), and elements of the self in relation to the social world (e.g., public self-consciousness; Damasio, 1999, 2010; Markus & Wurf, 1987; McAdams, 1996; Singer, 1995).

As such, the privileged access of self-knowledge through the self-memory system allows for information about values, desires, and goals to associate with one another within the stream of consciousness. Over time, I theorize that gaining access to self-related information through daydreaming can help a person conceptualize and unite one's self-knowledge into a coherent concept of self (Singer & Salovey, 1993, 1996; Pebble, Addis, & Tippet, 2013). More specifically, I propose that the organization of self-related information within daydreaming is related to self-concept clarity, which represents whether an individual

perceives self-concept content (e.g., values, goals, desires) as clear, consistent, and stable over time (Campbell, 1990; Campbell & Lavellee, 1993). For example, an individual with high self-concept clarity should not feel as if their values, goals, and desires change whether they are talking to their sister or seeing a group of friends from university. I also propose that associative and narrative daydreaming can affect other aspects of the self-concept, such as self-consciousness (i.e., awareness of self; self-knowledge) and self-esteem (i.e., evaluations of self).

Given the ubiquitous presence of the self in daydreaming, it is surprising that only a small sliver of research has explored how daydreaming may contribute to a person's self-concept (e.g., Luo, Zhu, Ju, & You, 2016; Vess, Leal, Hoeldtke, Schlegel, & Hicks, 2016; Williams & Vess, 2016). So far, the only available research on daydreaming and self-concept (or elements thereof) has highlighted that people report feeling more authentic and certain about their sense of self if they are prone to engage in daydreams that contain problem solving, future-oriented, and pleasant mental elements (e.g., McMillan et al., 2013; Singer, 1966). Conversely, daydreams containing hostile, achievement-oriented, and guilt-attached mental elements are more predictive of lower authenticity and a more distanced and uncertain sense of self (Williams & Vess, 2016). Furthermore, when daydreaming is measured using thought probes during a sustained attention task (SART; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997), a more distanced sense of self is predictive of more subjective daydreaming reports (Vess et al., 2016). Corroborating this finding, research has also demonstrated that adolescents who daydream more frequently also report less self-esteem (i.e., less favourable "I am" statements; Luo et al., 2016).

Overall, these findings suggest that daydreaming can be both detrimental and beneficial to the self-concept depending on how it is assessed (e.g., daydreaming content or daydreaming overall). This suggests that a surface understanding of daydreaming as a uni-faceted construct may not be enough to adequately understand its relation to the self. Instead, it may be necessary to isolate the processes influencing the retrieval and production of daydreaming content in order to understand how self-related elements arise in consciousness. In turn, these mental elements can inform how the self is conceptualized, abstracted, and united into a coherent narrative and a clear concept of self. As such, the core purpose of my dissertation is to test how daydreaming can be understood as a multi-faceted construct underlined by both *associative* and *narrative* processes. The second purpose of this dissertation is to investigate how these two ‘types’ of daydreams relate to the self-concept (i.e., to its structure and content through self-concept clarity, self-consciousness, and self-esteem).

Initiation and duration of daydreams

In order to fully grasp the complexity of daydreams and their proposed effect on the self-concept, it is first important to understand how perceptual decoupling (i.e., a decoupling of attention from the external to the internal environment; e.g., Christoff, Gordon, Smallwood, Smith, & Schooler, 2009; Smallwood, 2013; Smallwood & Schooler, 2015) is initiated and how mental content is sustained within consciousness. Regarding their process, daydreams can be broken down into occurrence (i.e., when they arise) and duration (i.e., the length of time with which they are sustained; Smallwood, 2013). Before they occur, daydreams are initiated by an imperative stimulus (Smallwood, 2013). Although difficult to

capture due to the indirect assessment of daydreaming (i.e., it is unfortunately, as of yet, impossible to ‘see’ directly into people’s minds), the imperative stimulus can nonetheless be defined as an event –or a series of events –preceding a specific mental phenomenon to arise within consciousness. When this imperative stimulus occurs, attention is decoupled from the external environment such that perception of stimuli is no longer the driving force in conscious experience.

It has been proposed early on by Klinger, Gregoire, and Barta (1973) that current concerns –also known as unachieved goals, or goals in progress –may cause the occurrence of daydreams because mental experience tends to focus on the most salient information available. As such, current concerns are salient because there is self-relevant incentive value in reaching or accomplishing these goals. Under this argument, mental experience will be focused on an external task if this task is more salient than the internal flow of consciousness, such as novel tasks that demand high cognitive engagement (e.g., Klinger, 2009; Smallwood & Andrews-Hanna, 2013; Smallwood & Schooler, 2006). However, the focus of mental experience will decouple from the external environment if a current concern with higher incentive value or salience than perceived stimuli appears within the stream of consciousness.

Adhering to this current concerns hypothesis (Klinger, Gregoire, & Barta, 1973), Smallwood and Schooler (2006) propose that while the onset of daydreams is most likely initiated by ongoing and self-relevant goal states, the decoupling of experience away from external perception and towards internal mentation is likely *sustained* by domain-general processes like executive control. As with perception, executive control processes would then assure that attention stays focused on the content of daydreams in order for the person to

process, elaborate, and embellish the ongoing mental episode (Dorsch, 2014; Smallwood, Brown, Baird, & Schooler, 2012).

Alternatively to this decoupling hypothesis, McVay and Kane (2010) argue that current concerns cannot be the sole imperative stimulus that leads to perceptual decoupling. Instead, they propose that a *failure* of executive functions mixed with current concerns leads perceptual resources to collapse, thus activating the brain's default network (e.g., Konishi, McLaren, Engen, & Smallwood, 2015; McKiernan, D'Angelo, Kaufman, & Binder 2006; Mason et al., 2007), which requires no domain general resources –such as executive processes –to function.

Indeed, the default network is activated when the mind is 'at rest' (it has even been termed REST for Random Episodic Silent Thought by Andreasen et al., 1995), such as when mental experience is spontaneously decoupled from the external environment (Andrews-Hanna, 2012), and when people are unaware of this decoupling (Christoff, Gordon, Smallwood, Smith, & Schooler, 2009), as would be expected if executive functions were to suddenly fail. It is still unclear, however, whether the default network stays activated when a person intentionally engages or becomes aware of daydreams (e.g., Crick & Koch, 2003; Koch & Tsuchiya, 2007), or whether executive function and working memory systems are recruited instead (Schooler, 2002).

To bridge these seemingly divergent theories, Thomson, Besner, and Smilek (2015) propose an alternative resource-control hypothesis specifically to explain why perceptual decoupling occurs. Based on the available literature, these authors posit that a person only has a set amount of attentional resources available for use. Because of this, performance on highly demanding tasks may decrease over time because less attentional resources are

available for daydreaming. That is, a large proportion of a person's attentional resources need to be focused on the difficult task. Worse task performance thus occurs when these limited attentional resources are inefficiently directed towards internal mentation (McVay & Kane, 2010). Under low demand tasks, attentional resources are more readily available (i.e., less needed for external tasks) and can be evenly distributed between task relevant thought and daydreaming without necessarily sacrificing task performance (Smallwood & Schooler, 2006). What the resource-control theory proposes then is that the distribution of attentional resources –and not executive failure or task demand alone –can explain the wax and wane of mental experience from the external to the internal environment. With feedback from the external environment, a person can re-distribute attention to correct or more adequately control task performance.

While these theories bring us closer to understanding how daydreams are initiated (i.e., salience of external versus internal goal-related incentives) and sustained (i.e., distribution of attentional resources stemming from executive functioning), they do not focus on how the content of daydreams may affect the self-concept differently whether decoupling is underlined by spontaneous/associative, or more abstracted/narrative processes.

Daydreaming as a unitary versus multifaceted construct

Although daydreaming is most notably viewed as a unitary construct in *recent* literatures, past theories have nonetheless adopted various positions regarding whether mental content during daydreaming can be generated and sustained through different processes (Regis, 2013). For example, Freud (Regis, 2013) chose to view daydreaming as waking fantasy that can only occur within states of reverie, that is, as solely spontaneous and

unintentional mental states. While more empirically-grounded than Freud's musings, Singer's (1966), and Varendonck's (1923) theories also conceptualized daydreaming as fortuitous and unsolicited imaginings that arise in consciousness without any warning.

While conceptualizing the onset of daydreaming as spontaneous, Singer (1966) also believed that individuals who were more aware of daydreams were likely to experience these more frequently. In this sense, Singer (1966) viewed daydreaming as spontaneous yet conscious states that could involve *agency*. Along the same lines, Morley (1998) determined that although daydreams may arise spontaneously, individuals can become aware of these thoughts as they unfold within consciousness, and impose agency on these by elaborating on their content.

Alternatively, philosopher Thomas Hobbes (Regis, 2013) was one of the earliest to make a clear distinction between daydreams initiated through either spontaneous or executive processes. According to his rationale, reverie can be characterized as thoughts that occur unintentionally or spontaneously, mainly through associative processes. On the other hand, instrumental thinking relies on evaluative processes (i.e., a deliberate monitoring of consciousness; Morin, 2006). Adopting a similar understanding, Person (1995) believed that daydreams could occur spontaneously, or that a person could intentionally engage in these imaginings in order to rehearse instrumental plans.

As elaborated in the decoupling hypothesis described in the previous section (Smallwood, 2013; Smallwood & Schooler, 2006), Klinger (1977) observed that daydreams are mainly initiated by current concerns (i.e., ongoing goal states). Although daydreams involve goal planning to some degree, Klinger posited that these do not necessarily involve awareness or evaluative processes (as proposed by Hobbes (Regis, 2013), Morley, 1998, and

Singer, 1966). Because of their spontaneous and un-evaluative nature, Klinger (1977) thus conceptualized daydreaming as serving a more reflective, rather than problem-solving (i.e., instrumental), function (Regis, 2013). Although not completely aligned with Hobbes' (Regis, 2013) reasoning, Klinger nonetheless believed that certain daydreams could be initiated by more reflective processes (Klinger 1977, 2009). More specifically, he saw these evaluative daydreams as clearly defined and chronologically accurate segments represented within the stream of consciousness. As opposed to other types of thought however, Klinger (1977, 2009) cautioned that even these more structured daydreams do not necessarily involve concrete evaluations or awareness, and that these are likely to drift back to spontaneous processes over the daydreaming episode. Similarly to Klinger (1977, 2009), Dorsch (2012, 2014) conceptualizes daydreaming as being initiated by both spontaneous and structured processes depending on whether the thought arose as part of an intention or as part of an association.

Even though these theories attempt to understand the different processes underlying daydreaming, they have yet to come to a clear *empirical* understanding of how daydreaming content –and more specifically *self-related content* –is assembled within consciousness. One way of understanding the possible multi-faceted processes underlying daydreaming is to differentiate between daydreams that occur spontaneously, and those that occur with intention (i.e., with a sense of agency). For example, research by Seli, Risko, and Smilek (2016) sought to demonstrate that daydreaming is not a unitary construct and that experimental manipulations can indeed separate the occurrence of perceptual decoupling into its intentional and spontaneous components. Specifically, these authors conceptualized intentional daydreaming as the deliberate focus of attention on internal elements (i.e., a controlled shift from the external to the internal environment, similar to a person intentionally reaching for a

cup of water; Giambra, 1995), while spontaneous daydreaming occurs due to an uncontrolled or unintentional decoupling of perception (Seli, Carriere, & Smilek, 2015; Seli, Risko, and Smilek, 2016).

In this study, participants were assigned to complete either the easy or the difficult version of the sustained attention to response task (SART; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997). Specifically, this task required participants to press the spacebar when they saw a go-digit (i.e., pre-assigned numbers, such as one through three, or five through nine) and to omit pressing the spacebar when they saw no-go digits (i.e., any number that is not a go-digit, such as four in the current example). For the difficult condition, numbers were presented in a completely random manner, while numbers in the easy condition were presented in a predictable fashion (i.e., in chronological order from one through nine, for example). Throughout the task, thought probes were projected onto the computer screen at random intervals to capture participants' daydreams. For these probes, participants had the option of answering that their attention was on task, that they were intentionally daydreaming, or that they were unintentionally daydreaming (Seli, Cheyne, Xu, Purdon, & Smilek, 2015).

Overall, participants reported the same proportion of daydreams across the two conditions. When looking at results between conditions, however, Seli and colleagues (2016) found that participants in the easier SART condition reported more intentional daydreams, while participants in the difficult SART condition reported more unintentional daydreams. These results highlight the importance of assessing both spontaneous and intentional processes, since measuring all daydreaming under one umbrella would have led these authors to conclude that task difficulty had no effect on the frequency of daydreams (as highlighted by the results across conditions). Instead, these results suggest that spontaneous daydreaming

arises when available attentional resources are mainly allocated to the external task, while intentional daydreaming seems to arise when attentional resources are evenly distributed between the external and internal environments, similarly to what is suggested by the resource-control hypothesis previously reviewed (Thomson, Besner, and Smilek, 2015).

Of course, a limitation to these studies on daydreaming and intention is that participants' reports of intentional daydreams could simply be a false perception of intention when in fact, the daydream was actually unintentional in nature. Indeed, research by Wegner and Wheatley (1999) tested the notion of false intention by having participants think about moving a computerized Ouija board-type device. At the end of this study, participants believed that the intention (i.e., willful thought) to move the board led it to shift, when it was actually the computer that moved the board. Knowing this, asking participants to categorize their daydreams as intentional or not could introduce the post-hoc perception that a sequence of mental elements was generated wilfully, while it may have been actually initiated unintentionally.

Notwithstanding these limitations, it is clear that defining daydreaming as a multifaceted construct is important in order to properly describe and assess it, and in order to accurately evaluate its effect on the self-concept. The research program conducted by Seli and colleagues highlighted above has made important advancements in this regard, mainly by showing that such an operationalization can be done. However, the concept of intention may not be the most appropriate to understand daydreams that contain more coherent themes involving the self. As such, the literature on narrative processing –or the ways in which people construct stories about themselves in relations to the world –may offer a fruitful line of investigation to determine how more thematically coherent daydreams arise. Furthermore, the

literature on autobiographical memories can begin to inform how self-related mental elements spontaneously associate within daydreams, thus extending Seli and colleagues' introduction of spontaneous processes in daydreaming. Overall, I am proposing that using a more descriptive approach to daydreaming (i.e., what the daydream 'looks' like; associative versus narrative) is an effective way to understand how daydreaming is related to the self-concept, while also extending previous research on spontaneous and intentional daydreaming.

Daydreaming and associative processes

Although most people daydream daily, the degree and frequency with which one engages in these reflective or prospective mental activities can be affected by personality (Blouin-Hudon & Zelenski, 2016; Zhiyan & Singer, 1996), mood (e.g., Smallwood & O'Connor, 2011; Spronken, Holland, Figner, & Dijksterhuis, 2016; Poerio, Totterdell, & Miles, 2013), and clinical disorders (e.g., Brannigan, Shahon, & Schaller, 1992; Murphy, Macpherson, Jeyabalasingham, Manly, & Dunn, 2013). Interestingly, researchers have also found that projection into the future during daydreaming greatly relies on autobiographical memories (Smallwood & Schooler, 2006; Smallwood et al., 2011; Szpunar & McDermott, 2009).

For example, Smallwood et al. (2011) found that self-referential thought –when primed by trait self-ascription –leads a person to project into the future to a greater degree during daydreaming than if primed to think about a close or distant other. This suggests that memories –especially autobiographical ones (i.e., recalling information and events involving the self) –may play an important role in allowing a person to organize daydreams into goal and self-relevant mental episodes that can move from the past to the future in a flexible and

purposeful manner. However, the *process* with which these autobiographical memories are retrieved may also inform how self-relevant mental episodes are organized within daydreams, and in turn, how this organization relates to the self-concept.

Broadly speaking, autobiographical memory involves the ability to remember past experiences and events that are relevant to the self (Kelley & Jacoby, 2012; Rubin, 2006; Williams, Conway, & Cohen, 2008). More specifically, autobiographical memory can be broken down into episodic and semantic components, which differ in vividness, emotionality, and specificity (Barsalou, 1988; Conway & Pleydell-Pearce, 2000; Neisser, 1986; Williams et al., 2008). For example, episodic autobiographical memories are retrieved with a high level of sensory, emotional, and perceptual detail, such that episodic retrieval allows a person to re-experience what it *felt* like to be in a previously experienced situation, at a specific time, and in a specific place (Tulving, 1984; Pebble, Addis, & Tippet, 2013). As such, episodic memories are closely connected to autonoetic consciousness, which involves a self-knowing mental state that provides the ability to represent events infused with a similar first-person perspective as the original experience (i.e., the feeling that an event was experienced by ‘me’, along with a feeling of ‘warmness and intimacy’; James, 1892; Levine et al., 2002; Markowitsch, 2003; Tulving, 2002, 2005; Vandekerckhove, 2009; Wheeler, 2004).

Conversely, semantic autobiographical memory involves a high-level and conceptual abstraction of the events and experiences in one’s life in order to create a broad chronological, thematic, and factual experience of self (Barsalou, 1988; Conway & Pleydell-Pearce, 2000; Levine, Svoboda, Hay, Winocour, & Moscovitch, 2002; Neisser, 1986; Tulving, 1984; Williams et al., 2008). As such, the retrieval of semantic autobiographical memories does not require the recall of first person, self-imbued experiences. Rather, these

memories are associated with noetic conscious experience, which is founded on an overarching and factual understanding of the self, similarly to how one would know about the Canadian prime minister's political role, or why sunlight is important for photosynthesis (Tulving, 1985; Vandekerckhove & Panksepp, 2009).

According to Berntsen (2010), the retrieval of more abstract and semantic information is a process that recruits executive functions, while the process of spontaneous retrieval is associative in nature and as such, predominantly relies on situational cues –as opposed to executive functioning –in order to operate. As such, autobiographical memories are more often retrieved using executive processes when they support a person's factual self-knowledge and higher-level self-concept (Berntsen, 2010; Conway, 2005). Because of this, the retrieval of these semantic memories requires a top-down scanning of mental elements, which more readily favours information relevant to a person's general life story, even if these elements are more specific in nature (i.e., thematic and temporal organization of events and experiences in a person's life; McAdams, 2008; McLean, 2005; Pasupathi, Mansour, & Brubaker, 2007; Rubin, Boals, & Berntsen, 2008), such as recalling a specific day at the beach with a friend.

In contrast, spontaneous autobiographical memories are mainly retrieved when novel cues from the external environment match previously stored self-related memories (Berntsen, 2010; Conway, 2005). Due to this associative retrieval, spontaneous autobiographical memories can access more specific emotional and situational information, characteristic of episodic autobiographical memories (Berntsen & Hall, 2004; Rubin et al., 2008; Williams, 1996; Williams et al., 2007). Ultimately, episodic autobiographical memories should follow a

more associative form of retrieval, while a more executive form of retrieval should underline semantic autobiographical memories.

Of particular relevance, Bernsten, Staugaard, and Sorensen (2013) designed an experiment to manipulate the encoding *and* retrieval of associative episodic and executive semantic autobiographical memories. Specifically, these authors' research is based on the principles of encoding specificity (Conway, 2005; Berntsen, 2009; Moscovitch, 1995) and cue overload (Nairne, 2002; Tulving, 1979; Tulving & Thompson, 1973; Watkins & Watkins, 1975). According to encoding specificity, an associated cue is more likely to lead to the retrieval of a specific memory when there is a large overlap between the information present in the cue and in the memory (i.e., the cue and memory contain highly similar information). Conversely, the principle of cue overload stipulates that a cue is more likely to lead to the retrieval of a specific memory if it is uniquely associated to this memory. As such, the strength of association between a cue and a memory declines the more memories are associated with this same cue. In the case of the second principle, it is the uniqueness of the cue –and not the extent of similarity to the memory –that is most predictive of retrieval.

Berntsen et al. (2013) also conceptualized the encoding and retrieval of spontaneous memories as an associative process explained by the cue-item discriminability principle (Conway & Pleydell-Pearce, 2000). According to this principle, past events with distinct features are more likely to be retrieved through association because it is easier to distinguish them from other more repetitive events. Furthermore, concrete external elements, such as objects, settings, and sensory experiences (i.e., smells, sounds, textures, etc.) are more likely to cue spontaneous memories than are abstract internal elements, such as thoughts and emotions (Berntsen, 2009).

To experimentally manipulate encoding and retrieval of spontaneous or voluntary autobiographical memories, Bertsen et al. (2013) randomly assigned participants to an encoding manipulation with four conditions. Participants were either presented with a series of unique sounds (i.e., that do not belong to the same category, such as chainsaws and fire alarms) paired with a series of repeated pictures (i.e., that belong to the same category, such as types of trees), a series of unique sounds paired with a series of unique pictures (e.g., car engine and deer), a series of repeated sounds (e.g., types of birds) paired with a series of unique pictures, or a series of repeated sounds paired with a series of repeated pictures. Empirically speaking, this manipulation formed a two (retrieval: involuntary versus voluntary; this will be described in greater detail below) by two (sound cue: unique versus repeated) by two (scene: unique versus repeated) analysis of variance design. Participants in each condition were instructed to sit and look at the pictures and listen to the sounds. Each picture-sound pair was presented for four seconds in order to allow participants to properly encode the stimuli.

The authors hypothesized that encoding of spontaneous memories would follow the associative principle of cue overload such that the unique sounds by unique pictures would have the lowest cue overload and the greatest chance of forming an association, since a category cue is paired to only one sound and one picture. On the contrary, the repeated sounds by repeated pictures condition is likely to have high cue overload since the same sounds belonging to the same category (e.g., types of birds) will be associated with pictures belonging to the same categories (e.g., types of trees). That is, participants in the later category are more likely to form general representations of the sounds and pictures, which

does not offer information that is unique enough for associative encoding (Berntsen, 2009; Williams, 1996; Williams et al., 2007).

Regardless of encoding condition, participants were then assigned to either a spontaneous retrieval or a voluntary retrieval condition. During this second experimental phase, participants in the voluntary retrieval condition were presented with 16 familiar sounds (i.e., four from each condition in the encoding phase) and instructed to actively remember a scene from the encoding phase after hearing each sound. Alternatively, participants in the spontaneous retrieval condition were given headphones that alternated in emitting a sound (i.e., 128 sounds were presented from the encoding phase, and 64 sounds were unfamiliar) in either the left or the right ear, while a bright yellow star was presented on either the right or left corner of the computer screen. Participants were instructed to press ‘one’ on the keyboard when the sound and the yellow star were on the same side (i.e., right or left), and to press the ‘two’ key if they appeared on opposite sides. During this task, participants were also told to press the ‘three’ key as soon as they experienced the spontaneous image of a scene in their mind. Doing so paused the experiment and allowed participants to write down a few keywords about the spontaneous imagining.

Across the four encoding conditions, results demonstrated that the spontaneous retrieval of memories follows principles of association. Specifically, spontaneous memories were more likely to occur when cues were unique as opposed to repeated, and were paired with quicker response times (when participants had to identify the learned stimuli a second time) than voluntary retrieval. This means that executive functions are recruited to a lesser degree in spontaneous retrieval. Conversely, voluntary retrieval was more likely to follow the presentation of repeated stimuli, which goes to corroborate past research and theories

indicating that more general, abstracted, and semanticized memories are retrieved through top-down processes (e.g., Ciaramelli, Grady, & Moscovitch, 2008; Martin & Chao, 2001; Tomita, Ohbayashi, Nakahara, Hasegawa, & Miyashita, 1999). Overall, Berntsen et al. (2013) demonstrated that not only could spontaneous and voluntary memory encoding *and* retrieval be experimentally manipulated via the presentation of unique versus repeated picture-sound pairings, but that different processes indeed underline these two types of recall.

With regards to research on daydreaming, a study by Berntsen and Jacobsen (2008) connects these findings back to the idea that the retrieval of autobiographical memories is necessary for planning and projection to the future, and can thus be important in explaining how the spontaneous and narrative autobiographical processes are important in organizing the content of daydreams. Specifically, this diary study examined if spontaneous and conscious prospective thought demonstrated similar characteristics to spontaneous and conscious autobiographical memories (i.e., retrospective thought). Participants were asked to record ten spontaneous future and past thoughts (i.e., past and future thoughts that come to mind without the person actively looking to retrieve these memories), and ten deliberate future and past thoughts (i.e., past and future thoughts that the person was purposefully looking to retrieve) over an open-ended time period. As soon as they became aware of these thoughts, participants were instructed to record their mental experience in a notebook supplied by the experimenters. This notebook asked participants to answer a series of questions pertaining to the external or internal circumstances that led to the thought, and to elaborate on its content. These authors found that both deliberate autobiographical memories and prospective thought were more conceptual and abstract, while spontaneous autobiographical memories and prospective thought involved more specific mental elements. This research supports Berntsen

et al.'s (2013) findings, and suggests that exploring spontaneous associative and more directed narrative processes in daydreaming is theoretically and empirically tenable.

As I have reviewed in this section, I expect certain daydreams to be underlined by associative processes. That is, associative daydreams will most likely contain event-specific and highly subjective (i.e., emotional, first person) mental episodes. While the research reviewed so far has highlighted how daydreams can operate and build off of spontaneous associative processes, I have not elaborated in detail on the processes underlining more abstract and directed daydreams that may operate in a more meaningful manner. In this next section, I will demonstrate how narrative processing may operate within daydreaming to organize mental elements in a conceptual and thematically meaningful way.

Daydreaming and narrative processes

Storytelling is inherent to humans, whether it is face-to-face, through music, visual art, or writing. What is even more impressive is that people tell stories about themselves to themselves on a daily basis. Because of their omnipresence, these self-stories allow a person to make sense of who they are in relation to the outside world and as such, to build a life story, which is at the basis of narrative identity (e.g., McLean, 2008). In fact, narrative identity is so intrinsic to human experience that it has been studied by researchers in cognitive science (Conway & Pleydell-Pearce, 2000; Conway, Singer, & Tagini, 2004), developmental psychology (Habermass & Bluck, 2000; McLean, 2008; McLean & Pasupathi, 2011), personality psychology (Bauer & McAdams, 2004; Lilgendahl & McAdams, 2011; McAdams, 1985, 1996), social psychology (Baumeister, Stillwell, & Heatherton, 2001; Langens & Schuler, 2005), and clinical psychology (Angus & Greenberg, 2011; Dimaggio &

Semeraris, 2004; McLeod, 1997). More specifically, narrative identity –and the life story –are built around socially normative life events such as attending school for the first time, graduating, and getting married (Habermas & Bluck, 2000). Together, these normative life events form the skeleton of the life script and offer scaffolding for other more repetitive elements of the life story, such as building friendships and learning new skills (Berntsen & Rubin, 2004).

In order to create a coherent life story and a stable narrative identity, individuals need to continuously connect their concept of self (i.e., who they believe they are) to ongoing experiences, a phenomenon also known as narrative processing. Specifically, narrative processing is the act by which people organize self-related mental episodes in an orderly and *meaningful* manner (e.g., Dorsch, 2012, 2014; McLean, Pasupathi, & Pals, 2007; Pasupathi, 2015; Williams, 2002). Narrative processing organizes mental elements in a chronological order through time, much like how events are structured in real life, and unlike night dreams that jump from different time points interchangeably without following a clear temporal structure (Bluck & Habermas, 2000; Carroll, 2001; Goldie, 2003; Lamarque, 2004). Furthermore, narrative processing creates thematic and causal coherence, such that the self-related mental episodes within a narrative are connected by similar goal states and autobiographical memories (Bauer, Tasdemir-Ozdes, & Larkina, 2014; Bluck & Habermas, 2000; Klinger, 2009; Singer & Bluck, 2001).

Narratives can also be broad or specific depending on the mental elements at their core. According to the dual memory system, both episodic and semantic autobiographical memories can be present within a narrative if they are relevant to the self-concept (i.e., goals, current concerns, beliefs, values; Conway, Singer, & Tagini, 2004; Singer & Conway, 2011).

What sets more specific narratives apart from strictly spontaneous associations however is that these self-relevant episodic memories get integrated into the self-concept through a meaning-making mechanism characteristic of narrative processing (Conway, Singer, & Tagini, 2004; Singer & Conway, 2011). That is, they become connected to other self-relevant memories in order to form a coherent story, which may then become important part of the broader life story (Singer, Blagov, Berry, & Oost, 2013). As such, a more specific narrative may contain one or more episodic memories linked together by a common underlying goal, value, or belief. An example of this can be found in research by Singer and Blagov (2000), where a participant narrates a specific self-defining memory underlined by the common theme of family in response to being asked “please recall a self-defining memory” (and after receiving an extensive definition of what a self-defining memory is):

When I was in seventh grade, I went to California with my family. We rented a van and were driving around in it. I remember how beautiful the scenery in the mountains was and what music was playing. I felt close to my family, because of the shared experience. (Singer & Blagov, 2000, p. 29).

In this example, the narrative contains very specific elements (e.g., seventh grade, California, van, music). It is possible that each of these individual episodic elements spontaneously associated within consciousness, as discussed in the section on daydreaming and associative processes. What makes them a narrative, and more than simple associations in this case is that they are combined together into a temporally logical manner and are bound together by the common theme of family and the goal of sharing experience. Of course, narratives can also encompass broader self-defining memories, as demonstrated in the following example:

I remember when I was really young all I would draw in art class was abstract pictures of our basement door. I remember being really intrigued by the basement door because you could open one half of it while the other half remained closed, but I don't exactly know why I drew all of these pictures. I guess I was easily amused. (Singer & Blagov, 2000, p. 32).

In this instance, the narrative contains repeated memories of drawing a basement door (i.e., not just one specific occasion). Like the more specific narrative above, this broader narrative follows a temporally logical order and contains self-defining elements that are linked together by the common theme of childhood and the goal of understanding the basement door.

Of particular relevance to this dissertation, a well-researched effect of narrative processing is its association with the self-concept (e.g., Kernis & Goldman, 2003; Markus & Wurf, 1987; McLean, Pasupathi, & Pals, 2007). According to Conway (Conway, 2005; Conway et al., 2004), narrative processing is central to the formation of the self-concept because it allows for the extraction of meaning from more concrete memories by creating thematic links between self-related events, and ultimately organizing a person's self-knowledge into a coherent life story (Pasupathi, Mansour, & Brubaker, 2007; Pebble, Addis, & Tippett, 2013).

These links between remembered or imagined events and the self are also termed self-event connections (Pasupathi, Mansour, & Brubaker, 2007). That is, making self-event connections allows a person to be clear and certain about who they are in relation to past experiences, which contributes to the development of the self-concept by updating the life story with self-relevant events (McLean & Thorne, 2006). According to Pasupathi and colleagues (2007), four general types of self-event connections exist. The first is called an *explain/illustrate link* and is characterized by the self 'causing' an experience to occur

(Pasupathi et al., 2007). For example, a person could narrate how she used her cooking skills to cause a catering event to unfold smoothly, as highlighted in the example below:

Late last year a close friend hosted a Christmas party at a rental in Park City. She knew that I was a pretty good cook and invited me to cater it. My friend (we'll call her Lois), is around my mother's age, so I didn't really expect to be invited at all. Therefore, I was flattered when she included me, if only as the help. Lois provided some of the recipes and asked me to come up with some of my own. She gave me the credit card and sent me to the market for the ingredients. Eight hours later the guests began arriving just as I dished up the last menu item. Things went even better than expected. (Pasupathi, Mansour, & Brubaker, 2007, p. 96).

This type of self-event connection provides stability to the life story by highlighting or confirming elements of the self-concept that already exist. Similarly, *dismissed-links* occur when a person narrates a situation that goes against the self-concept, but then attributes these negative implications for the self to external causes, as highlighted in the example below:

I know that this may seem silly, because a lot of people do it, and it was 4 years ago, but it is still embarrassing nonetheless. In high school when taking a test in my French class, a subject that I found very challenging, while taking a difficult test, I didn't know what to write, so I looked at the person's paper who was sitting next to me. I don't think that cheating is right and it is not as though I copied the entire test, or as if I smuggled in answers, but I did cheat. (Pasupathi, Mansour, & Brubaker, 2007, p. 97).

By dismissing the importance of this event for the self, the person's self-concept does not change and keeps its original stability. Ultimately, both explain/illustrate and dismissed links are narrated to keep the self-concept intact and unchanged.

Conversely, both *cause relations* and *reveal relations* links are narrated in order to demonstrate how past experiences have shaped and modified the self-concept. More specifically, cause relations are characterized by events leading to changes in the self, such as

when a person becomes more compassionate through the act of writing their autobiography, as shown in the example below:

I've always wanted to write my autobiography but never found the time and when I did, I discovered I was not sure I wanted to expose my families secrets, sadness, failing, and unhappiness. I finally decided to go ahead but not tell anyone in my family. At first I wrote in a superficial manner – that was five years ago- now, I'm able to go more in depth and as I write, I've found more compassion for those people who shaped my life. (Pasupathi, Mansour, & Brubaker, 2007, p. 98).

Alternatively, reveal relations lead to change in the self-concept by bringing to light a part of the self that had previously gone unnoticed by the individual, as demonstrated in the example below:

A scene from War of the Roses, a Michael Douglas movie, pinpointed what I felt for many years but did not realize. It was a need for freedom. My marriage has been a very good one yet in some respects it might have been best if I had stayed single. I was an airline stewardess – still love airplanes and flying. At the time (1954), when you got married you could no longer continue flying so I took on other duties with the airline. Things were never the same and although I love my husband I'm afraid there will always be regrets. (Pasupathi, Mansour, & Brubaker, 2007, p. 99).

Knowing this, I theorize that narrative processing –with its meaning-making and self-event connection components –can also contribute to self-concept clarity by providing the individual with information on the self that is clear, consistent, and stable over time (Campbell, 1990; Campbell & Lavellee, 1993). That is, creating narratives about the self through daydreaming can help confirm the importance and consistency of goals, values, and beliefs and this, within different imagined contexts (e.g., at work, with a friend, while traveling, etc.).

Of course, past research has posited that in order to have an effect on the self-concept, narrative processing needs to be paired with autobiographical reasoning (e.g., Dunlop &

Walker, 2013), a mechanism that leads to self-concept formation by allowing a person to actively evaluate memories and link them back to the self (Habermas & Bluck, 2000; McAdams, 1996; McLean, Pasupathi, & Pals, 2007). This allows a person to make connections between previously experienced events and the self and in turn, to extract personal meaning from these experiences (Habermas, 2011; Habermas & Bluck, 2000; McLean, Pasupathi, & Pals, 2007; Pasupati & Mansour, 2006; Singer & Bluck, 2001). Ultimately, autobiographical reasoning is a function within narrative processing that involves explicit awareness because it requires the person to consciously interpret past experiences (Pasupathi, 2015).

Knowing this, it seems reasonable to speculate that if certain daydreams are truly underlined by narrative processing, then an explicit awareness should also accompany this type of perceptual decoupling (e.g., Schooler, 2002). However, narrative processing can overlap with awareness, but it is not redundant of it. That is, explicit reasoning and awareness are not always necessary for events to become narrated, and in turn, for this narrative to shape a person's self-concept (Pasupathi, 2015). Indeed, just under half of narratives assessed using interviews have been found to contain explicit autobiographical reasoning (McLean & Thorne, 2006; Pasupathi, 2006; Pasupati, Mansour, & Brubaker, 2007), which suggests that although important, awareness of autobiographical experiences does not necessarily equate narrative processing.

More specifically, Pasupati (2015) crafted a theory in order to explain the processes involved in narrative formation that may operate below awareness. One of these processes involves the presence of tacit themes, which are represented in the narrative through subtle linguistic choices such as 'I' versus 'we', or even the amount of detail with which an event is

narrated (Tausczik & Pennebaker, 2010). The presence of these linguistic elements thus indicate beliefs, values, and ideologies that are not explicitly evaluated by the person, but that nonetheless shine through in the way experiences are narrated (Pasupati, 2015).

During narrative processing, a person also experiences the unfolding of autobiographical memories in relation to the social world surrounding the self. That is, the self is rarely experienced and imagined without accompanying social elements (i.e., cultural norms, close friends, family, work environments, etc.). As such, these remembered social contexts allow the person to form and solidify views of the self by seeing how that self interacts with social others (Hardin & Conley, 2001; Sinclair, Hunsinger, Skorinko, & Hardin, 2005; Swann, 2000). In turn, weaving social others into personal narratives allows the self to be represented in a consistent and stable way across different themes and situations (De La Ronde & Swann, 1998; McLean & Pasupathi, 2011; Pasupathi, 2015). For example, a person can create a narrative of themselves at work, and then create a narrative of themselves with a close friend. If core aspects of the self are present in both of these narratives (e.g., goals, values, beliefs), then these imagined social interactions highlight and confirm a consistent concept of self. Through such relational positioning, narrative processing can thus help people make sense of the self-concept in a relatively implicit way (i.e., whether it is consistent or not; Green & Donahue, 2009; Oatley & Mar, 2005).

This is in line with research on daydreaming, which demonstrates that social daydreams (i.e., thinking of social others) are associated with positive socio-emotional adjustment during significant life events (Poerio, Totterdell, Emerson, & Miles, 2016). In this research, one hundred and three first year university students' daydreams were probed through experience sampling over the course of twenty-eight days. To make sure that

participants were going through a significant life event, the study took place during the first three weeks of the fall undergraduate semester when the majority of first year undergraduate students have moved away from home, or are at least experiencing a drastically different educational experience. During that time period, participants received daily probes on their cellphones at random intervals between ten in the morning and ten at night. Once probed, participants were asked if they were engaged in daydreaming, and if so, whether the daydream involved another person (or people), real or imagined. Furthermore, participants were asked to rate if their task daydream was positive or negative, and whether it made them feel more lonely or connected. At the end of the experience-sampling period, participants were asked to fill out questionnaires on loneliness and social adaptation to university.

The authors suggest that daydreams involving others lead to positive adjustment because they can help the person regulate emotions before engaging in a social situation. They also posit that social daydreams may allow a person to extract meaning and make sense of self-relevant events (Taylor, 1983; Park, 2010) by helping the person to imagine past and future goal-relevant social interactions. Based on the research on narrative processing, relational positioning, and the self, it follows that narrative processes operating below and at the level of awareness are likely at the root of the meaning making mechanism mentioned by Poerio et al. (2016). Although these authors do not make this distinction, it is possible that imagining the self in relation to other people important in the university narrative –such as other students, or one’s parents –may help to reinforce the belief that starting a post-secondary education is important to the self and as such, should become part of one’s self-concept. More specifically, imagining *close* –more so than distant –others may help individuals during difficult life events by fostering life satisfaction (Mar, Mason, & Litvack,

2011), possibly because close others should be an important part of a person's narrative identity and life story. This research thus further highlights the importance of studying daydreaming as a multi-faceted construct underlined by both associative and narrative processes. Since Poerio et al (2016) only viewed daydreaming as a uni-faceted phenomenon, they missed an important opportunity to determine whether daydreams underlined by associative processes could lead to similar social adjustment, or whether it is truly narrative processing that gives daydreams this socio-emotional function.

Pasaupathi (2015) also posits that a person can create narratives by encoding patterns of sensory information into coherent embodied narratives. Specifically, embodied narrating involves the act of continuously mapping the bodily states and the environmental conditions associated with an experience in order to generate feelings in one's physical body (Damasio, 1999, 2010). In turn, these feelings of being a body in relation to the external world allow for the construction of a core sense of self; that is, of a self that exists not only as an abstract, solitary construct, but as a sensing, feeling agent in constant interaction with external events and other selves (Legrand, 2006, 2007; Pasupathi, 2015; Zahavi, 2005).

Interestingly, the capacity to use sensory information to form the embodied self also allows for the simulation of future events by recruiting pre-experienced patterns of feelings and overlapping them onto imagined future experiences (Damasio, 1999, 2010). By transporting the conceptual *and* embodied self in this way, narrative processing is made accessible in the past, present, and future. That is, past sensations and feelings important to the 'realness', and temporal and thematic coherence of the narrated self can be transported through time and across events, which allows for the experience of a complete sensing,

feeling, and thinking self (Damasio, 2003; Gallagher, 2000; Legrand, 2006; Martin, 2005; Morin, 2006; Neisser, 1988; Pebble, Addis, & Tippet, 2013).

Interestingly, Demblon and D'Argembeau (2014) found that people use narratives to project into the future, and to organize future thoughts into coherent event clusters. That is, event clusters mean that future events are not imagined in isolation, but are embedded within a broader sequence of events that are linked by a common theme. In this research, participants were randomly assigned to report everything that came into their minds from either the near future (i.e., in the next week) or the distant future (i.e., in the next year; Barsalou, 1988). After five minutes of uninterrupted thought flow, participants were instructed to think back at the events that they had just imagined, and to decide whether these followed a narrative structure, and whether the events were linked in one way or another (i.e., chronological link, thematic link, causal link, goal-related link, etc.; Brown & Schopflocher, 1998; D'Argembeau & Demblon, 2012). Finally, participants answered on a yes or no basis whether the events they had reported were part of a goal or used as a means to achieve their goals.

Results demonstrated that participants in both conditions reported events linked by chronological order and thematic coherence more frequently, and that participants in the distant future condition reported events to be organized by goals more frequently than participants in the near future condition. Overall, these authors found that 48% of near future events and 66% of distant future events were organized into narrative clusters. This suggests that events in prospective daydreaming do not simply share episodic similarities, but are linked by broader themes and causal sequences characteristic of narrative structures (e.g., Bauer, Tasdemir-Ozdes, & Larkina, 2014; Bluck & Habermas, 2000; Singer & Bluck, 2001). Although this research did not make the distinction between associative and narrative

daydreaming, it nonetheless provides preliminary evidence for a relation between narrative processing and daydreaming.

Furthermore, episodic and semantic autobiographical memories build off of each other to construct a clear sense of self (e.g., Berntsen et al., 2013; Berntsen & Jacobsen, 2008; Conway et al., 2004; Pebble, Addis, & Tippet, 2013; Singer & Blagov, 2004). Interestingly, Pebble et al. (2013) have theorized that it is narrative processing that makes the progression from associative episodic memory to conceptual semantic memory possible by extracting meaning and creating thematic links between unique and detail rich experiences. Similarly to Demblon and D'Argembeau's (2014) findings and Pasupathi's (2015) theory, Pebble et al. (2013) also argue that narrative processing uses semantic memories to create temporal self-continuity and extended self-knowledge (i.e., the feeling that the self is the same and extends in the past, present, and future) by transforming self-event memories into coherent life stories (Addis & Tippet, 2008; Habermas & Bluck, 2000; McAdams, 1993, 1996, 2001; McLean, 2008; Pasupati et al., 2007; Reese, Yan, Jack, & Hayne, 2010; Singer, 2004; Singer & Blagov, 2004).

Although in a different line of investigation, these findings nonetheless offer an unexplored explanation for the research demonstrating that autobiographical memories are necessary for constructing and projecting the self (e.g., Smallwood & Schooler, 2006; Smallwood et al., 2011; Szpunar & McDermott, 2009). In this case, it may be that episodic memories are abstracted and conceptualized into semantic memories through narrative processing during daydreaming –whether the person is aware of this or not –(Blagov & Singer, 2004; Schechtman, 1994; Thomsen, 2009), which then allows the person to gain a

broader, summarized temporal and thematic experience of the self (e.g., Demblon & D'Argembeau, 2014; Pebble, Addis, & Tippet, 2013).

The greatest problem with pairing the research on autobiographical memory retrieval and daydreaming on the one hand, and narrative processing and the self on the other, is that the effect of narrative processing on self-concept has mostly been studied in reference to narratives about the self that are told versus those that are not. For example, whether a memory is integrated into a person's narrative identity or life story over time depends on whom it was shared with, and whether it was shared at all (McLean, Pasupathi, & Pals, 2007). When these narratives are told, they get integrated into the self-concept because they reinforce the importance of the story to the self (Kernis & Goldman, 2003; Markus & Wurf, 1987; McLean, Pasupathi, & Pals, 2007). Because of this, untold stories are less likely to get integrated into the self-concept (Pasupathi, McLean, & Weeks, 2009).

Knowing this, it is still unknown whether daydreams underlined by narrative processes nonetheless count as told stories. McLean, Pasupathi, and Pals (2007) have suggested that imagined audiences could have a similar effect on the self as telling a narrative to a real audience or person. Since daydreaming often symbolise a person's social world (e.g., Poerio et al., 2015, 2016), these thoughts –paired with narrative processing – could represent an internal way of integrating autobiographical memories into the self.

Notwithstanding these limitations, the research that I have reviewed in this section offers evidence for the idea that daydreams can be organized in a conceptual, abstract, and thematic manner through narrative processing. Because of this, I expect narrative daydreams to contain elements such as temporal coherence (Bauer, Tasdemir-Ozdes, & Larkina, 2014; Bluck & Habermass, 2000; Singer & Bluck, 2001), thematic coherence (Bauer, Tasdemir-

Ozdes, & Larkina, 2014; Bluck & Habermass, 2000), causal coherence (i.e., events linked by motivations, explanations, causes; Bluck & Habermass, 2000; Klinger, 2009; Singer & Bluck, 2001), and context (i.e., who, what, where, how; Bauer, Tasdemir-Ozdes, & Larkina, 2014). I also expect that daydreams underlined by narrative processing will have an effect a person's self-concept clarity over and above associative daydreaming, since these may more meaningful links between the elements of the self (i.e., perceived traits, values, goals) and important life events.

Self-concept clarity, self-esteem, and self-consciousness

In early research days, self-concept clarity was viewed as a unitary construct defined as a person's general perception of who they are (i.e., their sense of self; Markus & Wurf, 1987). Because of this very broad definition, researchers mainly measured self-concept clarity through self-esteem, which today is understood as just one aspect of the self-concept. Indeed, self-concept clarity is now understood as a multifaceted construct comprised of a multitude of cognitive appraisals that a person makes about their own personality traits, values, goals, and memories (Greenwald & Pratkanis, 1984; Kihlstrom & Cantor, 1984; Kihlstrom et al., 1988; Markus, 1977; Nezlek & Plesko, 2001).

These cognitive appraisals about the self can be further broken down into content, structure, and evaluations. Content refers to knowledge/awareness (i.e., who, what, where, how) and evaluations (i.e., self-esteem; positive and/or negative self-beliefs) about the self, while structure refers to how these knowledge and evaluation components are organized (Donahue, Robins, Roberts, & John, 1993; Linville, 1985, 1987; Showers, 1992). As such,

one way for the self-concept (i.e., how a person perceives themselves) to be organized is through self-concept clarity (e.g., Campbell, 1990; Campbell & Lavalley, 1993).

Self-concept clarity is a way to organize the self-concept because it determines if knowledge and evaluative elements about the self are stable over time, internally consistent, and clear (Campbell, 1990; Campbell & Lavalley, 1993). However, self-concept clarity is a reflection of a person's belief about themselves and as such, is limited to the accuracy of those beliefs. That is, a person with a clear and stable sense of self is not necessarily more self-aware (Wicklund & Eckert, 1992), but is instead more consistent in the way that they present themselves to themselves and to others. This also means that people with higher self-concept clarity tend to be clearer about which personality traits, values, and goals they perceive themselves to possess, but are not necessarily more aware of these traits, values, and goals.

Self-concept clarity can be operationalized as both a state and a trait because it is subject to momentary fluctuations (e.g., opinion of others; memories; ongoing perceptions), but is also extremely stable over time such that individuals are likely to perceive themselves in similar ways over weeks, months, and years (although after ten years self-perceptions are likely to have undergone some change as the self evolves over time; Campbell & Lavalley, 1993; Conley, 1984; Lodi-Smith, Spain, Cologgi, & Roberts, 2017).

The self-concept can also be assessed through self-consciousness and self-esteem. Firstly, self-consciousness represents the awareness of internal states, and of how others perceive the self, such that the self becomes 'an object of one's own attention' (Duval & Wicklund, 1972; Wicklund & Golwitzer, 1987; Wicklund, 1975, 1978). By bringing thoughts, feelings, motives, physical sensations, and others' external perceptions to the

forefront of one's attention, self-consciousness allows the person to gain information about themselves and integrate it into the self-concept (e.g., Moring & Everett, 1990). In the current literature, self-consciousness has been found to related to well-being both negatively and positively (e.g., Grant, Franklin, & Langford, 2002; Harrington & Loffredo, 2010; Lyke, 2009; Trapnell & Campbell, 1999), mainly because an awareness of self can bring about a greater understanding of goals and values (i.e., positive), but also a greater anxiety related to what others think when they see the self in social contexts (i.e., negative; Carver & Glass, 1976; Kocovski & Endler, 2000; Mor & Winquist, 2002; Trapnell & Campbell, 1999).

Secondly, self-esteem represents self-evaluations (i.e., either positive or negative; Rosenberg, 1979) of the self-concept. Specifically, self-esteem encompasses both beliefs about the self and emotional states associated with these evaluations (i.e., associating positive or negative emotions with how one thinks about the self; Gray-Little, Williams, & Hancock, 1997). Although certain researchers choose to view self-esteem as a multi-faceted construct (e.g., people with high self-esteem as having secure versus fragile self-views; Jordan, Spencer, & Zanna, 2003; academic versus other specific types of self-concept; Marsh & O'Mara, 2008), Rosenberg's (1979) conceptualization of the evaluative component of self-concept –self-esteem, is a global one. This global component thus encompasses all possible specific subtypes and focuses on a person's general emotional evaluation of self (usually compared to others; Marsh, 1986; Marsh & Craven, 2006; Marsh & Hattie, 1996). This global understanding of self-esteem is relevant to this dissertation because it speaks to how daydreams may contain these evaluations of self –either through associative or narrative processes.

Overall, self-concept clarity, self-consciousness, and self-esteem seem particularly relevant to the daydreaming literature –and especially to this line of research –because they represent self-related content that a person becomes aware of and organizes (i.e., the way a person perceives themselves) into a clear and coherent structure over time, similarly to how I propose associative and narrative processes to organize daydreaming content. That is, associative processes organize daydreaming content in a way that is more random (i.e., spontaneous), which allows for the retrieval of more specific and emotionally salient content. Alternatively, narrative processes organize daydreaming content in a way that is temporally, thematically, and causally coherent, which allows for the retrieval of broader self-relevant mental content used for meaning-making.

As reviewed earlier, daydreaming content (i.e., mental images, thoughts, imaginings) often contain elements of the self-concept, such as goals, values, and autobiographical memories (e.g., Andrews-Hanna et al., 2013; Andrews-Hanna et al., 2010; Andrews-Hanna, Smallwood, & Spreng, 2014; Klinger, 2009; McMillan, Kaufman, & Singer, 2013; Stawarczyk et al., 2011; Stawarczyk, Cassol, & D’argembeau, 2013). It is then possible that the structure (i.e., clarity, temporal coherence, internal consistency) of the self-concept obtained through self-concept clarity is affected by the way self-related information (i.e., the content of the self-concept obtained through self-consciousness and self-esteem) are organized within daydreams. In this case, I expect narrative daydreams –as opposed to associative daydreams –to be especially useful in organizing elements of the self-concept into this clear, temporally coherent, and internally consistent form, specifically because these daydreams reinforce meaningful self-stories that perpetuate a person’s beliefs about their own personality traits, values, and goals (e.g., Nezlek & Plesko, 2001; Oyserman, 2004; Pasupathi,

Mansour, & Brubaker, 2007; Steiner, Thomsen, Pillemer, 2017). I also expect self-consciousness and self-esteem to be related to associative and narrative daydreams, in that specific and emotional associations, and coherent narratives are both likely to contain self-evaluations and bolster awareness of self-related elements.

The present research

Taken together, the research that I have summarized thus far highlights that daydreaming can be viewed as a multi-faceted construct underlined by associative *and* narrative processes (e.g., Seli, Risko, & Smilek, 2016). Furthermore, I have demonstrated that conceptualizing daydreaming as a multi-faceted construct can more accurately inform its relation to the self-concept (Andrews-Hanna et al., 2013; Andrews-Hanna et al., 2010; Andrews-Hanna, Smallwood, & Spreng, 2014; Klein et al., 2004; Klinger, 2009; Leslie, 1987; Lewis & Ramsay, 2004; McMillan, Kaufman, & Singer, 2013; Stawarczyk et al., 2011; Stawarczyk, Cassol, & D'argembeau, 2013; Pebble, Addis, & Tippet, 2013).

Based on the theoretical and empirical evidence that I have reviewed, the main purpose of my doctoral dissertation is to explore the role of associative and narrative processes in daydreaming. Since no research to date has experimentally examined *how* daydreams become either associative or narrative (Seli et al., 2016, 2017; Zedelius & Schooler, 2016), my dissertation research will focus on manipulating the processes likely to underlie each type of daydreaming. More specifically, I will investigate how associative and narrative processes are initiated –either through unique external stimuli or abstract and goal-laden internal elements, respectively –in order to understand how they relate to daydreaming content (Figure 1, panel A and B, respectively). After exploring the processes underlying

both types of daydreaming, I will examine how each associative and narrative daydreams relate to self-concept clarity, self-consciousness, and self-esteem (Figure 1, panel C).

As I will elaborate shortly, experiments one and two tested very similar hypotheses. That is, they both explored how associative and narrative processes relate to daydreaming content, and how these different daydreaming contents relate to self-concept clarity, self-consciousness, and self-esteem. However, both studies manipulated associative and narrative processes differently, in order to triangulate findings and as such, increase the generalizability of results (e.g., Crandall & Sherman, 2016; Makel, Plucker, & Hegarty, 2012; Meehl, 1978; Schmidt, 2009; Stroebe & Strack, 2014).

In experiment one, associative processes were manipulated using random stimuli from the external environment. That is, short sentences (e.g., camping trip; Schlagman & Kvavilashvili, 2008) were presented on the screen every one and a half seconds as participants underwent a modified sustained attention task (i.e., participants had to press ‘v’ on the keyboard when they saw a vertical line appear, as opposed to horizontal lines; this task was the same in all conditions) in order to trigger associations in memory. In experiment two, associative processes were manipulated by asking participants to voice whatever was going through their heads out loud (i.e., speak aloud protocol; Gabora, 2010; Olson, Duffy, & Mack, 1984) in order to trigger associations in memory. In experiment one, narrative processes were manipulated by asking participants to write down their goals and rate them on dimensions such as importance to self and commitment, in order to make salient narrative elements of self. In experiment two, narrative processes were manipulated by asking

Figure 1. Visual representation of broad hypotheses investigated in experiments one and two.

participants to list the seven most important events in their lives, and to write their life story according to these narrative pillars (i.e., the ‘flow’ of the life story should move from one pillar event to another).

Preliminary steps

As I have presented in the theoretical framework for this dissertation, there is a core implicit underlying hypothesis that participants’ reported daydreams will contain associative (i.e., specific, emotional) and narrative (i.e., temporally coherent, thematic, causally

coherent/meaningful) elements. As such, I expect that daydreams with more associative elements will cohere into the hypothesized associative daydreaming category, and that daydreams with more narrative elements will cohere into the hypothesized narrative daydreaming category. Because these daydreaming categories have not yet been explored in empirical research, a core goal of this dissertation is to use the sample of daydreams collected in experiments one and two to empirically test these assumptions derived from theory. As such, before testing any further hypotheses, I ran two exploratory factor analyses (one on daydreaming items rated by participants during experimental thought probes, and one on coder-derived items obtained by written daydreams obtained through experimental thought-probes; these methods are described in detail below). These exploratory factor analyses were run on the sample as a whole (i.e., experiments one and two) to obtain a larger sample size, since all participants were recruited at the same time and since both experiments were hypothesized to manipulate associative and narrative processes. I chose to run exploratory factor analyses to help me determine if the narrative and associative categories were indeed in line with the expectations derived by theory. As such, all hypotheses described below were tested on the categories derived from the factor analyses (which were also guided by theory; Comrey & Lee, 1992; Costello & Osborne, 2005). These exploratory factor analyses are described in the results of experiment one, but also apply to experiment two.

Hypotheses

Hypothesis 1: I expect daydreams to contain more narrative elements over time –such as temporal coherence/ordered events (e.g., narrated events unfold in a chronological order; Bauer, Tasdemir-Ozdes, & Larkina, 2014; Bluck & Habermass, 2000; Singer & Bluck,

2001); *thematic coherence* (e.g., elements in the narrative are related by a common theme, such as family, getting married, solitude, etc.) –if participants have written and thought about their current concerns and life story prior to the daydreaming period. That is, I expect that these narrative elements will not be random, and they will fit together under one umbrella theme (Bauer, Tasdemir-Ozdes, & Larkina, 2014; Bluck & Habermass, 2000), *causal coherence* (i.e., events linked by motivations, explanations, causes; Bluck & Habermass, 2000; Klinger, 2009; Singer & Bluck, 2001), and *context* (i.e., who, what, where, how; Bauer, Tasdemir-Ozdes, & Larkina, 2014).

Hypothesis 2: I expect daydreams to contain more associative elements over time – such as specific event and self-related information and higher emotionality (Berntsen et al., 2013; Berntsen & Jacobsen, 2008) –if participants have been exposed to stimuli from the external environment (i.e., random words flashing on the computer screen; talking out loud). Associations should not follow a coherent line of thought (like narratives).

Hypothesis 3: Although associative processes can provide the building blocks for self-related mental elements, narrative daydreams will allow for more meaning-making between the daydream and the self (Pasupathi, Mansour, & Brubaker, 2007; Singer & Bluck, 2000). As such, participants who report more narrative daydreams should also demonstrate more self-concept clarity than individuals who report more associative daydreams.

Hypothesis 4: Since both associative and narrative daydreams may contain self-related elements (either through emotional and specific self-related elements, or through coherent self-related narratives, respectively), both associative and narrative daydreaming will be related to greater self-consciousness (i.e., awareness of self) and self-esteem (i.e., evaluation of self). That is, both associative and narrative daydream content should relate to

more awareness and evaluations of self because self-related information is made easily accessible in consciousness. As such, daydreams low on both associative and/or narrative content would predict less self-concept consciousness and self-esteem due to this lack of self-related content.

Method: Experiment one

Please see Appendix A for specific information on the pilot experiments that have informed experiments one and two. The purpose of experiment one was to present participants with either unique external stimuli (i.e., words) or make salient internal narrative elements (i.e., personal goals/current concerns) in order to manipulate associative and narrative processes underlying daydreaming, respectively. The daydreams presented in Table 1 from the pilot data are perfect examples of what I am expecting to find in associative and narrative daydreams.

I designed the external stimuli condition to affect the occurrence of associative daydreams by targeting both associative processes and autobiographical memory retrieval (e.g., Berntsen et al., 2013). That is, I have chosen to base the manipulation in the external stimuli condition on autobiographical memory research because I believe –after reviewing the literature on daydreaming and the self-concept –that autobiographical memories will be most able to activate specific information previously stored in memory. Since I expect associative daydreams to follow associative processes, I also expect that the activation of these associations will come from unique and external –as opposed to repetitive and internal – stimuli (e.g., Berntsen et al, 2013).

Table 1.

Associative and narrative daydream examples from pilot data

<i>ID</i>	<i>Category</i>	<i>Written description</i>
3	Narrative	I was day dreaming about going to the gym with my sister and looking at myself in the mirror and finally being happy about my results and what I saw
19	Associative	The word *nail clippers* triggered a memory of being a young child sitting on the bathroom counter while my mom cut my toenails, accidentally cutting one too short and drawing blood. It was painful and somewhat traumatic at the time and is an easily accessible memory involving some state of chaos and ill feelings.

Although it is possible to design an experiment where participants are presented unique and repeated stimuli in order to form new associations, as in research by Berntsen et al. (2013), these artificial associations are usually self-unrelated (e.g., cars, plants, birds) and may not prove the most direct way to tap into self-related mental elements, since one of the core interests of this dissertation is to understand how daydreaming relates to the self-concept. As such, I believe that the exploration of my research questions necessitates an experimental manipulation that will tap into self-related mental elements.

Furthermore, much experimental research has used the sustained attention to response task paired with thought probes to study daydreaming in the laboratory (SART; Robertson, Manly, Andrade, Baddeley, & Yiend, 1997). During this task, participants are instructed to click on the computer mouse when they see a non-target stimuli appear on the screen (e.g., the colour green; the numbers two, five, six, and eight), but to withhold from pressing the mouse when they perceive target stimuli (e.g., the colour yellow; the numbers one, four, three, seven, and nine). Probes also appear on the screen at intermittent intervals in order to ‘catch’ participants engaged in daydreaming, when participants may not have realized this themselves (i.e., experimenter caught; Schooler et al., 2011; Schooler, Smallwood, Christoff,

Handy, Reichle, & Sayette, 2011). While this method is widely used (Weinstein, 2018), it does not allow for the manipulation of stimuli that may lead to spontaneous daydreams.

Instead of using the traditional SART paradigm, I have chosen to base the external stimuli manipulation for the first and second experiments of this dissertation on an involuntary recall task used in autobiographical memory research by Schlagman and Kvavilashvili (2008). As I will describe in detail, this manipulation is very similar to the SART, such that participants will be required to identify target and non-target stimuli during a vigilance task. I will also include experimenter-caught thought probes in order to determine the occurrence and nature of daydreams during this task. However, the target and non-target stimuli will be paired with additional stimuli shown to stimulate the retrieval of autobiographical information. Specifically, this stimulus will appear in the form of short sentence cues (e.g., ‘family trip’; ‘nail clippers’; Appendix B) that will flash on the screen (overlaid on top of the target and non-target stimuli) every one and a half seconds (Schlagman & Kvavilashvili, 2008) for the entire duration of the experiment.

The shortfall of this methodology is that I cannot fully and precisely experimentally control whether participants experience unique stimuli (because I do not know which situation represented in the sentence-cues may be uniquely associated to participants’ memories and other mental elements) and in turn, form associations that lead to specific and emotionally salient daydreams. This means that more conceptual mental episodes may appear within the stream of consciousness for participants in the external stimuli condition. In fact, one might say that choosing to manipulate self-related external stimuli in the first place is too complicated and will introduce too much noise, given that non-experimental –and uncontrollable –external stimuli will unquestionably be present during the experiment (e.g.,

noise coming from the computer, smell of the laboratory, surrounding objects, bodily functions like hunger). I agree that if participants in the external stimuli condition would be compared to a control group undergoing the same task, but without the word-cue manipulation, then the noise would far outweigh the strength of the experimental manipulation, thus making the external stimuli condition weak (i.e., less power; Cohen 1988, 1992). However, the external stimuli condition will be compared to a current concerns manipulation that I believe to be strong enough to occupy participants' minds with plenty of self-related *internal* stimuli (i.e., goals, life stories). Ultimately, I believe that the strength of the difference between the two conditions will overcome the possible noise in the external stimuli manipulation, such that participants in the current concerns condition should experience more narrative daydreams. Indeed, I designed the current concerns condition to affect the occurrence of more narrative daydreams by targeting goal-salient internal stimuli characteristic of narrative processing (Conway, 2005; Bernsten, 2010; Klinger, 2009; Klinger, Gregoire, & Barta, 1973; Smallwood, 2013).

Participants

To be selected for this experiment, participants had to be enrolled full-time or part-time at Carleton University. All participants were recruited through the Psychology Participant Pool/SONA system. Students enrolled in Psychology 1001, 1002, 2001, and 2002 classes had the chance to gain 1% of their total grade by enrolling in experiment one. A total of 152 participants were recruited for this experiment (79 in the external stimuli condition, and 73 in the current concerns condition; all participants were randomly assigned to condition). I aimed to recruit 150 participants in a between-person design because it would

provide enough power to find a small to medium effect size if one truly existed in the population³ (Bosco, Aguinis, Singh, Field, & Pierce, 2014; Cohen, 1988, 1992). Of course, power analysis is limited in estimating the sample size that will be needed to obtain the desired effect. However, the power analysis did offer a benchmark and guideline for research of this nature (e.g., Simonsohn, 2014).

Three participants exist in the SPSS dataset over the number of participants reported above because the computer program malfunctioned before study and condition could be recorded (along with any other data). Of this final sample, 76.3% of participants were female, 21.1% were male, and 2% identified as other. The age of this sample ranged from 17 to 48 with a mean of 20.51 and a standard deviation of 4.51. Furthermore, 54.6% of participants identified as Caucasian/white, 15.8% identified as Black (i.e., African, African American), 4.6% identified as South Asian (i.e., Indian, Pakistani), 4.6% identified as East Asian (i.e., Chinese, Japanese), 9.9% identified as Arabic or Central Asian, 3.9% identified as Hispanic, Central, or South American, 2% identified as Aboriginal, and 4.6% identified as other.

Procedure

This first study was of an experimental between-person nature and was conducted in a laboratory setting. I chose to adopt a between-person design because participants in the pilot experiments were more likely to report less (or no) daydreams at time two in a within-person

³ When I say ‘medium’ effect size, I am referring to the benchmarks for small, medium, and large effect sizes found in Cohen (1988). That is, for Cohen’s *d*, eta, and Hedge’s *g*, a small effect is equivalent to .20, a medium effect to .50, and a large effect to .80. For a correlation, a small effect is equivalent to .10, a medium effect to .30, and a large effect to .50. Since experiment one will be a between-person design, I chose to run a sensitivity analysis in g-power to determine the size of the effect that I would be able to detect with 80 percent power and a sample of 150 participants. To do this, I chose the F-test family and the ANOVA: Repeated measures, between factors statistical test. The test demonstrated that this design (with two groups at at least 4 measurements) would be sensitive enough to find an effect of $f = .18$, which is the equivalent to a Cohen’s *d* of .36 and a correlation of .17.

design (see Appendix A, Table 3 for specific details). For recruitment, an announcement was posted on Carleton University's SONA system, where students were told that they can participate in a study on daydreaming and well-being. Students were told that for this experiment, they will have to physically come into the Carleton University Happiness laboratory and to think about themselves, complete an attention task, and fill out short online questionnaires (see Appendix C).

Please see Figure 2 for a visual representation of experiment one. Once students signed up to participate, they were randomly assigned to the external stimuli or current concerns condition. In the external stimuli condition, participants were instructed to sort horizontal line patterns from vertical line patterns for a total of four hundred trials. Words were overlaid on top of the line patterns at each trial to prime spontaneous self-related information (see Appendix B). In the current concerns condition, participants were instructed to identify goals and concerns that are currently on their mind by completing the current concerns inventory (Cox & Klinger, 2004) for ten minutes. Pilot testing confirmed that ten minutes gave participants enough time to complete the pre-experimental portion of the inventory while also preventing them from getting bored (i.e., from a longer manipulation).

Next, participants were asked to complete the same pattern-sorting task as participants in the external stimuli condition, but without the overlaid words. To keep the details of both conditions as consistent as possible, word jumbles (i.e., letter strings that sound like words but with no particular meaning) were overlaid on top of the line patterns instead. For both conditions, ten thought probes randomly appeared within every block of forty trials to determine if participants were experiencing daydreams. For these experimenter-caught probes, the task was paused, allowing participants to fill out a short questionnaire pertaining

to the nature and content of their daydreams (see Appendix B). Pilot testing confirmed that ten daydreaming probes were sufficient to obtain a minimum of three daydream reports per participants, which are necessary for multilevel modeling analyses (see below).

Specifically, participants were greeted by myself, or a trained research assistant when they first arrived to the Carleton University Happiness laboratory. Then, the experimenter led the participant into an empty testing cubicle and gave them a physical copy of the consent form (see Appendix B). After the participant read and signed the consent form, the experimenter entered an anonymized participant ID into the Superlab software and instructed the participant to sit at the Macintosh computer. After this, the experimenter let the participant know that they will undergo a brief practice trial with three target stimuli to make sure that they understand their role in the study.

Figure 2. Visual representation of experiment one.

That is, participants were instructed to identify the three target stimuli (i.e., a black vertical line pattern) presented at random intervals from a greater number of a non-target stimulus (i.e., a black horizontal line pattern). During this practice trial, participants were presented with a 21.5 by 12.5 centimeter card portraying either the target or non-target stimulus (Figure 3). Each card was presented on the screen for one and a half seconds. Pilot testing confirmed that participants understood and completed this practice task without any problem.

Figure 3. Card stimuli presented during experimental practice trial.

After completing the practice trial, participants were asked if they have any questions regarding the task. Once participants accurately understood the task, the experimenter opened the main experimental file on Superlab and pressed start. For participants in the external stimuli condition, the task lasted around twenty minutes (with daydreaming thought probes) and participants were presented with a 21.5 by 12.5 centimeter card portraying either the

target (i.e., black vertical lines) or non-target (i.e., black horizontal lines) stimulus. Each card was presented on the screen for one and a half seconds for a total of four hundred trials. The target stimulus randomly contained between four and eight vertical lines and occurred on eight trials, once every 20 to 50 trials (i.e., around every 30 to 60 seconds) to make sure that it occurred at random and long intervals. Alternatively, the non-target stimulus randomly contained between four and eight horizontal lines and occurred on 392 trials (see Appendix B).

A word phrase (e.g., relaxing on a beach; missed opportunity; crossing the road) was also layered overtop of each target and non-target pattern in order to activate a unique association to an autobiographical memory (Figure 4). Each sentence was written in 18 point Arial font. Of course, it is impossible to predict which sentence may be uniquely associated to a memory for each participant. To this end, many positive (i.e., 133), negative (i.e., 133), and neutral (i.e., 134) sentences were presented in order to maximise the likelihood that certain sentences would illustrate unique situations that participants have naturally associated to autobiographical memories in daily life. In the original study (Schlagman & Kvavilashvili, 2008), a total of one thousand four hundred and ninety-two sentences were generated and examined by eight independent coders who assessed the sentence for positive, negative, and neutral content. After coding, only sentences with an interrater reliability of seventy-five percent or above were included in the study. A final sample of 400 sentences was then randomly selected from the sentences meeting this agreement threshold. For consistency across experiments, I have chosen to randomly choose 133 positive, 133 negative, and 134 neutral sentences from the original sample of sentences (Appendix B). The same reduced sample of 400 sentences was presented to all participants in my proposed dissertation.

Participants were reminded that their main goal should be to press ‘v’ on the keyboard when they saw the target pattern (i.e., vertical lines). Participants’ answer were then recorded by the computer. Participants were not instructed to ignore the overlaid words as in the original study to avoid possible depletion effects (e.g., Hagger, Wood, Stiff, & Chatzisarantis, 2010). That is, actively ignoring words on a screen may lead participants to become cognitively exhausted, which could influence how they respond to the main goals of the experiment.

Figure 4. Overlaid sentence stimuli presented to participants in the external stimuli condition during experimental phase.

Thought probes appeared on the screen at random intervals for each block of 40 trials, for a total of 10 random probes during the main experiment (e.g., Seli, Risko, & Smilek, 2016). When the task was paused due to experimenter-caught probes, participants were asked to elaborate on their mental experience. Since it has recently been proposed that the wording

used in experience sampling probes may introduce biases in responses based on whether participants are asked if their mind was on task or off task right before the probe (Weinstein, *in press*), I have decided to adopt the wording of Seli, Risko, and Smilek (2016). That is, these authors included both on task and off task wording in their experience sampling probes, which should reduce response bias by allowing participants to choose between both on task or off task perspectives. For each experimenter-caught probe, participants in the external stimuli condition were asked ‘which of the following responses best characterizes your mental state just prior to the presentation of this screen?’ with the option to choose from ‘only on task’, ‘thinking about something other than the task’ (Seli, Jonker, Cheyne, Cortes, & Smilek, 2015). If the participant chose the daydreaming (i.e., off-task) option, a questionnaire appeared on the screen, asking participants to elaborate on the occurrence and nature of their daydream (Appendix B).

The questionnaire was adapted from research on daydreaming (Stawarczyk, Cassol, & D'Argembeau, 2013) and autobiographical memories (Berntsen & Jacobsen, 2008) in order to gain information on the content of participants’ daydreams. Specifically, if participants chose the ‘thinking about something other than the task’ option, the questionnaire instructed them to provide a brief written description of the daydream. This written description will then be used as qualitative data in the coding table (Table 2) to differentiate between associative and narrative daydreams.

Next, I chose to include questions on the specific content of the daydream to determine whether it contained specific and concrete elements characteristic of associative processing, or broader and conceptual elements linked to narrative processing (e.g., Singer & Bluck, 2001; Pasupathi, Mansour, & Brubaker, 2007). To do this, I picked questions already

validated and employed in past research on the nature of daydreams (see Berntsen & Jacobsen, 2008; Stawarczyk, Cassol, & D'Argembeau, 2013, for the complete methodology). First, participants were asked to provide *descriptive information of daydreaming content*. To do this, they rated three items on a five-point Likert scale (i.e., *not at all* to *a great deal*): 'the daydream involved visual imagery', 'the daydream involved inner speech', and 'have you previously experienced this daydream before today?'. These questions were kept as single item answers (i.e., no composite score will be created from these items) for descriptive purposes only.

Then, participants rated one item on the *specificity of daydreaming content*: 'the content of the daydream was related to something concrete and well-defined (e.g., a precise situation or a particular action)'. Participants were also asked to answer items on the *emotional characteristics of daydreaming content*: 'the thought was negative', 'the thought was positive', 'the thought was neutral', and 'the thought was emotionally intense'. As such, each question in this section will be kept as unique items (i.e., no composite score will be created from the positive and negative items; however, the emotional intensity item will be used in a composite scale with specificity to create a self-rated associative daydreaming score).

Finally, participants were asked questions on the *narrative elements of daydreaming content*: 'the overall thought belonged to a structured sequence of smaller thoughts (e.g., like in a story)', 'the content of the thought was realistic and plausible', 'the content of the thought was of importance to your life', 'the content of the thought was related to your personal goals', and 'the thought contained an event that was central to your identity'.

Interestingly, research has demonstrated that participants' ratings of how confident they feel about their self-reported daydreams is significantly associated with the degree to which these thoughts relate to task performance (i.e., the dependent variable assessed in Seli, Jonker, Cheyne, Cortes, & Smilek's 2015 study). This means that more confident self-reports predict the expected effect to a greater degree. Albeit not perfect, this method can nonetheless be a useful way to clean the data of excess noise. As such, I chose to ask participants from both the external stimuli and current concerns condition at the end of every experience sampling probe questionnaire (Appendix B) how confident they are in their evaluation of their daydreams, rated on a scale of one (*not at all confident*) to five (*extremely confident*).

Finally, participants were administered Campbell et al.'s (1996) explicit self-concept clarity scale, Rosenberg's (1979) self-esteem scale, and Fenigstein, Scheier, and Buss' (1975) self-consciousness scale (see self-report measures section and Appendix B for more information on these scales) in order to explore if associative and narrative daydreams that occurred during the attention task were related with awareness, evaluation, and clarity of self in the moment.

Table 2.

Example coding of daydreaming content.

ID	Text	Probe	Associative element		Narrative elements							
			Emotional intensity (1a)	Specificity (2a)	Temporal coherence (1n)	Context/Theme (2n)	Causal coherence (3n)					
							Integrative	Self-event connections				
								Explain	Dismissed	Reveal relation	Cause relation	Total
1	I was daydreamin g about my friend playing his guitar for me on a Valentines day. I also dreamed about listening to the song song he sang and sitting at the by the fire, I felt the cold and moist air around me but the warmth of fire coming from one side. I smell fresh air.	1	3	5	5	5; fall in love; having peers	1	1	1	1	1	1
	painting, tasks i have to do thing week, tonights date, coffee, wine	3	1	4	1	1	1	1	1	1	1	1
	book i read, book i plan	5	4	4	1	1	1	1	1	1	1	1

	to read, my new friend, feeling self-cautious, driving in the rainy forest											
	laying in bed, candle light, cold and fresh room, feeling excited, warm blanket, food, dancing, people around watching me dance	6	5	4	1	1	1	1	1	1	1	1
	i was daydreaming about a past event. I was sitting at a park bench with my friend and we were playing music to each other. i remember i felt a little nervous, i remember my friend's smile (the warmest one i've ever seen)	8	4	5	5	5; having peers	1	1	1	1	1	1
	job i will do next week. i wonder what kind of people i will meet	9	3	2	3	5; the right job	1	3	1	1	1	3

	and wether i will not disappoint my employer											
	i think that there so many things i will have to do and so much is on my mind right now, but i am extremely tired	10	4	2	1	2	1	3	1	1	1	3

Note. The coding found in this table is repeated for every participant and for both external stimuli and current concerns conditions (experiment one) or associative and narrative conditions (experiment two). Examples in this table were taken from the coding table found in <https://osf.io/p6kqn/>

Alternatively, participants in the current concerns condition began the experiment by completing Cox and Klinger's (2004) personal concerns inventory (Appendix B). In part one of this questionnaire, participants were instructed to read through a list of life areas (e.g., home and housing matters; employment and finances; partner, family, and relatives; friends and acquaintances; love, intimacy, and sexual matters; self changes; education and training; health and medical matters; spiritual matters; hobbies, pastimes, and recreation; and other areas), and to select the areas that represent concerns or goals for them. After choosing as many items from this list as needed, participants were instructed to think about each selected life area and to jot down up to six concerns and goals that came to mind. Participants also wrote down how they would like each concern to turn out (i.e., what they would like to happen), and rate each concern on a scale of zero to ten on dimensions such as importance, how likely things are to turn out as planned, control, happiness, unhappiness, commitment, and length of time. However, they completed this portion (the rating) of the current concerns inventory after they had finished the sustained attention task. I chose to split the personal concerns inventory into two portions to allow participants to keep their goals in mind while undergoing the sustained attention task.

After completing this questionnaire, participants in the current concerns condition underwent the same sustained attention task as participants in the external stimuli condition. However, all four hundred trials included the horizontal and vertical line patterns with overlaid word jumbles (i.e., word strings that hold no meaning, such as Jilgon) instead of sentences (i.e., to make the task similar to the external stimuli condition). This is because the sentences were the experimental manipulation for the external stimuli condition, while the personal concerns inventory was the experimental manipulation for the current concerns

condition. Apart from this slight variation in procedure, participants in the current concerns condition were nonetheless exposed to the same amount of experimenter-caught daydreaming probes during the sustained attention task, and answered the same daydreaming probe questionnaire. After completing the task, participants once again completed the self-concept clarity scale, the Rosenber self-esteem scale, and the self-consciousness scale (trait and state).

Self-report measures.

Self-concept clarity scale (Appendix B). Self-concept clarity was assessed using Campbell et al.'s (1996) explicit self-concept clarity scale. This scale was developed to determine if self-concept clarity could be assessed using a self-report method. The items of this scale were designed to assess perceived self-concept consistency, temporal stability, and self-beliefs in order to determine if these elements of the self-concept are stable and consistent within an individual. I chose to first measure self-concept clarity using a similar method as Nezlek and Plesko (2001). That is, I used the following instructions in order to tap into participants' *state* self-concept clarity: 'For each of the following statements, please indicate the extent to which the statement applied to you right now.' Items two, eight, and nine from the original scale were omitted since these could not be translated from trait to state wording (e.g., 'My beliefs about myself seem to change very frequently'). Like the original twelve-item scale, participants were instructed to rate nine items on a scale ranging from one (*strongly disagree*) to five (*strongly agree*). Sample items from this reduced scale include 'My beliefs about myself conflict with one another', and 'I have a clear sense of who I am'. As can be seen in Appendix B, items one, two, three, four, six, seven, and nine will be reverse

scored. After this, these reversed items –along with items five and eight –were averaged into a composite score representing each participant’s self-concept clarity.

I also included the full trait scale in order to compare state and trait scores. That is, I wanted to know if the full twelve-item trait measure would compare to the nine item state measure in terms of direction and strength of association to daydreaming and other self measures. See Appendix B for the full twelve-item trait version of the self-concept clarity scale. When completing the twelve-item trait scale, participants were instructed: ‘For each of the following statements, please indicate the extent to which the statement applied to you in general.’ The experiment one alphas for the state ($\alpha = .80$) and trait ($\alpha = .86$) measures were very good.

Self-esteem (Appendix B). The self-esteem scale was developed by Rosenberg (1979) as a ten-item measure to assess what the literature has defined as the ‘evaluative’ aspect of the self-concept (Gray-Little, Williams, & Hancock, 1997). That is, the scale is intended to measure a global evaluation of the self-concept by determining if a person has either positive, negative, or mixed attitudes towards the self (Rosenberg, 1979). In his words, Rosenberg (1979) describes someone with high self-esteem as having: “self-respect, considers himself a person of worth. Appreciating his own merits, he nonetheless recognizes his own faults (p.54)”. Alternatively, a person with low self-esteem: “lacks respect for himself, considers himself unworthy, inadequate, or otherwise seriously deficient as a person (p.54)”.

The Rosenberg self-esteem scale has received much empirical support and validation (Byrne, 1996; Gray-little et al., 1997; Wylie, 1989). The scale was slightly modified to reflect a state (i.e., evaluation of self right now) as opposed to a trait (i.e., evaluation of self in general) orientation. In this experiment, participants were instructed: ‘for each of the

following statements, please indicate the extent to which the statement applies to you right now'. The ten-item scale is measured on a 1 (*strongly disagree*) to 5 (*strongly agree*).

Sample items include 'I feel that I have a number of good qualities', and 'I feel I do not have much to be proud of'. The alpha for experiment one was very good ($\alpha = .87$).

Self-consciousness (Appendix B). The self-consciousness scale was developed by Fenigstein, Scheier, and Buss (1975) as a dispositional measure of Duval and Wicklund's (1972) concept of self-awareness (Trapnell & Campbell, 1999). According to this theoretical framework, self-awareness means that attention can be directed towards any aspect of the self that is most salient in a particular moment. According to Duval and Wicklund (1972), the state of self-awareness can then be understood as 'becoming the object of our own attention', or described by expressions such as 'to examine, evaluate, or focus upon oneself' or 'to introspect'.

Accordingly, this scale has twenty-three items that assess individual differences along the dimensions of *private* self-consciousness (i.e., ten items), *public* self-consciousness (i.e., seven items), and *social anxiety* (i.e., six items; Carver & Glass, 1976; Turner, Scheirer, Carver, & Ickes, 1978). Private self-consciousness refers to an awareness of self that may or may not be presented to others, such as motives, feelings, beliefs, thoughts, and internal sensations. Alternatively, public self-consciousness represents an awareness of self that is available for others to see, such as physical appearance and mannerisms. Finally, social anxiety refers to the doubt, concern, or uneasiness associated with the awareness that one is being judged or negatively perceived by others in a social context.

All items were rated on a 0 (*extremely uncharacteristic*) to 4 (*extremely characteristic*) scale. Items were slightly modified to reflect a state orientation (i.e., awareness of the self

right now) as opposed to a trait orientation (i.e., awareness of the self in general). These sample items include ‘I’m trying to figure myself out’, ‘I’m self-conscious about the way I look’, and ‘I feel embarrassed’. This scale has been extensively used and evaluated in psychological research, and has been found to have strong construct validity across context (Carver & Glass, 1976; Carver & Scheier, 1978; Tuner, Scheier, Carver, & Ickes, 1978) and cultures ((Rime & Le Bon, 1984; Nystedt & Smari, 1989; Ruganci, 1995; Seek, 1994; Vleeming & Engelse, 1981). The alpha for experiment one of this dissertation was very good for the broad scale ($\alpha = .81$), good for the private subscale ($\alpha = .60$), good for the public subscale ($\alpha = .79$), and good for the social anxiety subscale ($\alpha = .80$).

Coding of daydreams.

The coding scheme in Table 2 was based in part on template analysis, which uses a structured coding scheme to analyse qualitative data (e.g., Brooks, McCluskey, Turley, & King, 2015). Then, the coding scheme is applied to a subset of data, is revised based on the data, and applied on further data until the scheme is sensitive to finding relevant information in qualitative data. To do this, researchers are encouraged to update the coding scheme based on the richest themes that emerge in relation to the research questions (e.g., Braun & Clarke, 2006; Gale, Heath, Cameron, Rashid, & Redwood, 2013; King, 2012; Madill, Jordan, & Shirley, 2000; Miles & Huberman, 1994; Wynn & Money, 2009).

Knowing this, the coding table presented in this dissertation was initially developed in order to determine if associative daydreams contained more specific and emotional elements, and if narrative daydreams contained more temporally accurate, contextual, thematic, and coherent self-narratives. Two independent raters (i.e., myself and two research assistants –

each coding half of the daydreams) coded the written portion of experimenter-caught daydream questionnaires on dimensions such as emotional intensity (associative), specificity (associative), temporal coherence (narrative), context/theme (narrative), and causal coherence (i.e., integrative elements and self-event connections; narrative). Each element was coded on a 1 (*Not at all*) to 5 (*A great deal*) Likert-type scale. All coders were blind to condition.

Context/theme was coded by determining who was in the daydream (e.g., grandfather, self, close friend), what was happening in the daydream (e.g., getting ice-cream), and where the daydream was taking place (e.g., local coffee shop, university, at home). Furthermore, the core life script taxonomy used by Berntsen and Rubin (2004; see Coding table instructions at <https://osf.io/p6kqn/>) was used to assist in coding for context/theme. This taxonomy provides 35 life script categories that highlight core life events such as having children, beginning school, and falling in love. If none of the life events were present in the narrative, but a theme was clearly there, then coders were instructed to write a keyword about the theme that was present (e.g., this theme may not be part of a core life event, such as a birthday party or cooking dinner).

Daydreams were also coded for causal coherence (see hypothesis 1). To do this, coders looked for the presence of integrative elements (i.e., narratives that demonstrate clear meaning making by explicitly highlighting a lesson learned, a belief, or a connection between the narrated event and behaviour) and self-event connections (i.e., explicit links between life events and their sense of self). Each integrative and self-event connection element was rated on a scale of 1 (*Not at all*) to 5 (*A great deal*). Then, an average ‘causal coherence’ score (i.e., ‘total’ in Table 2) was created to obtain a continuous ‘causal coherence’ item.

Specifically, daydreams were coded for integrative elements using Singer and Blagov's (2000) classification system for self-defining autobiographical memories (see <https://osf.io/p6kqn/>). That is, daydreams were classified as integrative if they contained elements that gave meaning to the mental episode. For example, integrative daydreams may have contained elements such as 'lessons learned', 'I believe', 'I think', 'when this happens (or will happen), then I' and so on. Conversely, daydreams were classified as non-integrative if they contained emotions and specific time-stamps and events, but missed out on explicitly or implicitly stating what the mental element means to the self. For example, non-integrative daydreams may have contained elements such as time and place, but failed to mention how experiencing this time and place was relevant to the person as a whole.

The content of daydreams was also coded for self-event connections (Pasupathi, Mansour, & Brubaker, 2007; <https://osf.io/p6kqn/>) in order to determine if participants made explicit links between life events and their sense of self within a particular daydream narrative. I have decided to code for self-event connections because these are necessary to the formation of a person's life story. That is, making self-event connections allows a person to be clear and certain about who they are in relation to past experiences, which contributes to the development of the self-concept by updating the life story with self-relevant events (McLean & Thorne, 2006). As such, identifying self-event connections in participants' daydreams will allow me to determine if daydreams are more likely to contain explicit links to the self, also termed global coherence (Habermas & Bluck, 2000). To do this, coders looked for four types of self-event connections in participants' daydream content, following Pasupathi, Mansour, and Brubaker's (2007) taxonomy, as described in the section on

daydreaming and narrative processes (i.e., explain/illustrate links; dismissed-links; cause relations; reveal relations).

Daydream content was also coded for emotional intensity, since I expect associative daydreams to be more emotionally intense than their narrative counterparts (see hypothesis two). To do this, coders determined if the daydream description was emotionally intense by identifying emotional cues such as ‘stressed’, ‘calm’, ‘eager’, etc. Coders and I rated 30 daydreams for emotional intensity and compared notes to make sure that our perception of emotionally intense (versus more tame or neutral) words was similar. Finally, coders rated daydreams on specificity. A similar method to rating emotional intensity was used, where coders rated 30 daydreams for specific elements (e.g., it is a unique occurrence; it has a brief duration of less than one day; details such as clothing worn, people present, street names, etc.; Singer & Blagov, 2000).

Once all data was collected, the self-concept clarity state scale was computed using the nine items listed in Appendix B, the self-concept clarity trait scale was computed using the twelve items listed in Appendix B, the self-esteem scale was computed using the ten items listed in Appendix B, and the self-consciousness scale was computed using the twenty-three items listed in Appendix B (with ten items for private self-consciousness; seven items for public self-consciousness; and six items for social anxiety).

Results: Experiment one

Descriptive statistics

All analyses were conducted using the SPSS (version 25) and SAS (version 9.5) statistical packages. Descriptive statistics for experiment one indicated that out of 152 participants, most reported three to six daydreams (but reports ranged from zero to nine daydreams; Figure 5). The means probe response was 3.6 with a standard deviation of 2.51.

Figure 5. Visual representation of experiment one participant answers per number daydreaming probe.

Overall, this sample reported a total of 548 daydreams (see Figure 6). On top of the coding scheme presented in Table 2, qualitative daydream reports were coded based on major themes. These themes were initially determined from a first reading of daydream reports by myself and two research assistants. Once all themes were collected, I re-read daydream reports and coded this on a yes (theme is present) or no (theme is not present) basis (i.e.,

nominal data). These descriptive themes were collected to inform future research on the content of daydreams in this sample, and to determine if certain themes corroborate past empirical data on daydreaming (Figure 6).

Although these descriptive statistics are not directly relevant to the main hypotheses of this dissertation, they nonetheless offer an interesting glimpse into the variety and similarities of daydreaming content across participants. In this sample, the majority of daydreams involved the self, close to half of the daydreams were set in the future, and close to half of daydreams demonstrated a short-term timeframe. Furthermore, slightly over three quarters of daydreams referred to participants' internal world (i.e., not so much about external distractions), and close to half of daydreams had social others present (see experiment one discussion for theoretical implications of these descriptive statistics).

Figure 6. Visual representation of experiment one daydream content descriptive statistics.

Interrater reliability and factor analyses

To obtain the coder-rated items, each daydream was coded by two individuals. That is, coder two rated the first 648 daydreams up to participant ID 145, while coder three rated the next 643 daydreams up to participant ID 306. Coder one (i.e., myself) rated all 1291 daydreams (i.e., all daydreams were rated across studies one and two, but coders were blind to study and condition). I chose to use the intraclass correlation as an indicator of interrater reliability because the data was coded using a Likert scale ranging from one to five, which meant that the data obtained was quantitative (Bartko, 1966; Koo & Li, 2016; McGraw & Wong, 1996; Shrout & Fleiss, 1979). Since coders were consistent across participants, the two-way random intraclass correlation was the most appropriate choice, since it models both an effect for rater and ratee, and assumes that both are drawn randomly from larger populations (i.e., random effects model; Bartko, 1966; Koo & Li, 2016; McGraw & Wong, 1996; Shrout & Fleiss, 1979). I also chose to define the model using the consistency option – and not the absolute agreement option – because I want to use the subsequent values as larger indicators for other analyses (i.e., I am not interested in knowing the reliability of individual scores for individual coders, but the overall agreement between coders; Bartko, 1966; Koo & Li, 2016; McGraw & Wong, 1996; Shrout & Fleiss, 1979). To do the intraclass correlation, I used five independent datasets with rater data taken from Table 2 (i.e., one per coded variable: emotional intensity; specificity; context/theme; temporal coherence; causal coherence; Bartko, 1966; Koo & Li, 2016; McGraw & Wong, 1996; Shrout & Fleiss, 1979) and ran one intraclass correlation per dataset. See <https://osf.io/p6kqn/> for complete access to all datasets, syntax, and excel documents.

An acceptable agreement was found between coders for emotional intensity, specificity, causal coherence, temporal coherence, and context/theme (Table 3). Since the agreement between coders was good for all five variables, I chose to compute an average score across both coders to obtain a final coder-rated score for each variable (see <https://osf.io/p6kqn/> for syntax).

Next, I chose to conduct an exploratory factor analysis⁴ on self-rated items (i.e., items that participants rated themselves in the daydream probe questionnaires), and a second exploratory factor analysis on coder-rated items (i.e., items that were determined by coders from written daydream content) to determine if these daydreaming categories made empirical sense, since the categories of associative and narrative daydreams are still purely theoretical (i.e., based on theory, I deducted that associative daydreams would be characterized by specificity and emotional intensity, and that narrative daydreams would be characterized by temporal coherence, theme/context, and causal coherence).

To do this, I decided to average self-rated and coder-rated items across all probes (instead of doing one factor analysis per probe) in order to obtain a factor structure that speaks to participants' daydreams on average as opposed to individual daydreams (MacCallum, Widaman, Zhang, & Hong, 1999). This analysis was done across both studies in order to obtain a larger sample and thus gain a greater understanding of underlying factor

⁴ I chose to do exploratory factor analyses instead of principal component analyses because principal component analysis (PCA) is only appropriate as a data reduction method (i.e., to reduce the number of items in a scale; Costello & Osborne, 2005; Gorsuch, 1990). Furthermore, PCA does not take into account latent variables and is thus most appropriate to reduce data on constructs that can be directly measured (i.e., it calculates components using the entire variance present in a measured variable; Ford et al., 1986). Since I did not directly measure participants' daydreams, but relied on indirect self-reported and coder-reported assessments instead, factor analysis is much more relevant to the latent structures that I am studying (i.e., components are extracted using the unique and error variance of a variable to understand its factor structure; Gorsuch, 1997; McArdle, 1990).

structures (Comrey & Lee, 1992; Costello & Osbone, 2005; Fabrigar, Wegener, MacCallum, & Strahan, 1999; MacCallum, Widaman, Zhang, & Hong, 1999). Indeed, it is recommended to obtain as large a sample size as possible in the early stages of research, especially when the level of communalities and number of factors is unknown (MacCallum et al., 1999). Since the sample for both studies was collected at the same time (i.e., participants were recruited together, but randomly assigned to experiment one or two), the overall sample belongs to the same population of university students. Indeed, this exploratory factor analysis is the first of its kind and requires as much data as possible, even if the manipulations between the two studies differed slightly.

Table 3.

Intraclass correlation, 95% confidence intervals, F-test (F), and significance estimates (p) for coder-rated items.

Coder-rated item	<i>Average measure intraclass correlation</i>	<i>Upper bound</i>	<i>Lower bound</i>	<i>F</i>	<i>p</i>
Emotional intensity	.71	.74	.68	3.46	< .001
Specificity	.88	.89	.87	8.39	< .001
Causal coherence	.72	.75	.69	3.65	< .001
Temporal coherence	.74	.76	.71	3.82	< .001
Context/theme	.86	.87	.84	7.22	< .001

The self-rated items entered in the first factor analysis were item four: ‘the content of the daydream was related to something concrete and well-defined (e.g., a precise situation or a particular action)’; item eight: ‘the daydream was emotionally intense’; item nine: ‘the overall daydream belonged to a structured sequence of smaller thoughts (e.g., like a story)’; item ten: ‘the content of the daydream was realistic and plausible’; item eleven: ‘the content of the daydream was of importance to your life’; item twelve: ‘the content of the daydream was related to your personal goals’; and item thirteen: ‘the daydream contained an event that was central to your identity’. All item correlations are medium to high, and positive (Table 4).

The Kaiser test (KMO) for this first factor analysis was high at .82 ($\chi^2(21, 306) = 768.07, p < .00$). Since this value is above .50, a factor analysis is likely useful for this specific data, according to this criteria (i.e., a high proportion of the data is likely explained by underlying factors; Costello & Osborne, 2005; Kaiser, 1970).

As another rule of thumb, communalities should be above .60 to adequately run a factor analysis. With the present dataset, items eleven, twelve, and thirteen are above .60, while items four and ten are between .50 and .60 (i.e., close to .60). This means that most items are highly related, and other items close to being highly related (i.e., .30 or higher). The range of communalities for this dataset is .31 to .73. Based on eigenvalues, there are two factors that have loadings higher than one. These two factors explain 67% of the variability.

The threshold that I used for determining ‘significant’ loadings on a factor was .50 as suggested in the literature (i.e., items that load at .32 can be considered ‘poor’, items that load at .45 can be considered ‘fair’, items that load at .55 can be considered ‘good’, and items that load at .63 can be considered ‘very good’; e.g., Tabachnick & Fidell, 2007). Because the sample size for this exploratory factor analysis is still relatively on the small side, I chose .50

as a more conservative cut off. Furthermore, if items are cross-loading on multiple factors, it is recommended that the second loadings have at least a .20 difference on the second factor (i.e., if an item loads at .80 on the first factor, it should load at minimum .60 on the second factor to be included; e.g., Costello & Osborne, 2005; Yong & Pearce, 2013).

Table 4.

Zero-order Pearson correlation matrix between self-rated daydream items pooled over studies one and two.

	1	2	3	4	5	6	7
1. Specific	-						
2. Emotional intensity	.34**	-					
3. Story-like sequence	.39**	.40**	-				
4. Realistic	.54**	.26**	.33**	-			
5. Important to life	.36**	.48**	.33**	.37**	-		
6. Related to personal goals	.33**	.42**	.29**	.21**	.73**	-	
7. Central to identity	.38**	.50**	.42**	.32**	.70**	.68**	-

Note. ** $p < .01$. * $p < .05$.

Results of the oblim rotation show that items ‘emotional intensity’, ‘important to life’, ‘important to personal goals’, and ‘central to identity’ have the highest loadings on factor one, and items ‘specificity’, ‘story-like sequence’, and ‘realistic’ have the highest loadings on factor two (Table 5). As can be seen in Table 5, the items ‘important to life’ and ‘central to identity’ cross-load on factor two, yet these loadings are below .60 (since they load at over .80 on factor one). Because the sample size of this factor analysis is under 500 (and well under 1000), I chose to be more conservative and not include these items in the final scales. However, it is important to note that these items make theoretical sense when paired with specific, realistic and story-like mental elements (this represents narrative daydreams well;

see interpretation below). Knowing this, future research may want to determine if these items produce higher loadings on factor two in larger samples.

Theoretically, factor one represents daydreams that are emotionally intense, but that are also very much related to the self (i.e., relevant to identity, goals, and life). This seems to be a mix of what I had theorized to be associative and narrative daydreams, where self-relevant mental elements (i.e., element of narrative daydreams) are combined within consciousness with more intense emotions (i.e., element of associative daydreams). This factor seems to follow the general empirical consensus that daydream content can vary on dimensions such as emotional intensity and relevance to self (e.g., Andrews-Hanna et al., 2013; Andrews-Hanna, Reidler, Huang, & Buckner, 2010; Andrews-Hanna, Smallwood, & Spreng, 2014; Klinger, 2009; Klinger & Cox, 1987; McMillan, Kaufman, & Singer, 2013; Singer, 1966; Stawarczyk, Cassol, & D'argembeau, 2013; Stawarczyk, Majerus, Maj, Van der Linden, & D'Argembeau, 2011).

Table 5.

Self-rated item loadings on each factor (from factor analysis with direct oblim rotation).

Item	Factor 1	Factor 2
Specific	.43	.76
Emotional intensity	.57	.47
Story-like sequence	.44	.53
Realistic	.35	.68
Important to life	.86	.50
Related to personal goals	.82	.38
Central to identity	.84	.52

Note. Loadings that appear in bold were retained for the factor.

For the present data then, a category of daydreams has emerged where emotional intensity and self-relevant elements are present within daydreaming episodes. The fact that this daydream category was derived from items rated by participants themselves may be explained by the self-reference effect in memory retrieval (Rogers, Kuiper, & Kirker, 1977; Symons & Johnson, 1997). According to this effect, self-related information is more easily retrieved than other information, particularly because self-related elements are perceived as unique and salient, which makes them easier to encode in memory. As such, it is possible that more intense emotions help to make this self-related information more unique and salient. When participants rate certain daydreaming episodes, they may be retrieving self-related information along with their associated emotions, making these daydreams both imbued with self as well as emotionally intense. This category is relatively similar to the associative category that I originally proposed (which was very close to episodic autobiographical memory retrieval; James, 1892; Levine et al., 2002; Markowitsch, 2003; Tulving, 2002, 2005; Vandekerckhove, 2009; Wheeler, 2004). However, specific mental elements are instead replaced by self-related elements (i.e., identity, goals, life). Furthermore, since these daydreams are not necessarily linked by a theme, or progress in a temporally coherent way, it does appear as though this factor represents more ‘random’ mental episodes also characteristic of associative daydreaming.

Alternatively, factor two represents daydreams that are realistic, that follow a structured sequence (i.e., like a story), and that are more specific. At first glance, this factor is formed by a mix of what I had theorized to be associative and narrative daydreams. On the one hand, factor two daydreams progress like a story and are anchored in reality (i.e., elements of theorized narrative daydreams) but they are also specific (i.e., elements of

theorized associative daydreams). Interestingly however, Pasupathi's (2006) research has demonstrated that narratives can also be specific, but that these must nonetheless follow a temporally coherent structure to be considered a complete narrative.

Along these lines, it has been determined that specific mental elements become more than unique associations when they are linked together by a common theme and progress in a temporally logical manner (Conway, Singer, & Tagini, 2004; Singer & Blagov, 2000; Singer, Blagov, Berry, & Oost, 2013; Singer & Conway, 2011). As such, it is possible that when participants rate their own daydreams, narratives are experienced as specific and highly realistic (i.e., not fantasy). Interestingly, the two factors were correlated at .56, indicating that although distinct, these emotional self and realistic narrative daydreams nonetheless overlap quite a bit. As such, it is possible that the retrieval of emotional self-related mental elements is also linked to the unfolding of specific, temporally and thematically coherent daydreams, and vice versa (i.e., specific narratives can be linked to emotional self-related mental elements).

To see if the coder-rated items would adopt a similar factor structure as the theorized associative and narrative daydream categories –or represent a similar structure as the factors derived from the analysis of the self-rated items –I conducted a second factor analysis with direct oblim rotation. In this analysis, I included coder-rated items for specificity, emotional intensity, temporal coherence, context/theme, and causal coherence (see <https://osf.io/p6kqn/> for coding instructions of these items). All item correlations were medium to high, and positive, except for context/theme with emotional intensity and specificity (i.e., the correlations are non-significant; Table 6).

Table 6.

Zero-order Pearson correlation matrix between coder-rated daydream items pooled over studies one and two.

	1	2	3	4	5
1. Emotional intensity	-				
2. Specificity	.54**	-			
3. Temporal coherence	.35**	.43**	-		
4. Context/theme	-.01	-.11	.18**	-	
5. Causal coherence	.39**	.19**	.21**	.16**	-

Note. ** $p < .01$. * $p < .05$.

The Kaiser test (KMO) for this second factor analysis was high at .61 ($\chi^2(10, 306) = 234.64, p < .001$). Since this value is above .50, a factor analysis is likely useful for this specific data, according to this criteria (i.e., a high proportion of the data is likely explained by underlying factors). As for communalities, emotional intensity and specificity items had values between .50 and .60, while temporal coherence, context/theme, and causal coherence items had values between .20 and .40 (these lower values may be explained by low correlations with the context/theme item). Based on eigenvalues, there are two factors that have loadings higher than one. These two factors explain 65% of the variability in the daydreaming construct. Because of the low communalities however, the analysis had trouble extracting a rotated matrix for these items (i.e., it was difficult to correlate the factors). Since I had a sample of over 200 participants and a few factors with only a few indicators each, these results can nonetheless be taken as representative of the population under study (although the findings of first exploratory factor analysis absolutely needs to be replicated in future studies; MacCallum, Widaman, Zhang, & Hong, 1999).

Nonetheless, the highest item loadings on factor one were for emotional intensity and specificity, two items that originally formed the associative daydream category that I derived

from theory (Table 7). However, the third highest loading item on factor one was temporal coherence, which I had theorized to belong to the narrative daydream category. Similarly, the highest item loadings on factor two were context/theme, and causal coherence items, two items that originally formed the narrative daydream category derived from theory (Table 7).

Of course, the causal coherence and the specificity items are low, yet I chose to include these for theoretical relevance. However, future studies should replicate this finding with higher loadings to make a confident conclusion on this factor structure. Furthermore, specificity loaded negatively on factor two, indicating less specific daydreams. I did not include the negatively-coded specificity item in my initial iteration of the narrative daydream scale. Although I did not explicitly theorize that narrative daydreams should be more or less specific, research has demonstrated that narratives can be specific as well as more general, as long as these are tied together by a common theme and progress through time in a logical manner (Conway, Singer, & Tagini, 2004; Singer & Blagov, 2000; Singer, Blagov, Berry, & Oost, 2013; Singer & Conway, 2011). As such, this negative loading makes theoretical sense. Although the loadings on factor two are much lower than factor one, I chose to keep both factors as they are both theoretically tenable (Cattell, 1978; Haig, 2010). However, much larger sample sizes (possibly 500-1000) should be used to replicate these factor structures in order to make a concrete conclusion.

Based on these factor analyses, I chose to compute new scales that I labeled ‘emotional self’ daydreams ($\alpha = .87$) and ‘realistic narrative’ daydreams ($\alpha = .77$) based on the self-reported items, and ‘temporal associative’ daydreams ($\alpha = .79$) and ‘narrative’ daydreams ($\alpha = .64$) based on the coder-derived items. All scales were computed by creating an average of all items (see <https://osf.io/p6kqn/> for syntax). The correlations between the

new daydreaming scales and the self-concept scales can be found in Table 8, while the means and standard deviations for these scales across and between all conditions and probes can be found in Table 9 and 10. As a next step, I ran data cleaning procedures on all self-concept scales, and on these factor analysis-derived daydreaming scales.

Table 7.

Coder-rated item loadings on each factor (from factor analysis with direct oblim rotation).

Item	Factor 1	Factor 2
Specific	.74	-.24
Emotional intensity	.74	-.05
Temporal coherence	.54	.16
Context/theme	.07	.69
Causal coherence	.41	.20

Note. Loadings that appear in bold were retained for the factor.

Experiment one data cleaning

All data cleaning was conducted by running filters where all study two participants were excluded from analyses. Furthermore, all participants who rated daydream confidence as less than two were excluded from final analyses. After applying these filters, I prepared my dataset in SPSS by screening for outliers and assessing normality in all levels and combinations of variables (e.g., Leys, Ley, Klein, Bernard, & Licata, 2013). To do this, I began by computing self-concept scales that will be used as dependent variables to test hypothesis three and exploratory hypothesis. Once computed, I correlated all between-person self-concept scales with each other.

As can be seen in Table 8, self-concept clarity state and trait scales are very highly positively correlated with one another, which suggests that these scales do not capture substantially different phenomenon in this study⁵. Furthermore, self-concept clarity scales (both trait and state) are highly positively correlated with self-esteem, which is in line with past research suggesting that self-esteem is an important part of self-concept clarity (e.g., Campbell, 1990; Campbell & Lavalley, 1993; Donahue, Robins, Roberts, & John, 1993; Linville, 1985, 1987; Showers, 1992). However, both self-concept clarity (state and trait) and self-esteem are negatively correlated with self-consciousness (broad scale and private, public, and social anxiety subscales). This is intriguing, as it suggests that as self-consciousness goes up, self-esteem and self-concept clarity go down (or vice-versa; see general discussion for the interpretation of these correlations).

To explore normality, I chose to look at the Kolmogorov-Smirnov test instead of the Shapiro-Wilk test. This is because both tests give discrepant information and have both been found to be extremely sensitive. It is suggested that with 50 cases or above, Kolmogorov-Smirnov is preferred, while with 50 cases and less, Shapiro-Wilk is preferred (Howell, 2013). Furthermore, these tests are not the only information that I am using to look for normality. I am also looking at skew, kurtosis, histograms, Q-Q plots, and boxplots.

Although certain variables were slightly skewed (see Appendix D), no problematic outliers were found. That is, no participant was found to be an outlier on more than one variable, and none of the possible outliers pulled any one variable very far from normality.

⁵ I chose to measure all self-concept variables using state scales. However, the complete self-concept clarity trait scale (i.e., all 12 items) could not be translated into state language. As such, the state scale included only nine items. I chose to administrate both state and trait scales to participants in order to determine if both scales measured the same phenomena. Given these correlations, I can conclude that the state self-concept clarity scale is equivalent to the trait scale.

Table 8.

Zero-order Pearson correlation matrix experiment one daydreaming scales and self scales.

	1	2	3	4	5	6	7	8	9	10	11
1. Self-rated Emotional self	-										
2. Self-rated Realistic narrative	.52**	-									
3. Coder-rated temporal Associative	.18*	.18*	-								
4. Coder-rated Narrative	.08	.00	-.28*	-							
5. Self-concept clarity (state)	-.21*	-.11	-.08	-.05	-						
6. Self-concept clarity (trait)	-.15	-.10	-.13	.02	.85**	-					
7. Self-esteem	-.03	-.01	-.10	.06	.61**	.67**	-				
8. Self-consciousness	.21*	.28**	.18*	-.06	-.45**	-.51**	-.43**	-			
9. Private self-consciousness	.16	.27**	.08	-.07	-.22**	-.23**	-.10	.70**	-		
10. Public self-consciousness	.12	.24**	.09	-.00	-.42**	-.48**	-.38**	.84**	.46**	-	
11. Social anxiety	.21*	.11	.21*	-.06	-.35**	-.44**	-.47**	.69**	.12	.40**	-

Note. ** $p < .01$. * $p < .05$.

Overall, self-consciousness, private self-consciousness, public self-consciousness, social anxiety, self-esteem, self-concept clarity, coder-rated narrative daydreams, coder-rated associative daydreams, self-rated emotional self daydreams, and self-rated realistic narrative daydreams were all deemed normally distributed (Appendix D). Furthermore, relationships between all variables of interest were linear and heteroscedastic (see Appendix D for details).

Hypothesis one and two: Multilevel model analyses

I used multilevel modeling (Goldstein, 2003; Hox, Moerbeek, & Van de Schoot, 2017; Nezlek, 2008; Singer, 1998) in order to answer hypothesis one (i.e., participants who were randomly assigned to the current concerns conditions –who wrote about their goals prior to, and thought about their goals during, the daydreaming task –will report more narrative daydreams over time than participants randomly assigned to the external stimuli condition –

who were shown random words during the daydreaming task), and hypothesis two (i.e., participants who were randomly assigned to the external stimuli condition will report more associative daydreams over time than participants in the current concerns condition).

I chose to do multilevel analyses to test these hypotheses because the data obtained from experiment one violated the assumptions of a traditional repeated measures ANOVA, which assumes that intervals between time points are equally spaced (i.e., daydreaming probes were randomly presented to participants and thus not presented in equal intervals to each participant), that the number of participants in all groups are equal (i.e., although the number of participants were very close to equal in both conditions, not all participants answered the same number of daydreaming probes, which means that not every time point – or daydreaming probe – will have the same amount of data), and that there are no missing data (i.e., once again, since not all participants answered all ten daydreaming probes, which caused all probes to contain missing data).

By adopting multilevel modeling for this data instead (and more specifically latent growth curve multilevel modeling), I was able to model the error terms in order to see how people vary from themselves and from other participants over time (Hoffman & Stawski, 2009).

Table 9.

Experiment one means and standard deviations (in brackets) across and between probes and conditions, and 95% confidence intervals for daydreaming variables.

Variable	Condition	Probe 1	Probe 2	Probe 3	Probe 4	Probe 5	Probe 6	Probe 7	Probe 8	Probe 9	Probe 10	Condition total/Grand mean	95% CI	
													Lower bound	Upper bound
Self-rated Emotional self daydreams	ES	3.24(.120)	2.82(1.05)	2.97(1.00)	2.49(1.22)	2.54(1.47)	2.92(1.10)	2.69(1.14)	2.60(1.35)	2.58(1.16)	2.26(1.06)	2.42(.77)	2.23	2.61
	CC	2.94(.96)	2.60(1.24)	2.52(1.04)	2.50(1.05)	2.62(1.10)	2.26(1.04)	2.93(1.30)	2.54(1.27)	2.46(1.21)	2.79(1.29)	2.64(.83)	2.43	2.85
	Sample	3.08(1.07)	2.70(1.15)	2.73(1.04)	2.49(1.13)	2.58(1.12)	2.56(1.11)	2.78(1.20)	2.57(1.30)	2.52(1.17)	2.53(1.20)	2.53(.80)	2.39	2.67
Self-rated Realistic narrative daydreams	ES	3.53(.82)	3.71(.52)	3.47(.90)	3.40(1.09)	3.35(.96)	3.52(.91)	3.27(.99)	3.36(.87)	3.65(.85)	3.22(.82)	3.48(.68)	3.27	3.48
	CC	3.92(.70)	3.57(.97)	3.50(1.04)	3.76(.82)	3.67(.88)	3.23(.92)	3.59(1.14)	3.47(.90)	3.54(.89)	3.73(1.05)	3.46(.77)	3.31	3.65
	Sample	3.74(.77)	3.64(.78)	3.48(.97)	3.57(.98)	3.51(.93)	3.36(.92)	3.40(1.05)	3.41(.88)	3.60(.86)	3.48(.97)	3.47(.72)	3.34	3.59
Coder-rated Temporal associative daydreams	ES	2.87(.62)	2.84(.92)	2.83(.81)	2.92(.60)	2.90(.78)	2.96(.72)	2.94(.61)	2.83(.79)	2.83(.72)	2.91(.69)	2.79(.59)	2.65	2.94
	CC	2.77(.99)	2.60(.83)	2.83(.74)	2.91(.62)	3.07(.72)	3.27(.85)	2.92(.80)	2.85(.88)	2.97(.86)	2.92(.82)	2.81(.64)	2.65	2.97
	Sample	2.82(.80)	2.73(.88)	2.83(.78)	2.91(.60)	2.98(.75)	3.10(.79)	2.93(.73)	2.84(.83)	2.90(.80)	2.92(.75)	2.80(.61)	2.70	2.91
Coder-rated Narrative daydreams	ES	2.69(.80)	2.89(.69)	2.68(.64)	2.77(.56)	2.53(.80)	2.57(.62)	2.80(.51)	2.65(.69)	2.53(.69)	2.67(.72)	2.63(.49)	2.50	2.75
	CC	2.62(.60)	2.45(.49)	2.58(.54)	2.52(.51)	2.60(.68)	2.56(.60)	2.49(.72)	2.43(.54)	2.80(.80)	2.58(.61)	2.57(.45)	2.46	2.68
	Sample	2.66(.71)	2.68(.64)	2.63(.59)	2.64(.54)	2.55(.74)	2.56(.61)	2.61(.66)	2.54(.63)	2.68(.76)	2.63(.67)	2.60(.47)	2.51	2.68

Note. ES = external stimuli condition; CC = current concerns condition. Self-rated emotional self daydream scale range = 1-5; self-rated realistic narrative daydream scale range = 1-5; coder-rated associative daydream scale range = 1-5; coder-rated narrative daydream scale range = 1-5.

Table 10.

Experiment one means and standard deviations (in brackets) across and between conditions, and 95% confidence intervals for self variables.

Variable	Condition	Condition total/Grand mean	95% CI	
			Lower bound	Upper bound
State self-concept clarity	ES	3.05(.78)	2.85	3.18
	CC	3.01(.71)	2.87	3.23
	Sample	3.03(.75)	2.91	3.15
Self-esteem	ES	2.90(.60)	2.73	2.99
	CC	2.86(.56)	2.76	3.04
	Sample	2.88(.59)	2.79	2.98
Self-consciousness	ES	2.64(.52)	2.52	2.79
	CC	2.64(.53)	2.53	2.80
	Sample	2.64(.52)	2.56	2.77
Private self-consciousness	ES	2.67(.49)	2.68	2.97
	CC	2.80(.55)	2.57	2.82
	Sample	2.74(.52)	2.65	2.82
Public self-consciousness	ES	2.82(.75)	2.57	2.99
	CC	2.75(.84)	2.64	3.04
	Sample	2.78(.79)	2.65	2.91
Social anxiety	ES	2.39(.92)	2.00	2.46
	CC	2.25(.88)	2.18	2.65
	Sample	2.32(.90)	2.18	2.47

Note. ES = external stimuli condition; CC = current concerns condition. State self-concept clarity scale range = 1-5; self-esteem scale range = 1-4; self-consciousness scale range (and subscales) = 0-4.

That is, I was able to model time as a continuous variable, which allowed me to determine if participants' daydreams differed over time between conditions, and if participants' daydream reports differed from their own previous daydream reports over time (Hoffman, 2007). See <https://osf.io/p6kqn/> for the full SAS syntax used in all multilevel modeling analyses.

As such, the questions that I aimed to answer with these latent growth curve multilevel models were: did participants' daydream reports differ over time (from themselves and from other participants)? More importantly, did participants' daydream reports differ over time by condition? In order to answer these questions, all four daydream variables (i.e., emotional self daydream change over time by conditions; Table 11; realistic narrative daydream change over time by condition; Table 12; temporal associative daydream change over time by condition; Table 13; and narrative daydream change over time by condition; Table 14) were modeled in the SAS version 9.4 statistical package. Each daydream variable was modeled individually with time, which created four models overall. To model whether participants varied from the average daydreaming score at probe one and the average rate of change in daydream reports over probes, the intercept and the slope for 'time' were left to vary randomly (Singer, 1998). In this case, 'time' represents each probe, such that time one represents probe one, while time two represents probe two, and so on until probe ten. To make this distinction clear, I have use 'probe' instead of 'time' in the model equations and tables. Furthermore, condition was contrast-coded (i.e., current concerns .5; external stimuli -.5) and entered in each model as a time-invariant covariate (i.e., γ_{01} Condition; Singer, 1998). This means that condition is predicting change in daydream reports over probes at level two, since it is assumed to have a constant value over time (i.e., participants did not change

conditions over probes). The equation used for all four daydreaming models can be represented as such:

$$\text{Level 1: } y_{ti} = \beta_{0i} + \beta_{1i}Probe_{ti} + r_{ti}$$

$$\text{Level 2: } \beta_{0i} = \gamma_{00} + \gamma_{01}Condition_i + \mu_{0i}$$

$$\beta_{1i} = \gamma_{10} + \gamma_{11}Condition_i + \mu_{1i}$$

Reduced form:

$$y_{ti} = \gamma_{00} + \gamma_{01}Condition_i + \gamma_{10}Probe_{ti} + \gamma_{11}Condition_iProbe_{ti} + \mu_{0i} + \mu_{1i}Probe_{ti} + r_{ti}$$

This equation demonstrates that the level-two condition time-invariant covariate is predicting scores at probe one (β_{0i}), as well as daydream change at each subsequent probe (β_{1i}). In its reduced form, the equation uses the symbol ($\gamma_{01}Condition_i$) to represent the mean difference between the current concerns and external stimuli conditions on the outcome variable (i.e., daydreaming) at daydreaming probe one. Alternatively, the symbol ($\gamma_{11}Condition_iProbe_{ti}$) represents the cross-level interaction predicting whether individuals experience steeper or flatter rates of change in each daydream category based on their assigned condition. Furthermore, the fixed slope for time ($\gamma_{10}probe$) demonstrates whether participants' daydream reports changed over probes from the general (overall sample) average. In Tables 11 through 14, the variance-covariance for the random effects is represented by (τ_{00}) for the intercept (i.e., whether participants show variability from each other at probe one), ($\tau_{11}probe$) for the time slope (i.e., whether participants show variability around the average rate of daydream change at each probe), (τ_{10cov}) for their covariance (i.e., whether probe one daydream scores influence daydream rate of change over probes), and

($\sigma_{2\text{resid}}$) for the within-person residual (i.e., whether participants deviated from their own average daydream report at each probe).

Overall, results indicated no significant differences between conditions for all four models (i.e., self-rated emotional self daydreams, self-rated realistic narrative daydreams, coder-rated temporal associative daydreams, and coder-rated narrative daydreams). These findings go counter to what I had predicted in hypotheses one and two, which stipulated that participants in the current concerns condition would experience higher narrative daydreams over probes than participants in the external stimuli condition, and that participants in the external stimuli condition would experience higher associative daydreams over probes than participants in the current concerns condition. These results indicate that the experimental manipulations did not work as expected.

Specifically, results demonstrated that participants significantly differed at probe one between conditions in their reports of self-rated emotional self daydreams (i.e., Table 11; represented by $\gamma_{01}\text{Condition}$). There were no significant condition differences at probe one for self-reported realistic narrative daydreams, for coder-rated temporal associative daydreams, or for coder-rated narrative daydreams (Table 12, 13, and 14). Although participants' self-reported emotional self daydreams also significantly differed from the overall sample average over probes (Table 11; represented by $\gamma_{10\text{probe}}$), this change was not significant between conditions (represented by the cross-level interaction $\gamma_{11}\text{ProbeXCondition}$). As demonstrated by the negative $\gamma_{10\text{probe}}$ coefficient, these results indicate that participants reported increasingly less emotional self daydreams over time on average (but this rate of change was true for the overall sample, and not for one condition over the other).

Furthermore, participants showed significant variability at probe one for self-rated realistic narrative daydreams, coder-rated temporal associative daydreams, and coder-rated narrative daydreams (represented by $\tau_{00\text{intercept}}$). This indicates that participants began the experiment with significantly different daydreaming scores from other participants. Participants also showed significant variability around the average rate of change for coder-rated temporal associative daydreams (represented by $\tau_{11\text{probe}}$). This indicates that temporal associative daydreams were especially idiosyncratic; in that participants varied from average associative daydreaming reports over their *own* probes (i.e., participants' daydreaming reports were not consistent from one probe to the next).

The non-significant covariance between the intercept and the time slope for all daydreaming categories (represented by $\tau_{10\text{cov}}$) indicates that probe one scores on these categories did not influence participants' rate of change over probes. Finally, the significant residual (represented by $\sigma^{2\text{resid}}$) on all four daydreaming categories indicates that participants significantly deviated from their own rate of change at each daydreaming probe. This means that participants' daydreams were quite different at each probe and did not follow a prescribed pattern over time. This is further highlighted by the intraclass correlations (ICC) in Tables 11 through 14. The ICC indicates how much variance in a model can be attributed to differences between and within individuals. In the present models, 14% (Table 11), 37% (Table 12), 46% (Table 13), and 36% (Table 14) of the variance in daydreaming can be attributed to differences between participants (i.e., between conditions). This indicates that much of the variance in daydreaming over time is attributable to changes within a person, which suggests that people report different categories of daydreams over time (i.e., daydreaming categories are not necessarily consistent from one probe to the next). Overall

these results fail to support hypothesis one and two, which predict that there would be condition differences in daydreaming categories over probes.

Table 11.

Experiment one parameter estimates (PE), standard error (SE), t-tests (t), and significance estimates (p) for self-rated emotional self daydreams growth through time by condition.

Model	PE	SE	t	p	ICC
$\gamma_{00intercept}$	2.76	.09	30.92	<.00	
$\gamma_{01Condition}$	.37	.16	2.05	.04	
$\gamma_{10probe}$	-.04	.01	-2.30	.02	
$\gamma_{11probeXCondition}$	-.04	.03	-1.25	.21	.14
$\tau_{00intercept}$	.15	.12	1.24	.11	
$\tau_{11probe}$	.00	.00	.34	.36	
τ_{10cov}	.02	.02	.95	.34	
σ^2_{resid}	.94	.07	13.23	<.00	

Note. Condition = external stimuli contrast-coded .5 and current concerns contrast-coded -.5.

Table 12.

Experiment one parameter estimates (PE), standard error (SE), t-tests (t), and significance estimates (p) for self-rated realistic narrative daydreams growth through time by condition.

Model	PE	SE	t	p	ICC
$\gamma_{00intercept}$	3.58	.08	44.83	<.00	
$\gamma_{01Condition}$	-.09	.16	-.60	.56	
$\gamma_{10probe}$	-.02	.01	-1.64	.10	
$\gamma_{11probeXCondition}$	.01	.03	.50	.62	.37
$\tau_{00intercept}$	.30	.10	2.86	.00	
$\tau_{11probe}$	.00	.00	1.50	.07	
τ_{10cov}	-.01	.01	-.62	.54	
σ^2_{resid}	.51	.04	12.67	<.00	

Note. Condition = external stimuli contrast-coded .5 and current concerns contrast-coded -.5.

Table 13.

Experiment one parameter estimates (PE), standard error (SE), t-tests (t), and significance estimates (p) for coder-rated temporal associative daydreams growth through time by condition.

Model	PE	SE	t	p	ICC
$\gamma_{00intercept}$	2.82	.08	36.83	<.001	
$\gamma_{01Condition}$	-.00	.15	-.01	.99	
$\gamma_{10probe}$	.00	.01	.52	.60	
$\gamma_{11probeXCondition}$	.01	.02	.26	.79	
$\tau_{00intercept}$	.38	.09	4.01	<.001	.46
$\tau_{11probe}$	.00	.00	2.08	.02	
τ_{10cov}	-.03	.01	-2.02	.05	
σ^2_{resid}	.44	.03	12.78	<.001	

Note. Condition = external stimuli contrast-coded .5 and current concerns contrast-coded -.5.

Table 14.

Experiment one parameter estimates (PE), standard error (SE), t-tests (t), and significance estimates (p) for coder-rated narrative daydreams growth through time by condition.

Model		PE	SE	t	p	ICC
A	$\gamma_{00intercept}$	2.61	.06	43.75	<.001	.36
	$\gamma_{01Condition}$	-.20	.12	-1.72	.09	
	$\gamma_{10probe}$	-.00	.01	-.31	.76	
	$\gamma_{11probeXCondition}$	.03	.02	1.42	.15	
	$\tau_{00intercept}$	.16	.05	3.11	.00	
	$\tau_{11probe}$	.00	.00	1.74	.04	
	τ_{10cov}	-.01	.00	-1.39	.16	
	σ^2_{resid}	.28	.02	12.98	<.001	

Note. Condition = external stimuli contrast-coded .5 and current concerns contrast-coded -.5.

Hypothesis three and four: Multiple regression analyses

Although analyses for hypotheses one and two indicated no significant differences between conditions, it is nonetheless important to determine if manipulations may have

created significant condition differences in the self-concept variables (i.e., self-concept clarity, self-esteem, and self-consciousness and its subscales). Indeed, hypothesis three stipulated that participants who report daydreams with a higher narrative structure would also report higher self-concept clarity. Along these lines, hypothesis four predicted that participants with higher narrative and/or associative daydreams would report higher self-esteem and self-consciousness. As such, I ran independent samples T-tests on all self-concept variables to explore condition differences. As can be seen in Table 15, no significant condition differences were found in all self-concept variables (highlighted by both p-values and confidence intervals, which include zero). Because of this, I chose to proceed with hypothesis three and the exploratory hypothesis by using the whole sample pooling over conditions.

Specifically, I used hierarchical linear regressions in order to investigate hypothesis three (i.e., participants who reported more narrative daydreams would report greater momentary self-concept clarity than participants who reported more associative daydreams), along with the hypothesis four (i.e., narrative and associative daydreams will be differently related to self-consciousness and self-esteem). Since all four daydreaming scales were linearly related to the outcomes and did not pose risk for multicollinearity (Appendix D), I decided to enter all four scales (i.e., the broad daydreaming scales derived from the factor analyses, pooled over all ten probes) in the same hierarchical regression, each predicting state self-concept clarity, self-consciousness (along with private, public, and social anxiety subscales), and self-esteem.

I chose to do this in order to determine which amount of variance in each daydreaming scale was *uniquely* associated to each self-concept outcome, over and above other daydreaming scales (Cohen et al., 2003). As can be seen in analyses for hypotheses one and two, participants' daydreams varied quite a bit at each probe. Because of this, it is likely that participants experienced many types of daydreams over time. To account for this overlap in daydreams, a multiple regression was appropriate in order to account for the unique effect of each daydream category on the self-concept outcomes.

Results indicated that none of the four daydream predictors were significantly associated with state self-concept clarity or self-esteem (highlighted by both p-values and confidence intervals, which include zero; Table 16). However, realistic narrative daydreams were significantly positively associated with self-consciousness –and more specifically with private and public self-consciousness (highlighted by both p-values and confidence intervals, which did not include zero; Table 16). The effect size –represented by the partial correlations –can be found in Table 16. Although significant, it is important to note that the confidence intervals for this relation varied quite a bit, with a lower bound of .04 and a higher bound of .31. The confidence intervals were also similar for private and public self-consciousness (Table 16). This demonstrates that the strength of the relation between realistic narrative daydreams and self-consciousness should be determined more conclusively in future research.

This means that in the current sample, participants who reported more realistic narrative daydreams (i.e., daydreams anchored in reality, that unfold in a coherent temporal sequence, and that are specific) also reported higher levels of overall self-consciousness, and more specifically, higher levels of private self-consciousness (i.e., propensity to introspect; Brewer, 1986; Kihlstrom & Klein, 1997; Leary & Tangney, 2012; Markus & Wurf, 1987;

Neisser, 1988) and public self-consciousness (i.e., propensity to be aware of how others perceive the self; Damasio, 1999, 2010; Markus & Wurf, 1987; McAdams, 1996; Singer, 1995).

Experiment one discussion

Overall, results of experiment one demonstrated that the narrative manipulation (i.e., participants in the current concerns condition that wrote about their ongoing goals) and the associative manipulation (i.e., participants in the external stimuli condition that were exposed to random word phrases on the screen) were not successful at inducing narrative and associative daydreams over probes, respectively. Instead, multilevel growth curve analyses demonstrated that participants' daydreaming reports varied quite significantly at each probe, indicating high variability in daydreams overall (i.e., participants' daydreams did not follow a consistent narrative or associative pattern over probes –depending on their condition –as expected). Although no significant differences between conditions were found, multiple regression analyses –pooling over daydreaming probes across the whole sample –revealed that self-consciousness and its private and public subscales were significantly uniquely related to realistic narrative daydreams.

I have included a detailed consideration of descriptive statistics and of factor analysis results in the general discussion, since the patterns found here apply equally to both experiment one and two. The same applies for results of the growth curve multilevel analyses and of most regression analyses. For conciseness, I will not repeat these interpretations here. However, one unique result to experiment one is that daydreams that are more realistic, specific, and that proceed in an ordered sequence of events (i.e., self-coded realistic narrative

daydreams) are related to both higher private *and* public self-consciousness (over and above all other three daydreaming categories).

Broadly, self-consciousness represents an awareness of one's thoughts, emotions, and perceptions (e.g., Duval & Wicklund, 1972; Wiley, 1994). More specifically, private self-consciousness is concerned with awareness of one's internal world, while public self-consciousness is characterized by an awareness of other's perception of the self, which is directed more outwardly (Trapnell & Campbell, 1999; McKenzie & Hoyle, 2008; Simsek, 2013). It is possible that realistic narrative daydreams relate to an increase in private self-consciousness because they contain specific memories presented in a story-like fashion, which may make the person more aware of mental elements related to perceptions, emotions, and thoughts (Fireman, McVay, & Flanagan, 2003; Grysman & Hudson, 2011; Ainley, Maister, Brokfeld, Farmer, & Tsakiris, 2013).

However, it is surprising that realistic narrative daydreams also relate to higher public self-consciousness since daydreaming in this sample was mainly governed by the internal environment. As can be seen in the descriptive analyses of daydreams in Figure 6, over 40% of daydreams contained social others (e.g., family, colleagues, friends, acquaintances). This is in line with research demonstrating that daydreams often include elements of the social world, whether this be social others, social norms, or culture more broadly (Hardin & Conley, 2001; Sinclair, Hunsinger, Skorinko, & Hardin, 2005; Swann, 2000; Poerio & Smallwood, 2016). In this case, it is possible that realistic narrative daydreams contain underlying social elements that relate to an increased awareness of how others may perceive the self (i.e., how the self is presented and perceived in a social setting). Since these results are correlational, it is also possible that individuals who are more self-conscious –publicly and privately –are

more likely to experience daydreams that are realistic and specific stories, possibly because their awareness of self and other's perceptions provides the mind with adequate stimuli to form these realistic narratives having to do with daily social life.

In order to triangulate findings and conceptually replicate the manipulation of narrative and associative processes in daydreaming, the purpose of experiment two was to manipulate both associative and narrative modes of thought through different methods (e.g., Crandall & Sherman, 2016; Open Science Collaboration, 2015; Schmidt, 2009). That is, experiment two was designed on the same theoretical basis as experiment one, but employs different methods to converge findings in a way that is not dependent on methodology (e.g., Nosek & Errington, 2017).

Method: Experiment two

For this second experiment, I hypothesized that being put in an associative or narrative mode of thought would influence the content of daydreams, like in experiment one. However, the methods for manipulating associative and narrative modes of thought differed from experiment one. That is, I expected daydreams to contain more associative elements (e.g., specific event information; high emotionality) if participants spontaneously associated thoughts through a think aloud protocol previous to the daydreaming period. Conversely, I expected daydreams to contain more narrative elements (e.g., thematic, temporal, and causal coherence) if participants narrated important events from their life story prior to the daydreaming period. Specifically, because of this narrative content, I expected participants in the narrative condition to create more self-event connections and meaning-making (i.e., integrative elements). That is, participants who constructed narratives would be more likely to

Table 16.

Unstandardized Regression Coefficients (Standard Error), 95% CI, and Effect Sizes for interactions between experiment one daydreaming scales self-concept variables.

Daydream predictors	B(SE)	<i>p</i>	Lower Bound	Upper Bound	<i>R</i> ²	Partial <i>r</i>	Self-concept outcome
Constant	3.82(.59)	<.001	2.65	4.98		-	
Emotional self	-.18(.09)	.06	-.37	.01	.05	-.17	State self-concept clarity
Realistic narrative	.01(.10)	.93	-.20	.21		.01	
Temporal associative	-.07(.11)	.51	-.29	.15		-.06	
Narrative	-.08(.14)	.58	-.36	.20		-.05	
Constant	2.97(.48)	<.001	2.02	3.92		-	
Emotional self	-.02(.08)	.80	-.17	.13	.01	-.02	Self-esteem
Realistic narrative	.02(.08)	.83	-.15	.19		.02	
Temporal associative	-.08(.09)	.36	-.26	.10		-.08	
Narrative	.04(.12)	.70	-.18	.27		.03	
Constant	1.78(.43)	<.001	1.00	2.63		-	
Emotional self	.06(.07)	.41	-.08	.19	.10	.07	Self-consciousness
Realistic narrative	.16(.08)	.04	.02	.31		.19	
Temporal associative	.10(.08)	.22	-.06	.26		.11	
Narrative	-.04(.10)	.71	-.24	.17		-.03	
Constant	2.22(.43)	<.001	1.37	3.07		-	
Emotional self	.02(.07)	.79	-.12	.15	.08	.02	Private self-consciousness
Realistic narrative	.19(.08)	.01	.04	.34		.22	
Temporal associative	.01(.08)	.88	-.15	.17		.01	
Narrative	-.08(.10)	.46	-.28	.13		-.06	
Constant	1.63(.66)	<.001	.33	2.93	.06	-	

Emotional self	-.02(.10)	.86	-.23	.19		-.02	Public self-consciousness
Realistic narrative	.27(.12)	.02	.04	.50		.21	
Temporal associative	.08(.13)	.53	-.17	.32		.06	
Narrative	.03(.16)	.86	-.29	.34		.02	
Constant	1.23(.75)	.10	-.25	2.71		-	
Emotional self	.21(.13)	.08	-.02	.45		.16	Social anxiety
Realistic narrative	-.02(.13)	.88	-.28	.24	.08	-.01	
Temporal associative	.27(.14)	.06	-.01	.55		.17	
Narrative	-.05(.18)	.78	-.41	.31		-.03	

Note. Items in bold are $p < .05$, $p < .01$.

show explicit links between narrated events and the self (i.e., causal coherence; Pasupathi, Mansour, & Brubaker, 2007). Since only the experimental manipulation (and not the overall procedure) was different from experiment one, the hypotheses for experiment two are the same as experiment one. Of course, the manipulations that lead to the specifics of these hypotheses were different (i.e., the way associative and narrative elements were manipulated was different, but they were expected to influence daydreaming content in similar ways).

Participants

To be selected for this experiment, participants had to be enrolled full-time or part-time at Carleton University. All participants were recruited through the Psychology Participant Pool/SONA system. Students enrolled in Psychology 1001, 1002, 2001, and 2002 classes had the chance to gain 1% of their total grade by enrolling in experiment two. A total of 151 participants were recruited for this experiment (75 in the associative condition, and 76 in the narrative condition; all participants were randomly assigned to condition). Of these, 80.1% were female, and 19.9% were male. The age of this sample ranged from 18 to 52 with a mean of 20.79 and a standard deviation of 5.40. Furthermore, 62.3% of participants identified as Caucasian/white, 11.3% identified as Black (i.e., African, African American), 6.6% identified as South Asian (i.e., Indian, Pakistani), 6.6% identified as East Asian (i.e., Chinese, Japanese), 5.3% identified as Arabic or Central Asian, 4.0% identified as Hispanic, Central, or South American, 0.7% identified as Indigenous, and 3.3% identified as other.

Procedure

This second experiment adopted a between-person design, and was conducted in a laboratory setting during two phases. See Figure 7 for a visual representation of experiment two. For phase one, participants were randomly assigned to either an associative or a narrative condition. In the associative condition, participants were instructed to complete a think aloud protocol (Rosenzweig, Krawec, & Montague, 2011), a method most widely used to understand the associative processes underlying working memory during a task (Charters, 2003; Cooper, 1999; Olson, Duffy & Mack, 1984). For the present experiment however, the associations generated during the think aloud protocol were *not* be analyzed for content, but were instead used to put participants in an associative mode of thought (e.g., Ellamil, Dobson, Beeman, & Christoff, 2012). To do this, participants were asked to sit down at an empty table, and to trace whatever shapes come to mind using a pen and a blank sheet of paper. While tracing, participants were also instructed to: “just say out loud whatever comes to mind whether or not it seems like it is relevant” (Gabora, 2010) for five minutes.

I opted for a tracing task during the think aloud protocol because it is simple and would create a relatively low cognitive load, since demanding tasks that create a high cognitive load can interfere with the spontaneous verbalization of working memory content (e.g., Ericsson & Simon, 1980; McKiernan, D’Angelo, Kaufman, & Binder, 2006). Although the content of the verbalized data was not relevant to experiment two, it was nonetheless important for participants to be able to accurately verbalize their thoughts in order to be put in the appropriate mode of thought (i.e., associative as opposed to analytic). I also believed that this manipulation would work in stimulating an associative mode of thought since associative processing has been linked with the medial temporal lobe (MTL; Eichenbaum, 2000; Squire

et al., 2004), which is activated when previously stored associations are retrieved from long-term memory and recombined in working memory (Addis, Wong, & Schacter, 2007; Aminoff, Gronau, & Bar, 2007; Bar, Aminoff, & Schacter, 2008; Botzung, Denkova, & Manning, 2008; Hassabi, Kumaran, & Maguire, 2007; Henke et al., 1997, 1999; Okuda et al., 2003; Rombouts et al., 1997; Szpunar, Chan, & McDermott, 2009). As such, being asked to freely narrate the contents of working memory should have allowed participants to retrieve previous associations and combine them in new ways as they underwent the simple tracing task (Ellamil et al., 2012).

Figure 7. Visual representation of experiment two.

After having completed this associative exercise, participants began phase two of the experiment. During this phase, they were asked to sit at a MacIntosh desktop computer and

complete the same involuntary recall task as in experiment one (Schlagman & Kvavilashvili, 2008). However, participants completed the version of this task that does *not* include the overlaid words or numbers. That is, participants were only asked to sort horizontal line patterns from vertical line patterns for a total of four hundred trials. As in the first experiment, one thought probe randomly appeared within every block of forty trials (for a total of 10 probes). When these daydreaming probes appeared, the task was paused, allowing participants to fill the same short daydreaming questionnaire as in experiment one (Appendix B). Once this task was completed, participants filled out the state and trait versions of Campbell et al.'s (1996) self-concept clarity scale, Rosenberg's (1979) self-esteem scale, and Fenigstein, Scheier, & Buss' (1975) self-consciousness scale (as in experiment one; see self-report measures section and Appendix B for more information on these scales).

For the narrative condition, participants were instructed to write down their seven most important memories on seven different cue cards, and to sort them in chronological order on the table in front of them (Köber & Habermas, 2017; Habermas & Silveira, 2008). They were given roughly five minutes to do this. Writing down these memories served as a prompt and memory cue for participants to write down their life story for five minutes without interruption. More specifically, participants were instructed to include the seven memories written down on the cue cards in their written narrative in order to describe how they became the person that they are today. Participants were also told that they can include any other important life event (i.e., not just the seven cue card events) into their written narrative if these contribute to the coherence of their overall life story. To increase the strength of the manipulation and the lasting effect of the narrated life story in participants'

memory, they were told that the narrative exercise is to help them prepare to tell their story to another experimenter later on. This small deception will be debriefed at the end of the study.

I chose to adopt this specific life story narrative manipulation because it is based on the cultural concept of biography, which encompasses developmental and socially normative life events such as learning to walk, going to school, and getting married (Habermas & Bluck, 2000). These normative events are more stable than other life events because they are closely linked to age norms, which determine when these events are likely to happen for most individuals in a particular culture. Together, these normative life events form the life script and offer scaffolding for other elements of the life story (Berntsen & Rubin, 2004). Since global coherence is necessary for life narratives to be comprehensible, it is essential to ask participants about these important autobiographical pillars in order for the narrated story to achieve temporal, thematic, and causal coherence (Habermas & Bluck, 2000). As such, by asking participants to think of seven important memories and to organize them in chronological order, temporal coherence is achieved, dominant life themes emerge, and core goals that have led the person to where they are today are made salient.

After completing the narrative exercise, participants completed the exact same sustained attention task as the associative condition. After this, they also completed Campbell et al.'s (1996) state and trait self-concept clarity scale, Rosenberg's (1979) self-esteem scale, and Fenigstein, Scheier, & Buss' (1975) self-consciousness scale (Appendix B).

Self-report measures.

Self-concept clarity scale (Appendix B). As in experiment one, state and trait self-concept clarity were assessed using Campbell et al.'s (1996) explicit self-concept clarity

scale. The experiment two alphas for the state ($\alpha = .79$) and trait ($\alpha = .82$) measures were very good.

Self-esteem (Appendix B). As in experiment one, the self-esteem scale was assessed using Rosenberg's (1979) as a ten-item self-esteem scale. The alpha for experiment two were very good ($\alpha = .90$).

Self-consciousness (Appendix B). As in experiment one, self-consciousness was assessed using Fenigstein, Scheier, and Buss' (1975) self-consciousness scale. The alpha for experiment two of this dissertation was very good for the broad scale ($\alpha = .83$), good for the private subscale ($\alpha = .68$), very good for the public subscale ($\alpha = .82$), and very good for the social anxiety subscale ($\alpha = .82$).

Self-rated daydreaming (Appendix B). The emotional self and realistic daydream scales derived from the factor analysis described in experiment one were also used for analyses in experiment two. In this experiment, the alpha for emotional self daydreams was very good ($\alpha = .87$), while the alpha for realistic daydreams was good ($\alpha = .75$).

Coder-rated daydreaming (Appendix B). Similarly, the associative and narrative daydream scales derived from the factor analysis described in experiment one were also used for analyses in experiment two. In this experiment, the alpha for associative daydreams was good ($\alpha = .76$), while the alpha for narrative daydreams was good ($\alpha = .72$).

Coding of daydreams.

Daydreams were coded using the exact same procedure as in experiment one (see Table 2 for complete coding scheme).

Results: Experiment two

Descriptive statistics

All analyses were conducted using the SPSS (version 25) and SAS (version 9.5) statistical packages. Descriptive statistics for experiment two indicated that out of 151 participants, most reported three to seven daydreams during the duration of the experimental task (but probe responses ranged from zero to ten probes; see Figure 8). The overall probe answer mean is 4.9 with a standard deviation of 2.53.

Figure 8. Visual representation of experiment two participant answers per number daydreaming probe.

Overall, this sample reported a total of 738 daydreams (see Figure 9). Of these daydreams, 705 (95.5%) mentioned the self, 184 (24.9%) daydreams mentioned the past, 129 (17.4%) daydreams mentioned the present, and 326 (44.2%) daydreams mentioned the future

(Figure 9). Similarly to experiment one, the majority of daydreams involved the self, close to half of the daydreams were set in the future, and close to half of daydreams demonstrated a short-term timeframe. Furthermore, slightly over three quarters of daydreams referred to participants' internal world (i.e., not so much about external distractions), and close to half of daydreams had social others present.

Data cleaning

All participants who rated daydream confidence as less than two were excluded from final analyses. After applying these filters, I began data cleaning by running descriptive statistics on all self-concept and daydream scales in order to see if the scale ranges matched what was presented to participants (i.e., to make sure that there are no data entry errors). The correlations between all self-concept and daydreaming scales can be found in Table 19. Specific steps to assess normality, multicollinearity, and heteroscedasticity can be found in Appendix D. No major issues were found across or between conditions (<https://osf.io/p6kqn/> for syntax).

Figure 9. Visual representation of experiment two daydream content descriptive statistics.

Hypothesis one and two: Multilevel model analyses

As in experiment one, the latent growth curve multilevel analyses allowed me to answer the questions: did participants' daydream reports differ over probes (from themselves and from other participants)? More importantly, did participants' daydream reports differ over probes by condition? Again, all four daydream variables (i.e., emotional self daydream change over probes by conditions; Table 20; realistic daydream change over probes by condition; Table 21; associative daydream change over probes by condition; Table 22; and narrative daydream change over probes by condition; Table 23) were modeled in the SAS version 9.4 statistical package. To model whether participants varied from the average daydreaming score at probe one and the average rate of change in daydream reports, the intercept and the slope for 'time' (i.e., time being represented by each probe as in experiment one) were left to vary randomly (Singer, 1998). As before, condition was contrast-coded (i.e., current concerns .5; external stimuli -.5) and entered in each model as a time-invariant covariate (i.e., γ_{01} Condition).

Like in experiment one, results indicated no significant differences between conditions for all four models (i.e., self-rated emotional self daydreams, self-rated realistic narrative daydreams, coder-rated temporal associative daydreams, and coder-rated narrative daydreams). These findings go counter to what I had predicted in hypotheses one and two (i.e., participants in the current concerns condition would experience higher narrative daydreams over probes than participants in the external stimuli condition, and that participants in the external stimuli condition would experience higher associative daydreams over probes than participants in the current concerns condition). These results indicate that the experimental manipulations did not work as expected, and that these manipulations are not necessarily more effective than those explored in experiment one.

Table 17.

Experiment two means and standard deviations (in brackets) across and between probes and conditions, and 95% confidence intervals for daydreaming variables.

Variable	Condition	Probe 1	Probe 2	Probe 3	Probe 4	Probe 5	Probe 6	Probe 7	Probe 8	Probe 9	Probe 10	Condition total/Grand mean	95% CI	
													Lower bound	Upper bound
Self-rated Emotional self daydreams	Associative	3.34(1.19)	2.57(1.08)	2.73(1.27)	2.69(1.30)	2.61(1.34)	2.71(1.14)	2.58(1.22)	2.63(1.24)	2.34(1.23)	2.48(1.31)	2.71(.84)	2.49	2.88
	Narrative	3.08(.93)	2.53(1.24)	2.66(1.14)	2.52(1.18)	2.15(1.04)	2.50(1.02)	2.30(1.07)	2.36(1.21)	2.38(1.10)	2.21(1.25)	2.51(.76)	2.32	2.67
	Sample	3.20(1.06)	2.55(1.16)	2.69(1.20)	2.60(1.23)	2.39(1.23)	2.60(1.08)	2.43(1.15)	2.51(1.22)	2.36(1.16)	2.34(1.28)	2.61(.80)	2.46	2.72
Self-rated Realistic narrative daydreams	Associative	3.94(.71)	3.78(.86)	3.50(.91)	3.59(1.12)	3.51(.96)	3.51(.93)	3.55(.89)	3.32(.88)	3.55(.96)	3.27(1.00)	3.51(.71)	3.33	3.66
	Narrative	3.97(.74)	3.72(.94)	3.46(1.01)	3.68(.99)	3.40(.93)	3.60(.93)	3.48(.96)	3.26(1.08)	3.71(.85)	3.54(1.10)	3.54(.65)	3.39	3.70
	Sample	3.96(.72)	3.75(.90)	3.48(.96)	3.64(1.04)	3.45(.94)	3.55(.92)	3.52(.92)	3.29(.97)	3.63(.90)	3.40(1.05)	3.52(.68)	3.41	3.64
Coder-rated Temporal associative daydreams	Associative	3.00(.81)	3.14(.78)	2.71(.68)	3.03(.77)	2.83(.67)	2.86(.61)	2.98(.74)	2.87(.73)	2.82(.73)	2.90(.68)	2.87(.54)	2.74	2.99
	Narrative	3.02(.73)	2.93(.79)	2.77(.78)	2.98(.77)	2.69(.67)	2.73(.69)	2.70(.69)	2.85(.72)	2.86(.66)	2.77(.58)	2.78(.55)	2.65	2.91
	Sample	3.01(.77)	3.04(.79)	2.74(.73)	3.00(.76)	2.77(.67)	2.79(.65)	2.83(.73)	2.86(.72)	2.84(.69)	2.83(.63)	2.83(.54)	2.74	2.92
Coder-rated Narrative daydreams	Associative	2.64(.68)	2.69(.62)	2.70(.69)	2.76(.58)	2.55(.66)	2.64(.70)	2.71(.72)	2.60(.54)	2.64(.55)	2.64(.53)	2.67(.43)	2.57	2.77
	Narrative	2.48(.69)	2.54(.66)	2.50(.83)	2.62(.64)	2.44(.66)	2.62(.69)	2.56(.65)	2.45(.68)	2.85(.55)	2.76(.59)	2.60(.45)	2.49	2.68
	Sample	2.55(.68)	2.62(.64)	2.60(.76)	2.68(.61)	2.50(.66)	2.63(.69)	2.63(.68)	2.53(.61)	2.74(.55)	2.70(.56)	2.64(.44)	2.56	2.70

Note. ES = external stimuli condition; CC = current concerns condition. Self-rated emotional self daydream scale range = 1-5; self-rated realistic narrative daydream scale range = 1-5; coder-rated associative daydream scale range = 1-5; coder-rated narrative daydream scale range = 1-5.

Table 18.

Experiment two means and standard deviations (in brackets) across and between conditions, and 95% confidence intervals for self variables.

Variable	Condition	Condition total/Grand mean	95% CI	
			Lower bound	Upper bound
State self-concept clarity	Associative	2.84(.74)	2.67	3.02
	Narrative	2.86(.67)	2.69	3.01
	Sample	2.89(.65)	2.73	2.97
Self-esteem	Associative	2.83(.62)	2.69	2.98
	Narrative	2.79(.65)	2.62	2.93
	Sample	2.81(.63)	2.70	2.91
Self-consciousness	Associative	2.77(.54)	2.65	2.91
	Narrative	2.69(.58)	2.56	2.84
	Sample	2.73(.56)	2.65	2.83
Private self-consciousness	Associative	2.88(.54)	2.76	3.01
	Narrative	2.76(.59)	2.64	2.92
	Sample	2.82(.57)	2.74	2.93
Public self-consciousness	Associative	2.90(.86)	2.74	3.13
	Narrative	2.80(.80)	2.63	3.00
	Sample	2.85(.83)	2.74	3.01
Social anxiety	Associative	2.42(1.00)	2.19	2.65
	Narrative	2.45(.96)	2.22	2.68
	Sample	2.43(.98)	2.27	2.60

Note. ES = external stimuli condition; CC = current concerns condition. State self-concept clarity scale range = 1-5; self-esteem scale range = 1-4; self-consciousness scale range (and subscales) = 0

Table 19.

Zero-order Pearson correlation matrix experiment two theoretical daydreaming scales and self scales.

	1	2	3	4	5	6	7	8	9	10
1. Self-rated emotional self	-									
2. Self-rated realistic narrative	.51**	-								
3. Coder-rated temporal associative	.24*	.34**	-							
4. Coder-rated narrative	.12	.10	-.09	-						
5. Self-concept clarity (state)	.11	.08	.01	.03	-					
6. Self-concept clarity (trait)	.06	.05	-.10	.04	.84**	-				
7. Self-esteem	.11	.14	.00	-.02	.55**	.63**	-			
8. Self-consciousness	.23**	.28**	.10	.11	-.33**	-.43**	-.25**	-		
9. Private self-consciousness	.32**	.43**	.16*	.20*	-.14	-.22**	.12	.70**	-	
10. Public self-consciousness	.15	.14	.07	.03	-.38**	-.45**	-.32**	.85**	.48**	-
11. Social anxiety	.06	.06	-.02	.02	-.20*	-.29**	-.32**	.68**	.09	.41**

Note. ** $p < .01$. * $p < .05$.

Specifically, results demonstrated that participants significantly differed at probe one between conditions in their reports of coder-rated narrative daydreams (i.e., Table 23; represented by γ_{01} Condition). There were no condition differences at probe one for self-reported emotional self daydreams, realistic narrative daydreams, or for coder-rated temporal associative daydreams (Table 20, 21, and 22). Furthermore, participants' self-reported emotional self daydreams and self-reported realistic narrative daydreams significantly differed from the overall sample average over probes (Table 20 and 21; represented by γ_{10} Probe). However, this change was not significant between conditions (represented by the cross-level interaction γ_{11} ProbeXCondition).

As demonstrated by the negative $\gamma_{10\text{Probe}}$ coefficient, these results indicate that participants reported increasingly less emotional self and realistic narrative daydreams over probes on average (but this rate of change was true for the overall sample, and not for one condition over the other). Participants also showed significant variability at probe one on all daydreaming scales (represented by $\tau_{00\text{intercept}}$). Furthermore, participants showed significant variability around the average rate of change on all daydreaming scales (represented by $\tau_{11\text{Probe}}$), except for coder-rated narrative daydreams. This suggests that daydream content remained fairly idiosyncratic in that participants' minds did not follow any particular prescribed pattern of thought (as hypothesized from condition manipulations). However, participants did not vary much over probes for coder-rated narrative daydreams, which suggests that this category of daydreams stayed fairly consistent over probes (however, this 'stability' in narrative responses over probes was not predicted by condition).

The significant covariance between the intercept and the time slope for coder-rated temporal associative daydreams (represented by $\tau_{10\text{cov}}$) indicates that probe one scores on these scales significantly influenced their rate of change over probes. Because the coefficient is negative, these results indicate that participants who had lower probe one scores on coder-rated temporal associative daydreams experienced steeper rates of (personal) change over probes than participants who had higher probe one scores on this variable. Finally, the significant residual (represented by $\sigma^{2\text{resid}}$) on all four daydreaming scales indicates that participants significantly deviated from their own rate of change at each daydreaming probe. This indicates that participants' daydreams were not consistent over time, and that their content shifted at each probe. The intraclass correlation for these models shows that 32% (Table 20), 29% (Table 21), 50% (Table 22), and 34% (Table 23) of the variance in

daydreaming can be attributed to differences between participants. As in experiment one, much of the variance in daydreaming can be attributed to changes within a person, and less between people.

Hypothesis three and 4: Multiple regression analyses

As in in experiment one, I wanted to determine if manipulations may have created significant condition differences in the self-concept variables (i.e., self-concept clarity, self-esteem, and self-consciousness and its subscales) even if no significant condition differences were found for all four daydreaming variables. As can be seen in Table 24, no significant condition differences were found in all self-concept variables (as indicated by both p-values and confidence intervals, which include zero). Because of this, I chose to proceed with hypothesis three and the exploratory hypothesis by using the whole sample pooling over conditions.

Table 20.

Experiment two parameter estimates (PE), standard error (SE), t-tests (t), and significance estimates (p) for self-rated emotional self daydreams growth through time by condition.

Model	PE	SE	t	p	ICC
$\gamma_{00intercept}$	2.88	.09	32.07	<.00	
$\gamma_{011Condition}$	-.18	.18	-1.01	.31	
$\gamma_{10Probe}$	-.06	.01	-4.32	<.00	
$\gamma_{11ProbeXCondition}$	.00	.03	.08	.93	.32
$\tau_{00intercept}$	.43	.13	3.36	.00	
$\tau_{11Probe}$	.01	.00	1.99	.02	
τ_{10cov}	-.02	.02	-1.14	.25	
σ^2_{resid}	.94	.06	15.82	<.00	

Note. Condition = external stimuli contrast-coded .5 and current concerns contrast-coded -.5.

Table 21.

Experiment two parameter estimates (PE), standard error (SE), t-tests (t), and significance estimates (p) for self-rated realistic narrative daydreams (Real) growth through time by condition.

Model	PE	SE	t	p	ICC
$\gamma_{00intercept}$	3.77	.07	53.20	<.00	
$\gamma_{01Condition}$	-.04	.14	-.28	.78	
$\gamma_{10Probe}$	-.05	.01	-4.19	<.00	
$\gamma_{11ProbeXCondition}$	.01	.02	.55	.58	.29
$\tau_{00intercept}$	.26	.09	2.93	.00	
$\tau_{11Probe}$	.00	.00	1.68	.05	
τ_{10cov}	-.00	.01	-.70	.48	
σ^2_{resid}	.62	.04	15.56	<.00	

Note. Condition = external stimuli contrast-coded .5 and current concerns contrast-coded -.5.

Table 22.

Experiment two parameter estimates (PE), standard error (SE), t-tests (t), and significance estimates (p) for coder-rated temporal associative daydreams (AssoC) growth through time by condition.

Model	PE	SE	t	p	ICC
$\gamma_{00intercept}$	2.90	.06	46.54	<.001	
$\gamma_{01Condition}$	.00	.12	.01	.99	
$\gamma_{10Probe}$	-.01	.01	-1.47	.14	
$\gamma_{11ProbeXCondition}$	-.01	.02	-.72	.47	.50
$\tau_{00intercept}$	.31	.07	4.66	<.001	
$\tau_{11Probe}$	.00	.00	2.65	<.01	
τ_{10cov}	-.02	.01	-2.62	<.01	
σ^2_{resid}	.30	.02	15.36	<.001	

Note. Condition = external stimuli contrast-coded .5 and current concerns contrast-coded -.5.

Table 23.

Experiment two parameter estimates (PE), standard error (SE), t-tests (t), and significance estimates (p) for coder-rated narrative daydreams growth through time by condition.

Model	PE	SE	t	p	ICC
$\gamma_{00intercept}$	2.58	.05	49.09	<.001	
$\gamma_{01condition}$	-.24	.10	-2.28	.02	
$\gamma_{10Probe}$	.00	.00	1.06	.29	
$\gamma_{11Probe \times Condition}$	.03	.01	2.29	.06	
$\tau_{00intercept}$	.16	.05	3.46	<.001	.34
$\tau_{11Probe}$	.00	.00	1.19	.12	
τ_{10cov}	-.01	.00	-1.51	.13	
σ^2_{resid}	.31	.02	15.76	<.001	

Note. Condition = external stimuli contrast-coded .5 and current concerns contrast-coded -.5.

To do this, I used hierarchical linear regressions in order to answer hypothesis three (i.e., participants who reported more narrative daydreams would report greater momentary self-concept clarity than participants who reported more associative daydreams), along with the exploratory hypothesis (i.e., narrative and associative daydreams will be differently related to self-consciousness and self-esteem). Since all four daydreaming scales were linearly related to the outcomes and did not pose risk for multicollinearity (Appendix D), all four scales (i.e., the broad daydreaming scales derived from the factor analyses, pooled over all ten probes) were entered in the same hierarchical regression, each predicting state self-concept clarity, self-consciousness (along with private, public, and social anxiety subscales), and self-esteem.

Results indicated that none of the four daydream predictors were significantly associated with state self-concept clarity or self-esteem (as indicated by both p-values and confidence intervals, which include zero; Table 25). Unlike experiment one, none of the four

daydreaming predictors were associated with public self-consciousness or social anxiety (as indicated by both p-values and confidence intervals, which include zero; Table 25). However like experiment one, realistic daydreams were significantly positively associated with self-consciousness -and more specifically with private and public self-consciousness –over and above emotional self daydreams, associative daydreams, and narrative daydreams (as indicated by both p-values and confidence intervals, which did not include zero; Table 25). Although significant, it is important to note that the confidence intervals for this relation varied quite a bit, with a lower bound of .02 and a higher bound of .34. The confidence intervals were also similar for private self-consciousness (Table 25). This demonstrates that the strength of the relation between realistic narrative daydreams and self-consciousness should be determined more conclusively in future research.

The effect size –represented by the partial correlations in Table 25 –for the association between realistic narrative daydreams and self-consciousness was also very close to medium, as well as the effect size for the association between realistic narrative daydreams and private self-consciousness. These results indicate in the current sample, participants who reported more realistic narrative daydreams (i.e., daydreams anchored in reality, that unfold in a coherent temporal sequence, and that are specific) also reported higher levels of overall self-consciousness, and more specifically, higher levels of private self-consciousness (i.e., propensity to introspect; Brewer, 1986; Kihlstrom & Klein, 1997; Leary & Tangney, 2012; Markus & Wurf, 1987; Neisser, 1988).

Experiment two t-tests between conditions for self-concept variables.

<i>Variable</i>	<i>Condition</i>	<i>Mean (SD)</i>	<i>Mean difference (SE)</i>	<i>t</i>	<i>p</i>	<i>df</i>	<i>95% CI</i>	
							Lower bound	Upper bound
State self- concept clarity	External stimuli		.02(.12)	.21	.84	146	-.20	.25
	Current concerns							
Self-esteem	External stimuli		-.04(.10)	-.38	.70	146	-.24	.17
	Current concerns							
Self- consciousness	External stimuli		-.08(.09)	-.84	.40	146	-.26	.10
	Current concerns							
Private self- consciousness	External stimuli		-.13(.09)	-1.37	.17	146	-.31	.06
	Current concerns							
Public self- consciousness	External stimuli		-.09(.14)	-.69	.49	146	-.36	.17
	Current concerns							
Social anxiety	External stimuli		.03(.16)	.17	.86	146	-.29	.35
	Current concerns							

Table 25.

Unstandardized Regression Coefficients (Standard Error), 95% CI, and Effect Sizes for interactions between experiment two daydreaming scales self-concept variables.

Daydream predictors	B(SE)	<i>p</i>	Lower Bound	Upper Bound	<i>R</i> ²	Partial <i>r</i>	Self-concept outcome
Constant	2.50(.53)	<.001	1.46	3.55		-	
Emotional self	.09(.09)	.31	-.08	.27		.09	State self-concept clarity
Realistic narrative	.03(.11)	.76	-.18	.24	.01	.03	
Temporal associative	-.03(.12)	.81	-.26	.20		-.02	
Narrative	.03(.14)	.84	-.25	.31		.02	
Constant	2.64(.47)	<.001	1.71	3.56		-	
Emotional self	.04(.08)	.57	-.11	.20		.05	Self-esteem
Realistic narrative	.13(.09)	.19	-.06	.31	.02	.11	
Temporal associative	-.07(.10)	.49	-.28	.13		-.06	
Narrative	-.07(.13)	.58	-.32	.18		-.05	
Constant	1.65(.40)	<.001	.89	2.44		-	
Emotional self	.08(.07)	.23	-.05	.21		.10	Self-consciousness
Realistic narrative	.18(.08)	.03	.02	.34	.10	.18	
Temporal associative	.00(.09)	.96	-.17	.18		.00	
Narrative	.09(.11)	.38	-.12	.31		.07	
Constant	.99(.38)	.01	.24	1.75		-	
Emotional self	.08(.06)	.19	-.04	.21		.11	Private self-consciousness
Realistic narrative	.29(.08)	<.001	.14	.44	.22	.30	
Temporal associative	.04(.08)	.65	-.13	.21		.04	
Narrative	.20(.10)	.07	-.01	.40		.16	

Constant	2.12(.61)	<.001	.91	3.32		-	
Emotional self	.10(.10)	.33	-.10	.30		.08	Public self-consciousness
Realistic narrative	.11(.12)	.40	-.14	.35	.03	.07	
Temporal associative	.03(.13)	.82	-.24	.30		.02	
Narrative	.02(.16)	.92	-.31	.34		.01	
Constant	2.21(.73)	<.01	.76	3.66		-	
Emotional self	.05(.12)	.67	-.19	.29		.04	Social anxiety
Realistic narrative	.08(.15)	.60	-.22	.37	.01	.04	
Temporal associative	-.08(.16)	.61	-.40	.24		-.04	
Narrative	.02(.20)	.93	-.37	.41		.01	

Note. * $p < .05$ ** $p < .01$

Experiment two discussion

The main goal of study two was to induce narrative and associative daydreams through experimental manipulations, and to determine if these induced narrative daydreams significantly influenced the self-concept over associative daydreams. Overall, experiment two failed to significantly manipulate narrative and associative processes in daydreaming. That is, the narrative manipulation (i.e., participants who wrote about their seven most important life events and used them to write their life story) and the associative manipulation (i.e., participants who talked out loud about anything that was going on through their minds) were not successful at inducing narrative and associative daydreams over probes, respectively. Instead, multilevel growth curve analyses demonstrated that participants' daydreaming reports varied quite significantly at each probe, indicating high variability in daydreams overall, like in experiment one.

Although no significant differences between conditions were found, multiple regression analyses –pooling over daydreaming probes across the whole sample –revealed that self-consciousness and its private subscale were significantly uniquely related to realistic narrative daydreams. Unlike experiment one, results of experiment two indicated no significant relation between public self-consciousness and self-rated realistic narrative daydreams. Otherwise, all results of experiment two are exactly the same as experiment one, demonstrating that participants varied significantly in their own daydreaming reports over probes, but did not significantly differ between conditions. Finally, all descriptive daydream elements remained the same, such that participants reported more short-term future-oriented daydreams containing the self and social others. Since the results of experiment one and two share common patterns, I chose to interpret these in the general discussion.

General Discussion

The first goal of this dissertation was to find and describe associative and narrative themes within daydreams. Specifically, I argued that narrative daydreams would be characterized by mental episodes that have a common theme/context, that progress logically through time, and that contain meaningful links between daydream elements and the self (Dorsch, 2012, 2014; McLean, Pasupathi, & Pals, 2007; Pasupathi, 2015; Williams, 2002). In turn, I hypothesized that these narrative daydreams could be initiated by activating existing goals, self-beliefs, and life stories. To manipulate these narrative processes in the laboratory, I asked participants in experiment one to write down their main goals and current concerns and to keep these in mind while they completed a modified sustained attention task (i.e., participants had to press ‘v’ on the keyboard when they saw vertical lines appear on the screen –as opposed to horizontal lines). With the same aim of manipulating narrative processes, I asked participants in experiment two to write down their life story using their seven most important life events as guides, and to keep this story in mind while completing a sustained attention task (Bauer, Tasdemir-Ozdes, & Larkina, 2014; Bluck & Habermas, 2000; Klinger, 2009; Singer & Bluck, 2001).

I also argued that associative daydreams would be characterized by specific and emotionally intense mental elements (e.g., Berntsen, 2010; Conway, 2005; Seli et al., 2016, 2017; Zedelius & Schooler, 2016). I hypothesized that these associative daydreams would follow basic rules of association by being retrieved through novel external stimuli. To manipulate these associative processes in the laboratory, I asked participants in experiment one to complete a similar modified sustained attention task as participants in the narrative condition. However, the vertical and horizontal lines were overlaid with short sentence cues

meant to trigger specific and emotional mental elements (as opposed to being presented with ‘bare’ pictures of vertical and horizontal lines). With a similar goal, I asked participants in experiment two to speak out loud and say whatever was going through their mind while tracing on a piece of paper, before completing a modified sustained attention task (Rosenzweig, Krawec, & Montague, 2011).

To assess the presence of these narrative and associative processes within daydreams, participants in both experiments, and in all conditions, were presented with ten random daydreaming probes. If participants said ‘yes’ to daydreaming, they were asked to describe the daydream using a text-box and the keyboard to type. They were then asked to rate their daydream on multiple dimensions using Likert-type scales (Appendix B). By using the written daydream descriptions on the one hand, and the Likert-type scales on the other, I was able to look for narrative and associative elements using self-report and coding (Bulmer, 1979; Charmaz, 2008, 2010; Clandinin & Connelly, 2000; Coffrey & Atkinson, 1996; Corbin & Strauss, 2008; Dey, 1999, 2007; Gergen, 1978; Glaser & Strauss, 1967; Henwood & Pidgeon, 1992; Rennie, Phillips, & Quartaro, 1988).

The second goal of this dissertation was to better understand how the self is constructed within imaginative environments by exploring how daydreaming was related to the self-concept. Specifically, I hypothesized that daydreaming would allow individuals to become more self-conscious, a phenomenon that is characterized by an increased awareness of self-related mental elements (e.g., introspection) and an increased awareness of others’ perceptions of the self (Carver & Glass, 1976; Duval & Wicklund, 1972; Fenigstein, Scheier, & Buss, 1975; Trapnell & Campbell, 1999; Wicklund & Grolwitzer, 1987; Wicklund, 1975, 1978). I also argued that self-related information obtained through daydreaming would help

individuals become aware of positive and negative evaluations about the self, also known as self-esteem (Gray-Little, Williams, & Hancock, 1997; Jordan, Spencer, & Zanna, 2003; Luo et al., 2016; Marsh & O'Mara, 2008; Rosenberg, 1979). Since self-related mental elements can be present in both associative and narrative daydreams, I expected both of these daydreaming categories to be related to higher awareness (i.e., self-consciousness) and evaluations (i.e., self-esteem) of the self.

However, I expected daydreams with a greater narrative structure to be related to self-concept clarity over and above daydreams with an associative structure. That is, self-concept clarity is characterized by the perception that self-concept content –such as values, goals, and desires –are clear, consistent, and stable over time (Campbell, 1990; Campbell & Lavellee, 1993). In order to reach this level of clarity and consistency, self-related information needs to be regularly connected to ongoing experiences. This is done through narrative processing, which organizes self-related mental elements and experiences in meaningful structures represented in a story-like manner (e.g., Dorsch, 2012, 2014; McLean, Pasupathi, & Pals, 2007; Pasupathi, 2015; Williams, 2002). Since I theorized that narrative daydreams would be underlined by meaningful self-related mental elements organized in a temporally coherent way, and underlined by a common theme, I expected that these narrative daydreams would make it easier for individuals to make connections between experiences and the self (Singer & Salovey, 1993, 1996; Pebble, Addis, & Tippet, 2013). Specifically, I hypothesized that narrative daydreaming would allow individuals to extract personal meaning that could help form a clear concept of self (Dunlop & Walker, 2013; Habermas & Bluck, 2000; McAdams, 1996; McLean, Pasupathi, & Pals, 2007; Pasupathi, 2015; Pasupati & Mansour, 2006; Singer & Bluck, 2001).

Before testing the main hypotheses for this dissertation, I conducted two exploratory factor analyses on the sample as a whole (i.e., using participants from experiment one and two). I chose to do this in order to determine if the items derived from the coding of the written daydreams on the one hand, and items derived from the self-rated Likert-type scales on the other, would cohere into the associative and narrative daydreaming categories that I had theorized about.

The first factor analysis was conducted on the self-rated items and produced two correlated factors. The first factor was characterized by emotionally intense mental elements, but also by self-related elements relevant to a person's goals, values, and life. As mentioned earlier, this first factor –although extremely self-relevant –may be closer to what I theorized to be associative daydreams, mainly because self-related elements are likely to be associatively retrieved if they have been encoded in memory alongside highly emotional mental elements (i.e., self-reference effect; Rogers, Kuiper, & Kirker, 1977; Symons & Johnson, 1997). As such, these unique and salient self-related elements are paired with intense emotions during retrieval, which produces a daydream imbued with emotional self-related content (James, 1892; Levine et al., 2002; Markowitsch, 2003; Tulving, 2002, 2005; Vandekerckhove, 2009; Wheeler, 2004). Since these emotional self daydreams are not necessarily linked by a theme, and do not progress in a temporally logical way, then it appears as though this category is closer to the proposed theoretical associative daydream category than the narrative category. The only major difference between theory and empirical data is of course the specificity of daydreaming content (i.e., it seems as though the emotional self daydreams do not appear to be specific or broad. Instead, specificity simply does not appear to be an important feature of this daydreaming category).

The second factor in the analysis on self-rated items was characterized by mental elements that are realistic, that follow a structured and story-like sequence, and that are more specific. Although I had theorized that associative daydreams would produce more specific mental content than narrative daydreams, research has nonetheless demonstrated that narratives can be specific, as long as the specific mental elements are linked together by a common theme and progress logically in time (e.g., Conway, Singer, & Tagini, 2004; Singer & Blagov, 2000; Singer, Blagov, Berry, & Oost, 2013; Singer & Conway, 2011; Pasupathi, 2006). Because of this, it is possible that daydreams that progress like a story can also contain mental elements that are specific, yet linked by an underlying theme. Whether these daydreams are perceived as specific because of their narrative structure, or whether these are *actually* specific remains to be determined. That is, these two correlated daydreaming factors –emotional self daydreams and realistic narrative daydreams –are derived from self-rated items. As such, they only represent participants’ perception of their own daydream, such that different categories may emerge when looking at daydreams rated by independent coders.

Indeed, the factor analysis conducted on the coder-rated items produced two factors relatively in line with what I had theorized to be associative and narrative daydreams. Although this factor analysis was not able to correlate the two extracted factors (e.g., Costello & Osborne, 2005), results nonetheless suggested that certain daydreams cohere into a category underlined by specific, emotionally intense, yet temporally coherent mental elements on the one hand (i.e., close to what I had theorized to be associative daydreams, although with a temporal element), and broad, and causally coherent (i.e., meaningful) mental elements tied together by a common theme (Conway, Singer, & Tagini, 2004; Singer & Blagov, 2000; Singer, Blagov, Berry, & Oost, 2013; Singer & Conway, 2011) on the other

(i.e., very close to what I had theorized to be narrative daydreams, but without the temporally coherent element).

In the present dissertation, there was no previous knowledge of factor structure or communality values to guide the choice and number of items included in the factor analyses (e.g., MacCallum et al., 1999). Indeed, this was the first study looking at the factor structure of items underlying the latent (i.e., theoretical) variables of associative and narrative daydreaming –and the first study developing and empirically testing a coding scheme to analyse associative and narrative elements in qualitative reports of daydreaming. Since the communalities in the coder-rated factor analysis were small and the number of items per variable was lower (i.e., only three items per factor), future research should aim to collect a much larger sample size (i.e., up to 500 participants or more; Comrey & Lee, 1992; Costello & Osborne, 2005; Fabrigar, Wegener, MacCallum, & Strahan, 1999; MacCallum, Widaman, Zhang, & Hong, 1999) to obtain a more representative factor structure (e.g., Costello & Osborne, 2005; MacCallum et al., 1999).

Notwithstanding the limitations associated with the generalizability of the factor structure to the population of interest (mainly with the coder-rated items), I chose to test hypothesis one and two –in both experiment one and two –by conducting latent growth curve multilevel models on each daydreaming category derived from the factor analyses (i.e., self-rated emotional self, self-rated realistic narrative, coder-rated temporal associative, and coder-rated narrative). Since hypothesis one and two were concerned with how daydreaming evolved across time based on condition, each multilevel model included the level-one predictor of time (i.e., daydreaming probe) along with the level-two predictor of condition.

For experiment one and two, results demonstrated that most of the variance in each

daydreaming category was within participants. This means that when daydreaming significantly changed across probes (which was only the case for self-rated emotional self and coder-rated narrative daydreams in experiment one, and self-rated emotional self and self-rated realistic narrative daydreams in experiment two), participants were more likely to report different daydream structures from their own previous report at each time point (i.e., probe). Since I was expecting participants in the narrative manipulations (i.e., current concerns condition for experiment one, narrative⁶ condition for experiment two) to report more narrative daydreams than participants in the associative manipulations (i.e., external stimuli condition in experiment one, associative condition in experiment two) –and vice-versa –I conclude that hypothesis one and two were not supported.

Instead, results suggested that although daydreaming episodes adopted fairly narrative and associative structures (as demonstrated in the factor analyses), participants nonetheless showed high variability in their daydreaming reports over time. That is, a single participant was more likely to report daydreams with different structures at each probe (i.e., more narrative one probe, more associative the next) than to consistently report daydreams belonging to the same category at each probe as I had initially hypothesized. Since daydreaming reports in experiments one and two were so idiosyncratic, it begs the questions: can daydreaming content truly be manipulated into associative and narrative structures?

⁶ I am using associative and narrative labels here as broader descriptors of the daydreaming categories derived in the factor analyses, mainly because these categories all generally follow associative and narrative categories derived from theory. Please see the factor analysis section of the discussion for a more in-depth interpretation of daydreaming categories.

Can associative and narrative processes be manipulated in daydreaming?

I designed the narrative manipulations around the retrieval of semantic autobiographical memories, which favours information relevant to a person's general life story, and can be used to project into the future (McAdams, 2008; McLean, 2005; Pasupathi, Mansour, & Brubaker, 2007; Rubin, Boals, & Berntsen, 2008). As such, the success of the manipulation relied on the assumption that participants –by writing about their goals or life story –would engage in a complete top-down scanning of the mental elements in their daydream in order to extract a complete narrative (Ciaramelli, Grady, & Moscovitch, 2008; Martin & Chao, 2001; Tomita, Ohbayashi, Nakahara, Hasegawa, & Miyashita, 1999). Indeed, Figure 1 demonstrates that for daydreams to become fully narrative, I theorized that mental elements need to go through narrative processing. This process recruits executive functions in order to organize mental elements in a meaningful manner (e.g., Dorsch, 2012, 2014; McLean, Pasupathi, & Pals, 2007; Pasupathi, 2015; Williams, 2002).

Furthermore, past research has demonstrated that autobiographical reasoning should be paired with narrative processing for a person to fully *actively* evaluate memories and link them back to the self (e.g., Dunlop & Walker, 2013; Habermas & Bluck, 2000; McAdams, 1996; McLean, Pasupathi, & Pals, 2007). It is precisely autobiographical reasoning that allows narrative processing to produce self-stories imbued in meaning (i.e., the integrative elements and self-event connections that were used in the coding table found in <https://osf.io/p6kqn/>; Habermas, 2011; Habermas & Bluck, 2000; McLean, Pasupathi, & Pals, 2007; Pasupathi, 2015; Pasupati & Mansour, 2006; Singer & Bluck, 2001).

Although Pasupathi (2015) demonstrates how autobiographical reasoning can take place below consciousness (through choice of words in narratives; Tausczik & Pennebaker, 2010; social context of narratives, Green & Donahue, 2009; Hardin & Conley, 2001; Oatley & Mar, 2005; Sinclair, Hunsinger, Skorinko, & Hardin, 2005; Swann, 2000; embodiment of experiences in narratives, Damasio, 1999, 2010; Legrand, 2006, 2007; Pasupathi, 2015; Zahavi, 2005), there is nonetheless evidence that this meaning-making process requires explicit awareness for individuals to consciously interpret experiences (including mental experiences) and integrate them into the self (e.g., Pasupathi, 2015).

Given results of both experiments one and two, the narrative manipulations may not have produced the thorough top-down scanning of mental elements necessary for autobiographical reasoning to take place, and thus for more complete narrative daydreams to emerge. Although some daydreams had a theme, and progressed in a logical temporal manner, most of these were lacking causal coherence. Indeed, daydreams rarely had integrative elements and self-event connections necessary for meaning to be extracted from the narratives, and thus for the narratives experienced in the daydreams to become fully and consciously integrated into the self-concept (mainly through self-concept clarity). Instead, daydreams seemed to appear within consciousness in semi-structured narratives, which at times, tempered off into other more associative thoughts, or simply lacked meaning-making (i.e., understanding how events reported in daydreams relate to the self).

Of course, this lack of meaning-making may be due to the fact that daydreams were written down. This method may not have been adequate in capturing the full

spectrum of daydreaming experience, since participants may not feel comfortable writing down such personal experiences, or may simply not be comfortable with the writing medium in the first place (e.g., Carini, Hayek, Kuh, Kennedy, & Ouimet, 2003; Musallam, Schallert, & Kim, 2011). Knowing this, I believe that writing may have been a barrier in adequately *manipulating* narrative elements prior to the daydreaming episode, and in *capturing* narrative elements once the daydreaming episode had occurred⁷. For example, certain participants mentioned the narrative manipulation in their daydream report, but simply did not provide enough information once it came time to describing the daydream: ‘i was daydreaming on goals as a continuation of the exercise from earlier⁸’ (participant 159, probe 7); ‘I am reflecting on the worksheet I filled in, specifically the career portion. I am thinking about where I will end up in the future, and I see myself happiest in a job where I have free time to be with my family, or make my own hours to some degree not a 9-5’ (participant 183, probe 1). While very few participants mentioned the narrative manipulation *and* wrote about how the narrative relates to the self, as participant 16 (probe 1) did:

I was day dreaming about the seven marking points I was asked to write about my life, how most of it I feel has to do about my heritage, growing without much representation of it on daily day basis but knowing of it, and now in University being able to seek this all out by myself, starting with Salsa, howw despite it not being a Mexican dance, it is latin and it feels like a step in the right direction, how amazing it feels to start learning something so beautiful and how there is so much to something to learn.

⁷ Instead of writing a traditional ‘future directions and limitations section’, I chose to include limitations and future directions in each sub-section of the general discussion to increase clarity (i.e., ideas pertaining to the same thens go together).

⁸ All written daydream descriptions are reported verbatim (including any spelling and grammatical errors).

Indeed, I had mentioned in the introduction one potential limitation to the methodology that I chose to adopt, especially when it came to manipulating narrative processes. That is, much of the research that I reviewed on the initiation and structure of narratives was based on narratives that were *told*, instead of narratives that were *imagined*. Specifically, researchers have demonstrated that mental elements are more likely to be integrated into a person's narrative identity or life story depending on whether it was shared (versus not shared), and depending on whom it was shared with (McLean, Pasupathi, & Pals, 2007). Sharing mental elements reinforces the importance of the story to the self, which makes them more salient in consciousness and more easily accessible to the self-concept (Kernis & Goldman, 2003; Markus & Wurf, 1987; McLean, Pasupathi, & Pals, 2007; Pasupathi, McLean, & Weeks, 2009).

When I began the research reported in this dissertation, it was uncertain whether written narratives counted as told stories, especially since it had been speculated that imagined audiences (or social others) could have a similar effect on the self as telling a narrative to a real person (McLean, Pasupathi, & Pals, 2007). Since goals and life stories often revolve around a person's social world (e.g., Poerio et al., 2015, 2016), I believed that writing down goals and other narrative elements would be enough for participants to integrate these elements into their imaginary worlds –and into their self-concept –at least for the duration of the experiment. However, this does not seem to be the case. Instead, this told element may be particularly important in bringing narrative elements to the forefront of participants' consciousness and as such, making these elements more accessible for narrative daydreams to emerge (over and above other associative mental elements like hunger, short-term tasks like cooking dinner and seeing friends –unless

these are tied together by a theme and involve meaning-making –and other mundane mental pressures like rehearsing mental maps to get from one place to another, for example).

Knowing this, I suggest that future research looking to manipulate narrative processes in daydreams should structure the experiments in a way where participants tell their goals and life stories to a researcher or research assistant. To obtain a large sample size, it may be appropriate to concentrate resources on one narrative manipulation, instead of two (e.g., Cohen, 1992; Simonsohn, 2015). In this case, the current concerns and life-story manipulations reported in this dissertation could be combined in a way that allows participants to list their most important goals alongside their most important life events, in order to combine these in a narrative that ranges from past meaningful experiences to future meaningful projections.

The narrative manipulations reported in this dissertation lasted ten minutes. However, at least five minutes may be necessary for participants to list their goals and life-events, and another ten minutes may be needed for participants to tell their narrative to the researcher or research assistants. As such, fifteen minutes may be needed for this kind of narrative manipulation, although pilot testing may determine more appropriate guidelines. After this ‘told’ narrative manipulation, participants should undergo a similar modified attention task with daydreaming probes as reported in this dissertation. Although ten probes seemed appropriate (i.e., the modified sustained attention task lasted twenty minutes without probes, and took participants an average of forty minutes to complete with probes), researchers may want to adapt this number to better fit their specific design and research questions.

After this task, I suggest that the daydreams be described ‘out loud’ in order to capture as much of the daydream as possible (which was limited for many participants when daydreams were reported through writing). Furthermore ‘telling’ daydreams in this way may further reinforce their importance to the self-concept. To do this, participants could ‘tell’ their daydreams in a recording device programmed within the experiment itself (such as windows media player or other) so that daydreaming content is not contaminated by the researcher or research assistants, while also maintaining this ‘told’ element that may be important to the formation of meaningful narratives (i.e., accompanied by a layer of awareness necessary for adequate top-down narrative processing; e.g., Ericsson, & Simon, 1984; Kottler, 2014; McLean, 2005; Pasupathi & Coombs, 2002). It is also important to note that written narratives were left relatively unfinished (i.e., participants were instructed to keep their narrative in mind while completing the computer task because they were going to tell their story to another experimenter after the task). As such, ‘told’ protocols should also adopt this method to make sure that narratives are being held at the forefront of one’s consciousness.

As far as the associative condition is concerned, I believe that the external stimuli condition –where random word phrases were overlaid overtop of the vertical and horizontal line stimuli –may slightly more promising than where participants had to speak out loud and doodle on a sheet of paper for five minutes. Although it is difficult to determine this empirically, since there were no significant differences in conditions across both experiments, the qualitative data obtained from daydream reports nonetheless offers some evidence that random word phrases successfully triggered specific and emotional

mental elements. Although I will not list all daydreams that mention the word phrases as a memory trigger, here are a few examples from the qualitative data⁹.

From participant 61, probe 6:

the words getting arrested brought on a daydream about one of my best friends who got arrested last year, more specifically when he called to tell me. It was around 1:30 in the morning and i was at home watching greys anatomy wih my dog at my feet and my sister on the couch opposite from me. My phone rang and I decided to take it in the other room for privacy, and thats when my friend told what had happened and what he had done. I remember the feeling of a knot in my stomach and taking about a minute to ask if he was okay.

And participant 61, probe 10:

the words house fire brought on a daydream about when I was in the 5th grade and I was sleeping at my grandfathers house because that day my grandmother had been hospitalized for a stroke, I watched the Scooby Doo movie before bed while my grandfather went downstairs and lit a fire in their fireplace so it would be warm at night. I then remember waking up because I felt like I had to for some reason but opened my eyes to see the room was filled with smoke. I remember getting up to wake up my grandfather who brought me outside and called 911.

From participant 205, probe 4:

After seeing the word "fat cat" i began thinking of y cat Sammuel, the larger of my two cats. I remembered the image of him lying in his cat bed this morning before I left, & how his fat tummy kind of stuck out from beneath him. Very Cute.

From participant 273, probe 2:

I was daydreaming about having a significant other in my life and how that would feel like, some of the words and phrases on the lines thing made me daydream about having a partner in my life to do those things with. I was daydreaming about a big hug, and someone fixing my flat tire.

From participant 278, probe 8:

⁹ It is important to mention that the speak out loud manipulation was never mentioned (experiment two). However, the word phrases were mentioned quite consistantly (experiment one).

I don't know if seeing images of the words count. But for a brief moment I pictured wet clothes when it came up and just for a moment thought about when I was almost drowned by one of the foster kids I was with while in foster care. My clothes got wet, if you were wondering.

From participant 285, probe 2:

the words that appeared in each slide of lines triggered a "dream." The word "injury" triggered me into when i broke my leg, my mind startd replaying what happened that day: it was at off ice practice for figure skating, i remember the lights being bright, the classic smell of the arena, i remember looking at the ground and preparing for the new jump i had just learned, i took a leap off the ground and it all happened very suddnly, i am thinking bout the cayos that broke out. Everything from here is very blurry, i couldnt see distinctly what was happening around me, i remember glimpses of what follower. My coach runs over and is talking me thugh what is happening - now i remmber nothing - my dad runs into the room, picks me up - i remmber nothing from here - i am in the car, it is sunny, no radio is playing, my mom is speeding to the hospital, i am in the front seat - dont remember anything, - i am carried into the hospital that my mom works at, i am seeing familiar facs, everyone knows that is is my eing brought in - dont remember anything - i am now getting xrays, the nurse is a woman, she has a pink or purple shirt on, she comments on my shoes, i get scanned and i am back on a sretcher bed - dont remeber anything - the docto enters a room ad starts giving me medication, i joke aboutit how the eleactis that is wrapped around my arm smells ike chocolate, they say i have a bad break in my leg and that i need surgery - dont remember anything - i wake up from surgery with a cast, i am in and out of sleep and being awake, when i wake up i see very bright blurry light cant hear much of anything, i see my mom first, i am in a wheel chair and am sent home

Although these are just a few examples, they further demonstrate how capturing daydream content using writing may not allow for the complete detail and structure of daydreaming content to emerge. Because of this, I suggest that future studies use the overlaid words along with probes that ask participant to report their daydreams by 'telling' them in a recording device and/or program. However, showing words on top of the line stimuli does seem to trigger specific and emotional mental elements (of course, when these daydreams are fully reported and can be adequately coded). Of course, it is possible that

associative and narrative processes cannot be manipulated in the laboratory enough to study differences with reasonable sample sizes. That is, daydreams could be too fleeting or momentary to adopt a particular structure over time, no matter how intensive the manipulation prior to the daydreaming episode is. In this case, it may be that daydreams are only influenced by more stable structures like personality, or more abstract elements like emotions.

Daydreaming and the self-concept

Results indicated that there were no significant differences between conditions in both experiments one and two for all self-concept variables (i.e., self-concept clarity, self-esteem, self-consciousness, private self-consciousness, public self-consciousness, and social anxiety). Furthermore, all four daydreaming categories derived from the factor analyses (i.e., self-rated emotional self daydreams, self-rated realistic narrative daydreams, coder-rated associative daydreams, and coder-rated narrative daydreams) were non-significantly related to self-concept clarity and self-esteem, and this across both experiment one and two. However, self-rated realistic narrative daydreams were significantly positively related to self-consciousness, and specifically private and public self-consciousness in experiment one. In experiment two, self-rated realistic daydreams were also significantly positively related to self-consciousness, but only positively related to private self-consciousness. Since I have discussed individual results from experiment one and two in their respective discussions, I will focus my analysis on the common thread that runs through both experiments. That is, self-rated realistic daydreams were predictive of an increase in overall self-consciousness –and in private self-

consciousness –over and above all three other daydreaming categories. However, none of the daydream categories were related to self-concept clarity and self-esteem.

The first question that emerges from these findings is why did all daydreaming categories –and especially daydreams with narrative elements like self-rated realistic daydreams and coder-rated narrative daydreams –fail to influence self-esteem and self-concept clarity? Indeed, I expected self-concept clarity to be related to narrative daydreams because narrative elements organize self-related mental elements into a clear, temporally coherent, and internally consistent form, which can help a person make meaningful sense of elements of the self-concept (e.g., Nezlek & Plesko, 2001; Oyserman, 2004; Pasupathi, Mansour, & Brubaker, 2007; Steiner, Thomsen, Pillemer, 2017). I also expected self-esteem to be related to associative and narrative daydreams since the self-related elements found in both daydreaming categories are likely to bring about evaluations of self.

To reiterate, self-esteem is characterized by how a person evaluates the self, either positively or negatively (Gray-Little, Williams, & Hancock, 1997; Jordan, Spencer, & Zanna, 2003; Marsh, 1986; Marsh & Craven, 2006; Marsh & Hattie, 1996; Marsh & O'Mara, 2008; Rosenberg, 1979), while self-concept clarity determines if knowledge and evaluative elements about the self are stable over time, internally consistent, and clear (Campbell, 1990; Campbell & Lavalley, 1993). Although the more narrative daydream categories contained temporally coherent mental elements connected by a common theme, it is possible that only fully *causally coherent* daydreams can truly be related to self-esteem and self-concept clarity. That is, all four daydreaming categories –even the more narrative ones –were missing the meaning-making element (i.e., causal coherence; this loaded quite low on the coder-rated narrative daydream, even if included in this scale) that is so crucial to narrative processing,

and especially to autobiographical reasoning (e.g., Dorsch, 2012, 2014; McLean, Pasupathi, & Pals, 2007; Pasupathi, 2015; Williams, 2002).

As previously mentioned, individuals should actively link experiences back to the self in a meaningful way for narrative content to become evaluations, and for these evaluations to be integrated into the self-concept (e.g., Dunlop & Walker, 2013; Habermas & Bluck, 2000; McAdams, 1996; McLean, Pasupathi, & Pals, 2007). It is possible that the top-down reasoning required for autobiographical reasoning –and as such for active evaluations of the self through self-esteem, and a concrete understanding of the self through self-concept clarity –simply did not take place in the daydreams reported in experiments one and two. As I have elaborated before, this lack of autobiographical reasoning in daydream reports may be due a weak narrative manipulation before the task, or weak methods regarding the capturing of daydream content (i.e., written as opposed to ‘told’).

Another possibility is that the inherent nature of daydreaming makes it difficult for mental elements to be processed in a fully top-down manner (e.g., Wang, Poerio, Murphy, Bzdok, Jefferies, & Smallwood, 2018), no matter the intensity and thoroughness of the narrative manipulation. Indeed, daydreaming is initiated when attentional resources are decoupled from the external environment and when the default mode network is activated (Andrews-Hanna, 2012; Christoff et al., 2009). This is often termed as the mind being ‘at rest’ (e.g., Andreasen et al., 1995). Although the extent to which executive resources are recruited when a person becomes aware of a daydream is still unknown (Crick & Koch, 2003; Kock & Tsuchiya, 2007; Schooler, 2002), researchers have theorized that daydreaming is initiated and sustained because executive functions fail (McVay & Kane, 2010). As such, this failure of executive functions causes the default mode network to activate, which does not

require executive resources to function (e.g., Konishi, McLaren, Engen, & Smallwood, 2015; McKiernan, D'Angelo, Kaufman, & Binder 2006; Mason et al., 2007).

Alternatively, the resource-control theory proposes that daydreaming occurs and is sustained due to a re-distribution of attentional resources to the internal environment when these resources are depleted (Thomson, Besner, & Smilek, 2015). In this case, distribution of attentional resources would explain how the default mode network is activated and sustained, and not a failure of executive functions. In both of these theories however, daydreaming acts as a 'rest' from executive processing, which is required for the top-down processing of self-related mental elements characteristic of autobiographical reasoning and self-concept formation. It is also possible that the modified sustained attention task used in both experiments occupied much of participants' attentional resources, which could have otherwise been used for more top-down processing of daydreams.

As such, daydreams with narrative elements –such as self-rated realistic narrative daydreams –may contribute to narrative processing by linking together self-related mental elements into temporally coherent narratives that can later be used in top-down autobiographical reasoning. However, narrative daydreaming itself may not be related to self-esteem and self-concept clarity because it does not include the conscious and thoughtful executive processing of narratives necessary for autobiographical reasoning. Instead, it is possible that autobiographical reasoning is initiated when narratives are shared with other people, as opposed to only imagined within a daydream (e.g., McLean, 2005; Pasupathi, 2015; Pasupathi & Coombs, 2002).

More evidence for this interpretation can be found in the results of this dissertation, where self-rated realistic narrative daydreams were positively related to self-consciousness

and private self-consciousness. Interestingly, self-consciousness is conceptualized as the awareness of one's own consciousness (i.e., actions, thoughts, emotions; Duval & Wicklund, 1972; Wiley, 1994). As such, this self-awareness can either be directed outwardly in the form of beliefs about how others perceive the self, or inwardly in the form of introspection and awareness of mental elements (such as daydreams; Trapnell & Campbell, 1999; McKenzie & Hoyle, 2008; Simsek, 2013). Interestingly, both experiment one and two of this dissertation demonstrated that self-consciousness and private self-consciousness were significantly *negatively* correlated with self-esteem and self-concept clarity, a finding that has been previously established in the literature (e.g., Campbell et al., 1996; Liu, Zhang, Pan, Hu, He, Chen, & Wang, 2017; Pullmann & Allik, 2000). If self-esteem, self-concept clarity, and self-consciousness are all constructs under the broader umbrella of the self-concept, then why should awareness of self predict less clear evaluations and a less stable understanding of the self?

It is possible that becoming aware of the self through self-consciousness and private self-consciousness is more like looking at one's reflection through ripples in the water than looking at oneself through a mirror. One is fragmented and moving, while the other is stable and clear. That is, being aware of one's internal world does not necessarily mean that one understands the meaning behind what he or she perceives (e.g., Debner & Jacoby, 1994; Dienes & Perner, 1999; Grant, Franklin, & Langford, 2002; Marchetti, 2018). Instead, daydreams containing narrative elements may disrupt the clarity and existing evaluations of the self-concept (Campbell, 1990; Campbell & Lavalley, 1993) by bringing new narratives into conscious awareness. For these narratives to be integrated into clear and stable evaluations of self, a deeper analysis of narrative content may need to occur (through

autobiographical reasoning). As such, becoming aware of the self disrupts previous beliefs about the self, which could explain why self-consciousness and its subscales are negatively related to self-esteem and self-concept clarity. One disrupts while the other binds. Looking at the opposite direction of this association, it is also possible that people who lack a clear sense of self-concept and esteem search for meaning by introspecting to a greater degree.

Through this lens of understanding, self-consciousness bolstered by daydreaming may be the first step in narrative processing. In this way, narrative daydreaming opens the door to narrative processing by combining random mental elements into coherent stories. As the person engages in these narrative daydreams, they become increasingly more self-conscious, especially when it comes to introspection or exploration of the inner world. Of course, these correlational results could also be interpreted in the opposite direction, where being aware of one's internal world through private self-consciousness brings about more narrative daydreams. Either way, results of this dissertation suggest that awareness of one's internal environment and narrative daydreaming go hand-in-hand. However, one important question remains: why did self-rated realistic narrative daydreams significantly and positively relate to self-consciousness?

To reiterate, realistic narrative daydreams are anchored in reality (as opposed to fantasy), follow a structured and story-like sequence, and are more specific. I believe that these daydreams can qualify as what I had theorized to be narrative daydreams –more so than associative daydreams –because specific mental elements can be considered narratives if they are linked together by a common theme and follow a structured and temporal sequence of thought (Conway, Singer, & Tagini, 2004; Singer & Blagov, 2000; Singer, Blagov, Berry, & Oost, 2013; Singer & Conway, 2011; Pasupathi, 2006).

What may set this category of daydreams apart from the others is that they contain both episodic (i.e., highly specific and realistic) and semantic (i.e., a broader perspective into one's experiences) autobiographical memories (Conway, Singer, & Tagini, 2004; Singer & Conway, 2011). Indeed, it is proposed that this dual memory system can bring about a greater understanding of self than strictly random associations because the level of detail gained from episodic memories paired with the broader perspective of semantic memories allows for more complete narratives to emerge, and for a greater ability to project into the future (Conway, Singer, & Tagini, 2004; Singer, Blagov, Berry, & Oost, 2013; Singer & Conway, 2011). Knowing this, it seems as though realistic narrative daydreams represent a mix of episodic and semantic autobiographical memories combined into a narrative sequence.

As previously mentioned, these realistic narrative daydreams may represent an elementary step in narrative processing. Indeed, Pebble and colleagues (2013) have demonstrated that a function of narrative processing is to weave thematic links between episodic and semantic autobiographical memories. In turn, this bridge between detailed rich experiences and broader self-related themes allows for meaning-making and self-concept clarity to flourish. Under this interpretation, realistic narrative daydreams create detailed and thematically rich narratives. When linked with self-consciousness, realistic narrative daydreams kick-start the first steps of narrative processing (i.e., for the person to become aware of these narratives). What is left to be determined is whether another daydreaming category not observed by this dissertation is able to recruit top-down processes in order to extract meaning from these narratives (i.e., autobiographical reasoning), or whether cognitive processes outside of daydreaming assume this function in order to influence self-concept clarity in a meaningful way. It is also possible that early stages of narrative processing do not

occur in such a causal sequence, but are instead characterized by multiple iterations of realistic narrative daydreaming and introspection to prepare for the creation of a more concrete and meaningful life story.

It is also possible that narrative daydreams are not an extension of what Seli, Risko, and Smilek (2016) have termed intentional and unintentional daydreaming. Indeed, I had theorized that daydreams that follow a narrative structure may be experienced as more intentional since they are more coherent and temporally logical. That is, I proposed that asking participants whether a daydream was intentional or not could induce retrospective bias, where participants falsely believe that a daydream was intentional when it was not. Since I did not ask participants whether their daydreams were intentional or not, it could be interesting for future studies to include items related to intentionality. Knowing this would allow to determine whether intentional and unintentional daydreams (Giambra, 1995; Seli, Carriere, & Smilek, 2015; Seli, Risko, and Smilek, 2016) are unique from narrative and associative daydreams. If so, intentional daydreams that also contain narrative elements may recruit more top-down processes necessary for complete autobiographical reasoning and as such, may relate to self-esteem and self-concept clarity to a greater degree.

Finally, certain participants may have experienced increases in self-concept clarity and self-esteem after considering the self in a daydream, while others experienced a decrease. This may be explained by a third individual difference variable that was not measured in this research, but that cancels out a systematic increase in these self-concept variables. As such, it could be interesting for future research to assess individual differences (either using the Big Five or other relevant measures) in order to capture this possible third variable influence.

Concrete examples of qualitative analysis

Since experimental psychology –when purely based on the natural science model (i.e., deduction¹⁰) risks of adopting a reductionist approach to human consciousness (e.g., Dilthey, 1894), I decided to pair quantitative self-report methods with qualitative daydreaming reports in the present dissertation. The importance of including such observations is that qualitative paradigms are based on constructivist epistemologies, which are driven by description as opposed to explanation. They are concerned with describing a particular phenomenon through participants' eyes in order to understand the context and complexity of experience (Bulmer, 1979; Clandinin & Connelly, 2000; Coffrey & Atkinson, 1996; Gergen, 1978; Henwood & Pidgeon, 1992). This approach is also based on the idea that as descriptions are accumulated, hypotheses can also be modified to better fit new understandings. This is slightly more in line with induction, since concepts and hypotheses emerge from what is observed in the data, rather than the data being fit to an *a priori* theory. Knowing this, I talk about how to improve the coding table developed within the context of this dissertation using findings from this descriptive analysis (p. X).

My hope for this dissertation is to contribute to the formation of a grounded theory of daydreaming and the self-concept (e.g., Charmaz, 2008, 2010; Corbin & Strauss, 2008; Dey, 1999, 2007; Glaser & Strauss, 1967; Rennie, Phillips, & Quartaro, 1988), which is developed over time through the analysis of qualitative and quantitative data. I strongly believe that a

¹⁰ Psychological research as observed today is based on both induction and deduction (e.g., Collins, 1985; Gauch, 2003; Popper, 1959). On the one hand, induction is used to collect observations (i.e., empirical data) and build a reliable body of knowledge –or theory. On the other hand, deduction uses theory in order to inform data collection, whose purpose is to falsify said theory. As such, the present dissertation uses both inductive and deductive methods to understand the research questions. That is, the empirical methods presented in previous sections mainly rely on deduction to answer the research questions, since a theoretical foundation was used to create hypotheses, and data was collected in order to falsify these hypotheses (although it can be argued that the goal in most psychological research is not to disprove a theory, but to find evidence that supports hypotheses).

theory regarding daydreaming and the self-concept should be informed by the careful analysis of verbatim daydreaming reports (alongside empirical investigations; Creswell, 2009; Creswell & Plano Clark, 2011). In this dissertation, qualitative analysis of daydreaming reports was done in such a way that items could be created (i.e., coding was done on a liker-type scale) and entered in a factor analysis.

In this section, I present a few examples from the descriptive analysis of daydreaming reports (see Figure 6 and 9 for a visual distribution of themes). If the theme corroborated past empirical findings, then I present these findings in order to bridge the gap between quantitative and qualitative understandings of daydreaming. I have also included examples of what I initially theorized to be associative and narrative daydreams to provide more context for these categories (while also providing examples of daydreams that varied within these theoretical categories). On this note, I suggest that future research keeps using empirical (i.e., self-report) methods in daydreaming probes, but that qualitative daydreaming reports always accompany these in order to obtain a complete and multifaceted understanding of daydreaming.

The self in daydreaming.

Past research has demonstrated that a large proportion of daydreams contain self-related elements (e.g., Andrews-Hanna et al., 2013; Andrews-Hanna et al., 2010; Andrews-Hanna, Smallwood, & Spreng, 2014; Klinger, 2009; McMillan, Kaufman, & Singer, 2013; Stawarczyk et al., 2011; Stawarczyk, Cassol, & D'argembeau, 2013). Interestingly, over 90% of daydreams across both experiment one and two included the self. That is, participants directly referred to themselves in their daydream reports using pronouns like 'I', 'me', 'my'

and ‘we’, to list but a few¹¹. This corroborates past research and provides further evidence for the theory that self-related information may be more easily retrieved than self-unrelated information (Rogers, Kuiper, & Kirker, 1977; Symons & Johnson, 1997). It is also possible that daydreams include so much self-related information because it is useful for the self-concept. As such, self-related information is accessed through self-consciousness, and later updated into the self-concept through autobiographical reasoning. Other self-unrelated information may be less necessary for providing useful building blocks to the self-concept and as such, appear within daydreams less often. Of course, these speculations are elaborations based on the results presented in this dissertation. Further research is absolutely needed to determine the tenability of these assumptions.

However, I will present examples retrieved directly from the qualitative data obtained in experiment one and two in order to demonstrate the prevalence of the self in daydreaming in the hopes that it can be of use to future studies on daydreaming and the self, or of daydreaming content more broadly. For example, participant 274, probe 5 mentions a daydream where the self is present: ‘my relationship with women will repeat the same as it did in college. They’ll all ignore me or play games just to mess with me’. In these next subsections, I will list qualitative examples of social others in daydreaming, and short-term future elements in daydreaming (the most common themes apart from the self in daydreaming found in Figure 6 and 9). I will also provide examples of associative elements in daydreaming, and narrative elements in daydreaming (including broad and specific narratives) in order to demonstrate how qualitative data can help us better understand (and provide context for)

¹¹ It is important to note that for a daydream to be coded as self-relevant, the self had to be the *subject* of the daydream. Daydreams such as ‘I am thinking of pears’ would not be considered self-related even if ‘I’ is used. This is an important delineation between self as thinker/creator of the daydream, and self as subject of the daydream. An exception is if the subject of the daydream is not directly the self, but is associated to the self through possessive pronouns such as ‘my dad’ or ‘my boyfriend’.

empirical findings (Bulmer, 1979; Charmaz, 2008, 2010; Clandinin & Connelly, 2000; Coffey & Atkinson, 1996). I will not provide more unique examples of the self in daydreams, as all daydreams reported in these sub-categories also include the self. Furthermore, most of the daydreams reported in these examples include internal elements (as opposed to reports of external distractions –apart for specific daydream triggers like the words on the screen).

Social others in daydreaming.

As can be seen in Figure 6 and 9, over 40% of daydreams in experiment one and two contained social others, such as family members, romantic interests, significant others, colleagues, roommates, acquaintances, and even domestic animals. As demonstrated in previous research, individuals rarely imagine the self without accompanying social elements, such as cultural norms and social others (Hardin & Conley, 2001; Sinclair, Hunsinger, Skorinko, & Hardin, 2005; Swann, 2000). These researchers propose that imagining social elements in this way allows individuals to rehearse social interactions. In line with this thinking, daydreaming researchers have demonstrated that daydreaming of social others is associated with positive socio-emotional adjustment during significant life events (Poerio, Totterdell, Emerson, & Miles, 2016), and with increased happiness, love, and feelings of connection (Poerio, Totterdell, Emerson, & Miles, 2015). The examples listed below highlight this focus on social aspects of self in daydreaming reports.

Participant 1, probe 1 reports a daydream about a friend playing music on Valentine's day:

I was daydreaming about my friend playing his guitar for me on a Valentines day. I also dreamed about listening to the song song he sang and sitting at the by the fire, I felt the cold and moist air around me but the warmth of fire coming from one side. I

smell fresh air.

Participant 8, probe 8 reports on daydream about a family member:

I was thinking about my dad, he left yesterday to go on a business trip for a few days. I was thinking about the moment that he left.

Similarly to participant 22, probe 4:

i was daydreaming about going on a vacation at the beach and get a really nice tan, as well as spending more time with my family because i did not see them in 1 year.

And participant 103, probe 1:

I was daydreaming about fishing at my cottage with my dad. I can see myself having so much fun and being stress-free. Sitting on my boat with my dad, having fun conversations and feeling lucky to be spending so much time with my dad.

As well as participant 104, probe 8:

I was remembering the time I went on a trip to Portugal with my grandparents. (this daydream specifically, was on the Portuguese island of Sao Miguel(I think that is the name of the island)) There was this really cool garden on the side of a cliff that had a whole bunch of really pretty tropical flowers. I remember feeling really happy when I was there, because I was with my grandparents and I was stress-free. The sun was shining down the mountain side, And I could see the ocean from where I was. It felt so calm and it was so quiet.

And participant 294, probe 3:

I was thinking of this morning, my mom was able to drive me to school this morning, which doesn't happen often. She brought pie in the car and while she was driving I was helping her eat it. I had some too. I thought it was really funny and a good start to the day

Participant 264, probe 4:

i was day dreaming about my mother and how much i love her

And participant 27, probe 8:

i daydreamed about how much i want to call my mom now to tell her important stuff that happened to me yesterday

Participant 60, probe 1 reported a daydream about their homeland of Isreal and their family:

When I was filling out the question about my ethnic background, I started thinking about my homeland (Israel). I started imagining my trip there as i am going there this summer. My family came to mind and i just imagined going to the beach with them and the nice warm weather.

As did participant 299, probe 7:

i was thinking about my bestfriend, who is from new zealand. And i should go visit him. That i always go to australia, but i dont come down to new zeland to visit him. and i really should. And i really want to. I would love to see him, and travel around new zealand

And participant 274, probe 2:

My friends are giving me motivation to keep trying to pursue football, even though I had a bitter end playing the sport during highscool. All of them truly believe in me and think I can make the team.

Participant 294, probe 1 reported a daydream about someone that they are seeing romantically:

I was daydreaming about a person I am currently dating. I was thinking about the last time I saw them. How they made me feel good about myself. as well as being intimate with them. Being with him feels like a little vacation away from all my responsibilities and stresses.

As did participant 32, probe 8:

My daydream was about my boyfriend and i sitting on my couch watching a scary movie and eating popcorn. It took place in my house but the couch or any furniture wasnt outlined. The daydream was of me laughing and throwing popcorn in his mouth and being happy.

As highlighted by these examples, social others make an important appearance in daydreams by helping the daydreamer understand the self in light of their relationship with others. Sometimes, the self is understood through feelings for others (e.g., love, happiness,

enjoyment), while at other times, the self is understood by the roles others play in the person's development (e.g., motivation, romantic relationships).

Short-term future in daydreaming.

Another interesting finding that came out of the qualitative analysis of daydream reports is that over 40% of daydreams across experiments one and two mentioned the future, and were related to short-term experiences and events (see Figure 6 and 9). Interestingly, research demonstrates that self-related mental elements can bring about more future-oriented thoughts (Smallwood et al., 2011; Stawarczyk, Majerus, Maj, Van der Linden, & D'Argembeau, 2011). As such, the examples below highlight daydreams that reported short-term and future-oriented mental elements. It is interesting to note that most of these daydreams also include the self and social others.

From participant 11, probe 10:

Planning out my weekend in my head. Multiple quick thoughts. As my classes are cancelled tomorrow and I have Fridays off so I have a 4 day break. Mid terms are finally over so I can spend the weekend with friends and family. Pictured myself cutting firewood, eating dinner with family members and spending time with friends.

From participant 14, probe 3:

I was daydreaming about what I'm going to do after the study and I was wondering if I was going to get certain messages on my phone after the study that will dictate how my day plays out today

From participant 18, probe 5:

I am daydreaming about what I'm going to do when I go home. I've been at school all day. My day dream involved me having a shower and cooking dinner as well as the walk home. I don't know what I was making for dinner but I was really excited about it. It was also cold on the walk home

From participant 59, probe 4:

I was just daydreaming about what I was going to do following the test, which is to

continue working on my assignment for another class.

From participant 265, probe 1:

I was at first day dreaming about a guy that I hate but i may have a slight sexual attraction to. Then I started day dreaming about what i will be doing after this study, which is sleeping. I have a friend called Naomi, and i spend everyday together with and on Wednesdays she finishes classes at 12:30, meaning that i can sleep for another hour and then get ready to go eat and then head on to my psychology class which statrts at 2:35. I was also daydreaming about doing my makeup as well, after i wake up from my nap.

From participant 183, probe 6:

At the moment I am thinking about the dinner I am going to have at my grandmas house tonight. She goes to a lot of trouble to make presentable and delicious meals. I was just thinking about what she may have cooked tonight (I am hungry..).

From participant 129, probe 5:

thinking about calling my mom at work to see if she could print my resume for a job I want

From participant 47, probe 4:

I was daydreaming about the left overs I have in my fridge at home that I get to eat later today. Its my moms home made soup that I use to have all the time as a kid

From participant 1, probe 9:

job i will do next week. i wonder what kind of people i will meet and wether i will not disappoint my employer

From participant 33, probe 3:

I was daydreaming about the event that I attended last night, the people I met and the performances I watched. I was also daydreaming about he event that I am going to tonight, and what I need to do in order to get ready for it after I complete this experiment. I also daydreamed about me crying over a boy who broke my heart and some nightmares I had last night.

And from participant 60, probe 4:

Im daydreaming right now about driving, im still in the process of learning to drive and have upcoming lessons on friday. I imagined me driving down the road with my driving instructor and convincing myself that driving is not scary or hard.

The fact that many daydreams reported in experiment one and two of this dissertation are short-term may reflect the idea that it is easier to connect to a future self that is more proximate than distant, since one may feel more real as opposed to abstract and undefined (e.g., Blouin-Hudon & Pychyl, 2015, 2017; Pychyl & Sirois, 2013).

Associative elements in daydreaming.

As mentioned in the theoretical development of this dissertation, associative elements in daydreams are characterized by a high level of sensory, emotional, and perceptual detail, which can feel like an individual is re-living (or pre-living if the person is projecting in the future) what it feels like to be in a particular experience (Tulving, 1984; Pebble, Addis, & Tippett, 2013). As such, daydreams with associative elements are more likely to contain a similar first-person perspective as the original experience (James, 1892; Levine et al., 2002; Markowitsch, 2003; Tulving, 2002, 2005; Vandekerckhove, 2009; Wheeler, 2004). Examples of such emotional and specific daydreams are listed below.

The first daydream is from participant 89 probe 7, which shows a great example of unrelated mental elements that lead to an emotional (i.e., ‘very happy’; ‘ridiculous’) and specific (i.e., a specific instance of spending time with best friend) episode:

I was daydreaming about my phone still being locked in the box, then I sa a word that reminded me of vines. I am now thinkng of vines. I am reminded of the time that I was hanging out with one of my bestfriends and he pointed put that all I had said in the past half hour was vine quotes. I remeber him thinking I was ridiculous, but I was also very happy.

Participant 257, probe 6 recalls the specific details of meeting their friend for the first time, accompanied by a heavy feeling of letting parents down (the participant does not elaborate on why this feeling is associated to their friend):

My friend was wearing a black t-shirt, grey joggers and a black pair of Adidas when we first met in the library. I could remember how his perfume usually smells like too, ocean with mint and a mixed of sweets. The feeling of letting your parents down was too much, too heavy. We first dined out together was at Sushi Town Restaurant.

Participant 257, probe 7 also reports a highly associative daydream containing many random mental elements, but each vivid and emotional in their own way:

The feeling of rubbing my hands against my mom skin. The image of my grandma falling asleep when she was reading me bedtime stories. The feeling of her hands rubbing slightly on my back so I could fall asleep. The smile of my nephew when he saw me picking him up from school. The excitement to see someone after waiting for 5 months. The thoughts of something you expected to last has officially ended. The smell and the taste of the food someone you love makes for you, The image of someone you love focusing on their work.

Participant 260, probe 5 reports a daydream where certain associative elements are related to what is going on in the external environment, while others are related to what is going on in the participants' internal environment. The daydream is reported with an emotional tone, and each mental element has to do with a specific time and place (even if concrete details about smells, tastes, etc. are not reported):

My leg is doing that annoying shaky shaky thing....and my knee still hurts from my injury too long ago. this chair is hard. I can't make out what the sign says above me....i wonder what my parents are eating tonight. i wonder if my cat misses me.....nah he's probably having fun with his friends. the researcher outside seems to also be with others. I wish i had a group of friends at university already....it's only been a month so i'm not too worried.

Participant 44, probe 3 reports a daydream where mental elements move from real life to fantasy and entertainment. This daydream is considered more associative than narrative

because the daydream contains elements where the participant is experiencing the fantasy in the moment (i.e., running around in a video game; being in Game of Thrones). Furthermore, emotional information is provided regarding how *excited* they are to be back home:

At first I thought of how interesting daydreams are, and for some reason this reminded me of the movie Avatar. This then reminded me of a videogame that my roommates play, in which they have to complete missions and defeat creatures in a fantasy world. I then imagined being a character in that world, and for some reason that reminded me of Game of Thrones, so the theme song started playing in my head. I was just running around, in some sort of medieval clothes, with some sort of wapon (possibly a sword) as the music is playing. This reminded me of how long it has been since I watched Game of Thrones, and it made me think of being back home for the winter break, and get really excited for school to end. It also reminded me of how much good food I get to eat whenever I go back home, and I am now hungry.

Finally, participant 2, probe 6 reported an associative daydream where she describes events linked to specific times in the day, while also mentioning relatively intense emotions (i.e., ‘dislike’; ‘anxiety’). It is also interesting to note that the events reported in the daydream are quite random, and are not linked by a common theme as would be expected of a narrative:

my roommate because she just left to London and i dislike her, my dog that i get to see soon, the time because its close to 4 which is the time my friend gets off work, meeting my tinder date at a movie tomorrow, anxiety

It is important to note that daydreams reported in this section were pulled out from the coding table to provide some concrete examples of the theoretical concepts that I presented in the introduction. As the factor analysis revealed however, not all daydreams were perfectly associative in the way that I had theorized. As such, this section is more descriptive than highly conclusive on any given daydreaming patterns (i.e., it is meant to supplement the findings that I have discussed thus far with concrete examples. See <https://osf.io/p6kqn/> for all written daydreams). Please see the next section on the coding table to see how the

descriptive analysis of daydreams can be used to improve on the coding scheme for future research.

Broad narrative elements in daydreaming.

While associative elements in daydreams are characterized by highly specific and emotional mental elements flowing in a fairly random manner, narrative elements are organized in a chronological way and are linked together by a common theme (Barsalou, 1988; Conway & Pleydell-Pearce, 2000; Levine, Svoboda, Hay, Winocour, & Moscovitch, 2002; Neisser, 1986; Tulving, 1984; Williams et al., 2008). These daydreams can also be characterized by a meaning-making element, where an individual links imagined experiences back to the self. As seen in the results of this dissertation however, this meaning-making element does not always seem to be present in reported daydreams. However, this does not stop them from nonetheless adopting a fairly narrative structure. Although self-rated realistic narrative daydreams were underlined by specific narratives, coder-rated narrative daydreams followed a broader structure founded on broader mental elements (Berntsen, 2010; Tulving, 1985; Vandekerckhove & Panksepp, 2009). Examples from these broad narrative daydreams are presented below.

To start, it is interesting to see that an associative manipulation (i.e., the overlaid words) triggered a relatively broad narrative daydream for participant 278, probe 7. In this example, the participant tells the story of imagining not being able to play music like their hero (theme). The participant further highlights why this story is important to the self on a broader level:

Somewhere I saw the word Music. And right away I thought about what it must of been like for my hero (Friederich II von Hohenzollern) to have not been able to play

music when he wanted to. Music for me is so important to keep myself going and not kill myself that I cannot imagine what it must of been like for him when he was not allowed to do that.

Participant 34, probe 6 reports a narrative that falls under the theme of self-confidence, or even self-improvement. This narrative is considered broad because the participant introspects about how being more positive can help them reach their goals and dreams, which fit into a more general life-story:

I was gathering my thoughts and bringing myself back to focus on teh task, because I can be very sel critical about my own goals and dreams and make myself feel bad about not achieving as much as I would like. I was talking to myself in my head and telling myself that I was not a loser, that I was loved and admired, that I need to be more positive and just focused on my goals and dreams. My worth does not depend on any other personè thoughts or opinions of me. Everyone is learning skills, everyone is good at different things. Dont beat yourself up.

Participant 24, probe 6 recalls a choir from Uganda, which prompts a narrative around the theme of human rights. The participant also links this narrative back to the self by highlighting how they thought more about people in need:

It is not vivid, but I am thinking of the Watoto Childrens Choir again and Uganda too. The choir is from Uganda. I was thinking about how the conditions there are so poor, and how those people are really struggling, especially the women. And I want to sponsor a child badly but I just cannot afford to at this stage in my life. I see in my head replays of clips of interviews with some of the women, mostly the young woman who was sewing. I just think about how people get so caught up in their own world, their own immediate situation, that the rest of the world that is suffering even more is forgotten. And I am not feeling guilty, but I do wish I kept the people of Uganda and in other parts of the world on my mind more.

Participant 98, probe 7 provides a great example of a narrative using past memories to imagine the future (even if this future could never occur in this specific example). In this narrative, the participant talks about the theme of motherhood and the complexities around losing a baby that was not planned in the first place:

I was thinking about how my best friend was pregnant in August. She was excited about having a baby but miscarried just before September. She was both relieved and sad. I was imagining what it would be like now if she hadn't lost the baby. It would be born and crawling around by now, and how would her nursery look. I imagined her having a little girl, and dressing her in the stereotypical princess gowns and all that. I pictured myself holding the baby by the crib.

Participant 299, probe 3 makes a link between straight lines and the broader theme of getting bored of people quickly. This narrative also has an underlying theme of close relationships, since this participant is planning on how to tell their current boyfriend that they should take a step back:

i was seeing a visual picture of me and my (almost) boyfriend in the car. We drive a lot together. On highways that are straight forward and boring. I like straight lines, but i also dislike them. I was thinking how i might get a bit tired of people really quickly, and i am tired of my almost boyfriend. But i would not and should not tell him the news in the car

Participant 21, probe 9 reports a short narrative that is very broad. It is underlined by the theme of humanitarianism and why this is important to the participant. If the participant had provided more information on this narrative, it would have been easier to make out the temporal sequence of mental elements to a greater degree. However, this daydream can nonetheless be considered more narrative than associative:

imaging myself to have such an amazing impact as malala has had, most of all to add to the world and make it a better place, thinking about fighting for justice from slavery and freedom.

Participant 183, probe 2 reports a narrative describing how their personal hobby may make them happy and financially stable in the future:

I was thinking about my personal hobby and how that's working out - trading stocks and cryptocurrency. I wonder if one day the money I make off of that hobby which makes me happy can satisfy my need to work for money to provide for myself and my family.

Finally, participant 47, probe 7 reports a narrative daydream around the theme of close relationships. They tell the story of what it would be like to get back together with their ex-partner, and the repeated memory of being ignored by this same person in the past:

I was day dreaming about my ex boyfriend and what it would be like if we got back together. Quickly I realized it would not be a good idea because of how poorly the relationship carried out. One scene that came to mind was how every time I would text him he would leave me on read and I would feel really stupid.

Similarly to the associative section, narrative daydreams reported in this section were pulled out from the coding table to provide some concrete examples of the theoretical concepts that I presented in the introduction. As such, this section is more descriptive than highly conclusive on any given daydreaming patterns (which is better explained in the factor analysis from coder-derived items).

Specific narrative elements in daydreaming.

If you have made it this far into the document, it is now clear that there is theoretical and empirical evidence to support the idea that narratives can be broad and specific (Conway, 2005; Conway et al., 2004; Kernis & Goldman, 2003; Markus & Wurf, 1987; McLean, Pasupathi, & Pals, 2007; Pasupathi, 2006, 2015; Pasupathi, Mansour, & Brubaker, 2007; Pebble, Addis, & Tippet, 2013). As such, the qualitative examples listed below highlight daydreaming reports that are narrative, yet specific in nature.

Participant 15, probe 2 reports a daydream with the underlying theme of sports. In this narrative, the participant describes in detail what it is like to make a quick decision in hockey. Although this daydream is missing a meaning-making element, it nonetheless has a clear theme and progresses in a temporally logical manner:

I am imagining thing related to playing hockey. This activity was reminding me of how to play hockey you have to make quick choices simmlar to like when the vertical line pops up quick out of nowhere. I was picturing myself skating down the ice with the puck, there was a guy from the other team skating at me but before he reached me I had to mae a quick choice either pass it off keep skating and try to dodge him or shoot. I I hat the best option was to pass it off quick so that I would no get hit.

Participant 17, probe 10 reports a narrative daydream with the underlying theme of close relationships and wedding. The participant is telling a specific day in August where they will attend a wedding, and the reason behind certain decisions like the choice of makeup and attire:

I was daydreaming about the fact that I am attending a wedding this summer, as my boyfriend is one of the groomsmen, and I was thinking about what I plan on wearing and how I plan on doing my makeup because I want to take some nice photos with my boyfriend and everyone else. I was also thinking about how hot it is going to be to sit through an outdoor wedding in the middle of August, which then made me go back to thinking about what I want to wear and how lèm going to make my makeup stand through the heat and sweat.

Participant 142, probe 4 reports the narrative daydream with the underlying theme of work and career. This daydream is specific because it tells the story of a specific interview experience along with the participant's thoughts on how the interview went:

I had an interview yesterday with a new potential job. It would be working with individuals of all ages with disabilities. There were two ladies and they had brought along a client. He had Down Syndrome. He was too funny, half-way through the interview he let out this huge yawn which totally through me off my answer as I started thinking, oh man I am super boring. He did it three more times in the interview. I tried not to take it personally as he did a few other things that made me think he was just really bored. The questions were not exactly thrilling. I thought it very interesting they brought a client in. I wonder what he thought of me. I really want the job! Anyway, that is what I was thinking about. I am glad the interview is done. They make me so nervous!

The qualitative daydreaming reports presented in this section were meant to provide concrete examples of important themes that emerged during analysis by three independent coders. That is, coders followed a pre-determined scheme (<https://osf.io/p6kqn/>) to code for associative and narrative elements. Agreement was good between coders and an average score was created for all coder-rated items, which were then entered into a factor analysis. As such, these coder-derived items represent the qualitative aspect of this dissertation. Furthermore, coders were instructed to write down other daydreaming themes as they emerged during the coding process. These themes were then matched between coders and an exhaustive descriptive daydreaming elements list was obtained. As such, the daydreams presented in this section were meant to provide concrete examples for descriptive and theoretical themes found during coding, but were not meant to provide strong conclusions regarding these themes. Conclusions and interpretations can be found at the end of each experiment, and in earlier sections of this general discussion. In the next section, I talk about how the qualitative analysis of daydreams can be helpful in improving the coding table for future research.

Coding table

A core goal of the present dissertation was to develop and test a coding table meant to qualitatively assess narrative and associative elements in daydreams. Although the items derived from this table (Table 2) generated two factors in an exploratory factor analyses, the communalities between items were low, which indicates that certain items struggled to load on any factor (i.e., factor loadings were weak). As mentioned earlier in this dissertation, the coding table was developed based on a template analysis framework, which adopts an

incremental understanding of qualitative data in order to perfect the coding scheme over time (e.g., Brooks, McCluskey, Turley, & King, 2015). In order to achieve this, it is important for future research to improve on this table in order to perfect the coding scheme to more adequately reflect the data in relations to the research questions (e.g., Braun & Clarke, 2006; Gale, Heath, Cameron, Rashid, & Redwood, 2013; King, 2012; Madill, Jordan, & Shirley, 2000; Miles & Huberman, 1994; Wynn & Money, 2009). This is also in line with a grounded theory approach to research (e.g., Charmaz, 2008, 2010; Corbin & Strauss, 2008; Dey, 1999, 2007; Glaser & Strauss, 1967; Rennie, Phillips, & Quartaro, 1988).

One way to achieve this –and to increase communalities in the empirical translation of qualitative data –is to increase the sample size, as previously mentioned (e.g., Costello & Osborne, 2005; Fabrigar et al., 1999; Haig, 2010; MacCallum et al., 1999). Another way to do this is to increase the number of items that are included in the factor analysis. While too many items can also pose problems, too few items can make it difficult to distil a representative factor structure, since not enough detail on the latent construct is provided in general. A more diverse sample (i.e., more than first year female university students) could also provide greater insights into the tenability of associative and narrative daydreaming structures.

To this end, the upgraded coding table could include elements of each daydream category that emerged in the factor analyses, even the self-rated ones. For example, realism could be coded for, since it was such an important aspect of the self-rated realistic narrative daydream category (which was also the only significant predictor of self-related outcomes). Furthermore, specificity could be coded for both associative and narrative daydreams (i.e., this item would simply need to be moved from the associative header to the a shared elements

header to make it clear in data analysis that specificity may cohere into a narrative factor, as well as an associative factor; see Table 26).

Table 26.

Updated coding scheme based on qualitative and quantitative analyses.

ID	Text	Probe	Emotional intensity	Specificity	Temporal coherence	Context/ theme	Causal coherence	Self	Others	Past	Present	Future	Long/ short term	Realism
1		1	4	5	2	1	3	5	4	3	2	5	2	3

It would be important to code for elements that emerged in the descriptive analysis of daydreams in order to align the coding table with the most important qualitative themes. For example, a continuous scale could be used to code for aspects of self in daydreams, social others, temporality (i.e., past, present, future), and temporal perspective (i.e., long-term, short-term). Although these items may not be directly related to associative and narrative elements, it may nonetheless be important to include them if they are so prevalent in daydreams, since they could account for more variance (i.e., produce a third factor) in the daydreaming construct.

Since the self was also important in self-rated factors, it is also possible that these themes do end up being important for understanding associative and narrative elements in daydreaming. An example of the upgraded coding table is presented in Table 26. Of course, a specific coding scheme would need to be developed in order to determine what is a relatively short-term daydream (i.e., possibly a one or two on a Likert scale) versus a more long-term daydream (i.e., possible a four or five on a Likert scale). The same goes for daydreams with the self (how do you code for more or less self on a one to five scale), social others, and past,

present, and future elements.

Conclusion

Overall, the aim of this dissertation was to determine if daydreaming could be investigated through associative and narrative processes, and in turn, to see if daydreams underlined by these processes could predict greater awareness and clarity of self-concept. Notwithstanding the many avenues for future research and limitations to the present methods, this dissertation nonetheless has important implications.

This dissertation furthers our understanding of how the self is constructed within imaginative environments such as daydreaming. Indeed, there is still very little research on the relation between daydreaming and the self-concept, even if many daydreams contain self-related information (e.g., Andrews-Hanna et al., 2013; Andrews-Hanna et al., 2010; Andrews-Hanna, Smallwood, & Spreng, 2014; Klinger, 2009; McMillan, Kaufman, & Singer, 2013; Stawarczyk et al., 2011; Stawarczyk, Cassol, & D'argembeau, 2013). As such, this dissertation offers a novel way to study the self in daydreaming by understanding it through processes of association and narration.

Of course, neither of the two experiments were successful in manipulating associative and narrative processes. However, this research nonetheless provides new insights into self-reporting and coding for the daydreaming elements that can have an important relation to the self-concept, which is done by accounting for emotional intensity, specificity, theme, temporal coherence, and meaning-making. In turn, this coding scheme (and future improvements of this scheme) can help determine how associative and narrative structures within daydreams inform the self-concept.

As an indirect implication, this dissertation can also inform research on narrative identity by examining a novel way (i.e., daydreaming) through which self-narratives are constructed (Pebble, Addanis, & Tippet, 2013). Although narrative daydreams lacked the meaning-making mechanism necessary for complete narrative processing to occur, results suggested that daydreaming may nonetheless play a central part in early iterations of narrative elements, which can be important for more concrete narrative identity to emerge.

As was demonstrated in this dissertation, daydreams reflect what is important to a person; what worries them, who they care about, and what they love and aspire to do. In other words, daydreams are made up of pieces of who we are. When these pieces reflect real life and flow like stories, we pay attention, we look, and we become aware.

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Appendix A: Pilot testing of experiment one and two

Both experiments one and two were created in the Superlab version 4.5 software and were stored on a MacIntosh computer. All participants were recruited through the SONA participant pool between November 13th and December 8th, 2017. Please see Table 1 for descriptive statistics.

Once they arrived at Carleton's Happiness Laboratory, participants were randomly assigned to experiment 1A, 1B, 2A, or 2B. I initially chose to pilot these experiments using a within-person design because I believed that this would increase the overall power of my proposed experiments (i.e., I wanted to see if a within-person design made sense for the experiments that I am proposing). As such, participants assigned to experiment 1A went through the external stimuli condition first (i.e., where random sentences are overlaid on top of the horizontal and vertical line patterns) and then went through the protocol for the current concerns condition (i.e., where they fill in the personal concerns inventory before doing the attention task). Alternatively, participants assigned to experiment 1B went through the current concerns condition first, and then completed the external stimuli condition. Similarly, participants assigned to experiment 2A went through the associative condition first (i.e., where they have to talk out loud while tracing) and then completed the narrative condition (i.e., where they have to list 7 core life events). Finally, participants assigned to experiment 2B completed the narrative condition first, and then went on to complete the associative condition. Because of this within design, all participants –in both experiments –were shown 800 target and non-target stimuli and 20 daydreaming thought probes.

Table 1.

Descriptive statistics for experiment 1 (n = 14) and 2 (n = 13) pilot.

	Experiment 1			Experiment 2		
	Frequency/Range		Mean(SD)	Frequency/Range		Mean(SD)
Age	17-33		20.57(2.85)	18-25		19.69(2.02)
Gender	78.6%	21.4%	N/A	69.2%	30.8%	N/A
	(female)	(male)		(female)	(male)	
Condition	8	6	N/A	7	6	N/A
	(External stimuli)	(Current concerns)		(Associative)	(Narrative)	

Before I report the results of these pilot tests, it is important to mention that the sample size collected ($n = 14$ for experiment 1, and $n = 13$ for experiment 2) was not large enough to obtain adequate power for the statistical analyses that I have proposed. The purpose of this pilot was to determine how long it would take participants to complete the experiment, if instructions were understood correctly, and how many daydreams participants reported on average to determine if multilevel analyses could be conducted (i.e., need at least three data points or daydream reports per participant), and if the manipulation times were adequate. As such means and standard deviations in Table 1 should be taken with a grain of salt at this stage (i.e., it will be difficult to see differences between conditions), since a sample of 150 participants could generate very different statistics. I nonetheless chose to include this statistical information for descriptive purposes and also to familiarize myself with the SPSS syntax that I will use for the main analyses of my proposed dissertation (i.e., computing scales, averaging over daydreaming probes).

Table 2.

Self-report daydream characteristics mean(SD).

Variable	Experiment 1		Experiment 2	
	Condition		Condition	
	External stimuli	Current concerns	Associative	Narrative
Total daydreams	3.8(3.90)	2.9(2.01)	3.58(2.68)	4.45(2.58)
Daydream associative elements	3.13(.80)	2.66(.85)	2.97(.87)	3.13(1.00)
Daydreams narrative elements	2.97(.76)	2.92(.94)	3.07(.73)	3.10(1.08)
Daydream visual images	2.65(.90)	3.02(1.50)	2.63(1.19)	2.73(1.10)
Daydream inner speech	4.34(.70)	3.78(.95)	3.77(1.13)	3.54(.75)
Daydream frequency	2.65(1.67)	3.16(1.60)	3.11(1.25)	3.51(1.08)
Daydream high detail	3.86(.81)	3.36(1.02)	3.60(1.23)	3.67(1.17)
Negative daydreams	1.70(.82)	1.81(1.23)	1.68(.72)	1.90(1.56)
Positive daydreams	3.31(.87)	2.94(1.16)	3.04(1.11)	2.85(1.09)
Neutral daydreams	3.01(.70)	2.94(1.16)	2.76(1.04)	3.05(1.09)
Daydream emotional intensity	2.45(1.30)	2.07(1.14)	2.37(.92)	2.58(1.06)
Daydream structured thoughts	2.71(1.41)	3.25(1.28)	3.15(1.32)	3.27(1.05)
Daydream realistic elements	3.87(.76)	3.57(1.01)	3.93(.69)	3.90(.97)
Daydream importance to life	3.00(.95)	2.78(1.26)	3.14(.94)	3.02(1.42)
Daydream goal relevance	2.66(.99)	2.44(1.02)	2.85(.86)	2.95(1.33)
Daydream Identity elements	2.63(1.02)	2.51(1.40)	2.28(1.07)	2.40(1.23)
Daydream confidence	4.34(.57)	3.81(.74)	4.37(.61)	4.44(.63)
Self-concept clarity	3.17(.78)	3.07(.81)	2.72(.93)	2.65(.71)

As can be seen in Table 2, the total daydream reports for both experiments is over three, which suggests that participants in the main data collection phase should also report –

on average –enough daydreams to conduct multilevel analyses. All reported written daydream descriptions for both experiments also appear in Table 4. In this same table, the aggregated scores for associative elements (i.e., items 3 and 4) and narrative elements (i.e., items 9-13) of the daydream reports appear beside the written description.

What I conclude from the information in this table is that (a) participants report different categories than the two hypothesized daydream categories (i.e., associative and narrative); (b) what is coded as associative and/or narrative by the researcher may not always align with what participants are reporting as associative and/or narrative (through the Likert-scale items; i.e., there may be discrepancy between daydream written descriptions and self-report descriptions); and (c) participants report significantly less daydreams in the second condition that they are assigned to than in the first condition (see Table 3).

Regarding daydreaming categories, I was expecting that because it is impossible for me to gain complete control over the associations that participants are making during the tasks (e.g., they could be hungry, preoccupied with exams or other responsibilities, or triggered by external stimuli), then participants may report daydreams that are either a mix of narrative and associative processes, or that are not associative or narrative at all (e.g., participant ID#21). However, when looking at the large amount of daydreams that were reported with only 27 participants, I expect to have at least three associative or narrative daydream reports per participant in the final sample. I also do not want to increase the number of probes because research has demonstrated that more frequent probes do not equate more daydream reports, but instead, less (Seli, Carriere, Levene, & Smilek, 2013). As can be seen in Table 4, the daydream reports from the pilot experiments are rich and diverse and offer a plethora of interesting associative and narrative elements (see participant ID#19, daydream 2

for a prime example of an associative daydream, and participant ID#3, daydream 2 for a prime example of a narrative daydream). However, it may be interesting and important to categorize daydreams that do not fall into the associative and/or narrative dimensions that I have proposed. So far, the other categories that I have seen emerge are bodily functions (e.g., I have to pee; I am tired; I am hungry; e.g., participant ID#15, daydream 2), and very current concerns/short-term goals (e.g., my exam today; things that I have to prepare for tonight when I get home; what I will make for dinner; phone being locked in the safety box during experiment; participant ID#11 even seemed to be studying for a biology or chemistry exam in her daydreams). Although this portion will be exploratory, I will aim to categorize all daydreams in the final sample in order to discuss possible implications for future research.

Regarding qualitative versus quantitative coding of daydreams as associative or narrative, I am aware that there may be some discrepancy between what participants are reporting as associative and/or narrative, and what I am coding as associative and/or narrative using the written descriptions. This means that results of the statistical analyses using the descriptive/categorical data of daydream description may differ. Ultimately, I will run factor analyses on self-report and coder-rated daydream reports to explore if any interesting differences may emerge. These results could speak to the advantages and disadvantages of studying daydreaming –and specifically associative and narrative daydreams –in a qualitative and/or quantitative manner (i.e., do they give significantly different results?).

Regarding participants' daydream reports across conditions, Table 3 demonstrates that 15 out of 27 participants reported more daydreams in the condition in which they were assigned to start the experiment (i.e., time one) versus the condition in which they were assigned to end the experiment (i.e., time two). Although this is just a little over half of

participants, it is nonetheless alarming that so many participants (in such a small sample) would report more daydreams during time one (i.e., with 400 target and non-target stimuli and 10 daydreaming probes). This suggests a fatigue effect and increases the risk that a within-person design may reduce power (by reducing the amount of comparable daydreams per condition) than increase power as I had previously thought (by increasing the number of data points per participant). Because of this, I chose to adopt a between-person design where participants go through one condition only. I report these designs in detail in the procedures sections for experiment one and two, above.

Finally, it took participants around 45-60 minutes to complete either experiment one or two (i.e., no participant went over the hour mark) as they went through both conditions. Because of this, I expect the new between-person design to take participants around 30-45 minutes to complete, since the experimental protocol will be cut in half (i.e., one condition will be removed). Four participants also finished the narrative task in experiment two (i.e., sorting seven core life events in chronological order) before the 10 minutes was up and went to get the researcher to let them know that they were done. It will thus be important to be extremely explicit with participants that they should engage with the task until the researcher comes to get them.

Table 3.

Number of daydreams reported per start versus end condition

ID	Experiment	Start condition number of daydreams	End condition number of daydreams
1	1A	0	0
2	2A	0	0
3	1B	3*	1
4	2B	3*	1
5	1A	9*	2
6	2A	5*	3
7	1B	1*	0
8	2B	4*	2
9	1A	4*	1
10	2A	6*	3
11	1B	7	7
12	2B	3	3
13	1A	0	0
14	2A	2*	1
15	1B	2*	0
16	2B	6*	5
17	1A	3	3
18	2A	0	0
19	1B	5*	3
20	2B	4*	2
21	1A	0	5
22	2A	4	4
23	1B	1	7
24	2B	8*	3
25	1A	10*	5
26	2A	10	10
27	1B	3	10

Note. *Participants who reported more daydreams in the start condition than the end condition (n = 15 out of 27).

Table 4.

Written daydream reports for experiment one and two

ID	Condition	Daydream description	Experiment 1				
			Narrative elements	Associative elements	Confidence	Daydream condition	Probe
1	1	None	N/A	N/A	N/A	N/A	N/A
3	2	I was daydreaming about what me and my bestfriends are going to do on new years eve. We were drinking and partying with other friends	2.20	3	5	ES	10
		I was day dreaming about going to the gym with my sister and looking at myself in the mirror nd finally being happy about my results and what I saw	4.60	3.50	4	Current concerns (CC)	2
		I am daydreaming about waking up in a huge beautiful house next to my husband with our kid	4.60	3	5	Current concerns (CC)	5
		daydreaming about sitting in the hall after this experiment to wait for my friend	1.80	1	5	Current concerns (CC)	8
		going on a tropical trip	4.20	3.50	5	External stimuli (ES)	1
5	1	Food	3.20	3.50	5	External stimuli (ES)	2
		Food	1.60	1.50	5	External stimuli (ES)	3
		Working on my essays	4.40	4.00	5	External stimuli (ES)	4
		tv show	1.60	1.00	5	External stimuli (ES)	5
		going home	4.20	2.50	5	External stimuli (ES)	6

					(ES)	
		getting new keys and coffee	4.00	1.50	4	External stimuli (ES) 8
		going to bed	3.40	2.00	5	External stimuli (ES) 9
		Clothes	2.40	2.00	5	Current concerns (CC) 1
		need a rich boyfriend	3.80	3.00	5	Current concerns (CC) 8
7	2	honestly, i'm just thinking about the task and how i accidntly pressed the button twice when I shouldn't have and was wondering how that would affect my results and what information you could gather from that. it's more of a backgroung thought though, i suppose. not much of a daydreamable to gat	2.40	2.50	4	Current concerns (CC) 6
9	1	was daydreaming about my iphone being locked in the safety box and i was hard to open the box	2.80	2.50	5	External stimuli (ES) 3
		it is my dream to become a doctor. I was daydreaming about my day as a doctor	5	4	5	External stimuli (ES) 6
		I was daydreaming about my day at the mall when i was at the largest candy store	1.80	3	4	External stimuli (ES) 7
		i was daydreaming about me failing the biology exam and now i am trying to get a better grade	5	5	5	External stimuli (ES) 8
		i was daydreaming about my phone being locked in the safe	2.80	3.5	5	Current concerns (CC) 9
11	1	i am imagining go to th disney world with my family. In that time, I am so happy but now I grow up and I cannot find that feeling.	2.8	3	5	External stimuli (ES) 1
		I cut my long hair to change my mood	3.6	4	5	External stimuli (ES) 4
		my favorite song in my childhood is twinkle star	3.20	3	5	External stimuli (ES) 6

		have a dinner with friends	3.8	4.5	5	External stimuli (ES)	7
		I want to go to London bridge	3.4	4.5	5	External stimuli (ES)	8
		Fresh bread	3.2	4	5	External stimuli (ES)	9
		Best friend	4	4	5	External stimuli (ES)	10
		Preference	3	4	4	External stimuli (ES)	2
		lampack	2.6	2.5	4	External stimuli (ES)	3
		volumn	4.2	3.5	4	External stimuli (ES)	5
		clidal	3.2	3.5	4	External stimuli (ES)	6
		coupas	3.6	3	4	Current concerns (CC)	7
		unicate	4	3.5	4	Current concerns (CC)	9
		femid	3.2	3	4	Current concerns (CC)	10
13	1	None	N/A	N/A	N/A	N/A	N/A
15	2	was thinking about what my plans are tonight and planned out a schedule of what ièm going to do when i get home in order to get ready in a timely fashion. day dreamed about what i am going to wear, eat for dinner, what time i have to be ready to go out by. etc	4	2.5	5	Current concerns (CC)	4
		i was daydreaming about food because i havent eaten a lot today and im thinking about what im going to have for dinner	3.25	2	4	Current concerns (CC)	9
17	1	I was daydreaming about a song.	2	3	4	External stimuli (ES)	2
		Santa Claus/park	1	2	4	External stimuli (ES)	8

		Movies at the library/cinemas	3.8	3	4	External stimuli (ES)	10
		Playing sports, like ice hockey and tennis	4.2	4	4	Current concerns (CC)	1
		sports/gym/food/drinking water after working out/friends	4	3.5	4	Current concerns (CC)	8
		sports/movies/happy songs	4.20	3.5	4	Current concerns (CC)	10
		Being captivated by some visual impressions on the white screen, but other than that, am on task.	1	1	5	External stimuli (ES)	2
		The word *nail clippers* triggered a memory of being a young child sitting on the bathroom counter while my mom cut my toenails, accidentally cutting one too short and drawing blood. It was painful and somewhat traumatic at the time and is an easily accessible memory involving some state of chaos and ill feelings.	2.2	4.5	5	External stimuli (ES)	3
		Thinking about the full moon last night and how exquisite it was to witness	3.8	4.5	5	External stimuli (ES)	6
19	2	Thinking ahead to what I will wear to upcoming party. Simultaneously thinking of conversation had with friend about sex and deeper love.	3.6	4	5	Current concerns (CC)	2
		Well, the screen makes my eyes feel kind of funny, which is similar to how they feel working at a computer all day. So there were fleeting thoughts related to what I wrote about in terms of decreasing hours spent at office job so I can pursue more heart-based work in service of others, that does not involve as much analytical-technical-computer skills.	3.8	4	5	Current concerns (CC)	3
		Perhaps not considered a daydream, but as I see the words on the screen, I tend to envision a creature that looks like it would be called that word, and I find that	1	2	5	Current concerns (CC)	4

		amusing. It also makes me wonder where these words originated, and if they are in fact *real* words at all.					
		Again, not sure if constitutes a daydream but full attention was not on task at hand. As eyes softened a bit in an attempt to not read the words, visual distortion grabbed my attention and I found myself having to constantly return awareness to my breathing in order to not get lost in the visual patterns that were emerging from the computer screen, or seemingly between the computer screen and my eyeballs. If that makes any sense...	1	1	5	Current concerns (CC)	7
		Thinking about what I'll be doing this afternoon when I return to the office.	2.6	3	5	Current concerns (CC)	8
		i am sleepy	2.4	2.5	5	Current concerns (CC)	6
		i am sleepy	2.6	3	5	Current concerns (CC)	7
21	1	i want to sleep	3.8	2.5	4	Current concerns (CC)	8
		still sleepy	2	2.5	4	Current concerns (CC)	9
		sleepy	2.8	3	4	Current concerns (CC)	10
		I see a pub that my friends and I usually go to, during the summer. Its evening time and all my friends are around the table. Were ordering our favorite chicken wings, and I see a cup of Sprite in a clear plastic cup, a cup of iced tea right beside it. Everyone around me is laughing.	3	2.5	4	External stimuli (ES)	1
23	2	Stars and stripes actually reminded me of a group of friends in LA. Its morning, and were walking on a sidewalk. Then, it flashes to the night time, theres only about 5 or 6 of us, outside in a place with	2.4	1.5	4	External stimuli (ES)	2

pillars that light up. Were leaning against the pillars taking photographs.					
lol my friends dad used to be part of a bad called the nail clippers. I can picture them in the living room of a pretty big house. There are a lot of windows in the house and the curtains are white. My friends dad is actually singing their song that topped the charts back in the day. It then switches to an arena filled with people. I know Im in a different city and my friend is beside me, because he got me free tickets to their reunion concert. There are a lot of people around, screaming and singing along to the song.	1.8	1.5	4	External stimuli (ES)	3
Im at a track and field event. Around the race track theres a piece of rope that wraps around the whole race track. Im standing by the rope with my 5th grade crush. He has blonde curly hair.	2.4	3	4	External stimuli (ES)	4
I see a picture of a house. A huge house. Im standing outside by the front entrance. Theres a paved road that leads to the house. The road leading to the house is cobbled stone not, pavement. Im walking towards the house and I open the door. Its an open concept home. I look up and I can see its a high ceiling. A huge window.	3	1.5	3	External stimuli (ES)	6
Me walking across the stage with my graduation toga and the hat. Then flashes to me seeing my parents in the crowd. My mom and dad are crying.	4	4	4	External stimuli (ES)	7
I see my friends dad again. I can see his glasses, and then I see him at my grandparents 50th wedding anniversary.	4	1	3	External stimuli (ES)	8
Daydreamed of a person who I know. I just saw a glimpse of his face then saw	1.6	1	3	Current concerns (CC)	7

25	1	his sister.					
		I was daydreaming about my one summer romance and my memories of what happened tha summer and then I thought of winter break vacaion and the work shifts I will have gaining lots of money at the same time putting money towards my credit card.	2.2	3	3	External stimuli (ES)	1
		I was daydreaming about a relaxing morning where I woke up and drew open the curtains and one of my favourite teachers from high school.	2	2	5	External stimuli (ES)	2
		I was daydraming about my boyfriend and the beginning of our relationship when we would go on walks in the forest overall being content being together.	2.4	3	5	External stimuli (ES)	3
		I was daydreaming about my old best friend who devoted a lot of the time to when we spent together and my driving insructor who wore heels whenever she drove and bought her and I iced caps.	2.2	2.5	4	External stimuli (ES)	4
		I was daydreaming about the cold weather and my chapped lips and the time my boyfriend was accused an illegal act and arrested.	3	2.5	4	External stimuli (ES)	5
		I was daydreaming about the friendly waiter on one of my vacation cruises and the breakout I have on my face.	2.8	2.5	4	External stimuli (ES)	6
		I was thinking about what I will do after my bachelors and my boyfriend who told me he loved me in 3 months.	4	3	4	External stimuli (ES)	7
		I was daydreaming about the exam I failed because I had no clue wha anything mean and the watercress soup my mom makes at home that I despise.	2.2	2.5	4	External stimuli (ES)	8
		I was thinking about my parents anniversary and wondered if they did anything special and my bruise knee from	2.2	2.5	4	External stimuli (ES)	9

27	2	hitting the post that I tried to climb over.					
		I was daydreaming about the christmas decorations in my house that still need to be put up and what to do for new years eve this year in Toronto.	2.2	2.5	4	External stimuli (ES)	10
		I was daydreaming if chaivarly is dead like society says, however I believe it exist still.	1	1	3	Current concerns (CC)	1
		I was daydreaming about playing clarinet in highschool and being at the apple farm.	1.4	3	3	Current concerns (CC)	3
		i was daydreaming about the time my mother called me a flrt for having many guys as friends.	1	2.5	3	Current concerns (CC)	5
		i was daydreaming a flower as also a lion.	1	1	3	Current concerns (CC)	7
		i was daydreaming about a water lion	1	1	3	Current concerns (CC)	9
		imaging if i was in these scenes that the words just showed on the screen	5	5	4	External stimuli (ES)	1
		a big hug from my ex boyfriend	4.8	5	5	External stimuli (ES)	2
		sky jumping	5	5	4	External stimuli (ES)	3
		wondering travel to London with someone and go get a hair cut.	4.4	5	4	External stimuli (ES)	4
		want a big hug from a freezing cold day like today	4.4	4.5	5	External stimuli (ES)	5
		in my grandmother's birthday party	3.6	5	3	External stimuli (ES)	6
		holding somebody's hand in a cold day	4.8	5	4	External stimuli (ES)	7
		on the way home	3.8	4.5	5	External stimuli (ES)	8
		in hurry to hand in my assignment	4.6	4	5	External stimuli (ES)	9
		want to sleep and why there are many	3.2	3.5	4	External stimuli	10

different lines				(ES)		
		i was dreaming if i can understand the vocabulary that show on the screen	3	4	3	Current concerns (CC) 8
		dreaming to hand in my assingment	4	4	3	Current concerns (CC) 9
		i was daydreaming about home and sleep	4.6	4.5	5	Current concerns (CC) 10
Experiment 2						
ID	Condition	Daydream description	Narrative elements	Associative elements	Confidence	Daydream condition Probe
2	1	None	N/A	N/A	N/A	N/A
4	2	thinking about thanksgiving with my friends	2.4	3.5	4	Associative (A) 3
		thinking about what time it is, what im going to eat after this, my friend thats sitting outside, and also the questions that were asked at the beginning keep getting repeated in my head	2.6	1.5	4	Narrative (N) 1
		my mind just went blank and i wasnt really thinking of anything specific but i wasnt thinking about the study	1	1	4	Narrative (N) 3
		thinking about how bored and hungry i am	1.6	1.5	3	Narrative (N) 7
		I want have a dinner with my friend and his wife. I need spend more time with my boyfriend, but I have to work in this friday and Sunday. I like work, but it's tired too. I like to fullfill my life, but sometimes it just need more time to do all my responsibility.	3.6	3	3	Associative (A) 1
6	1	I am starving I need food!	2.8	2	3	Associative (A) 3
		mushroom chicken soop rice cola microwave roast chicken	2.6	4	3	Associative (A) 5
		mushroom water boil add chicken one hour sleep take a nap and drink the soup	3.6	3.5	3	Associative (A) 6
		grapes sweet food food food chicken makeup lipstick foundation. I want to have a dinner with my friend and pay it	3.6	2.5	4	Associative (A) 10

		with one bill. I earn money but have no time to spend it.					
		I need wash my hair today or tomorrow. I don't like my hair looks like this now.	3	4.5	4	Narrative (N)	5
		mushroom chicken soup. rice. cola	3.2	3.5	4	Narrative (N)	7
		friend mother-in law sister food cat coffee milk mushroom	2.2	2	4	Narrative (N)	10
		as i was looking at the horizontal likes i saw a penis, a man smiling, a bouddha, and an inukshuk	2.6	3	4	Associative (A)	1
		about what i will say for my spanish discussion	4.2	3	5	Associative (A)	7
		errands hat need to be run, wedding plans, the caterer and florist, how this test is boring(sorry), about me fiance and what we will eat for dinner and if i need to do groceries	4.8	4	5	Narrative (N)	3
8	2	daydreaming about being hungry and thinking about my spanish class after this and how i dont know if i should go with navy or plum coloured peonies for the wedding and whether the midnight snack bar should be a smores bar or a food truck	5	3.5	5	Narrative (N)	4
		bout how sterssed i am about my upcoming spanish class that i have nt finished the work for and how i am going to lookse makrs for participation for this discussion and how i hope to have time after this to finish it	4.2	5	5	Narrative (N)	5
		how bored i am with this	2.6	3	5	Narrative (N)	6
		that I am telling my best friend about what I did in this experiment	5	5	5	Associative (A)	1
10	1	that I will receive 100% on this exeiment if the researcher e-mails me the resuls later	5	3	5	Associative (A)	2
		talking to my dad	3.6	4.5	5	Associative (A)	7
		of what I as going to answer when this	3	3.5	3	Associative (A)	8

		question pops up again. I was going to answer saying I started to answer wrong and then realize it because I am getting bored of doing the same task on and on again and again. I began to slack off.					
		my friend being in montreal thinking of our fight that we had before	4	4.5	5	Associative (A)	9
		My friend buying a Macbook this year. Me singing a song in my head. My friend and how she told me that sona labs are easy. It is true what she said.	3.4	3	3	Associative (A)	10
		How it is actually moving to the next image by itself	3	3.5	3	Narrative (N)	2
		talking to my closest friend on the phone	2	2	2	Narrative (N)	3
		hugging my favorite best friend	4.4	5	5	Narrative (N)	8
		running into my ex-girlfriend at a party	2	3.5	5	Associative (A)	3
		completing important tasks today	4.2	2	5	Associative (A)	5
		a girl I met at a party	3.5	4	5	Associative (A)	10
		imagining a party this weekend	4.6	3.5	5	Narrative (N)	3
		a girl I met at a party	4.2	3.5	5	Narrative (N)	5
		a frat party	3	3	5	Narrative (N)	7
		I am thinking about drawing products in my sketchbook for school.	3.2	2.5	4	Associative (A)	6
		I was thinking about how intense my dream was last night. It was quite negative, felt like I was being hunted. I did not know where I was, all I knew was that I needed to stay alive. It was a forested area, quite dark, and many people were being killed by military or militia in the distance. I just stayed hidden and tried to escape...	2.2	3.5	4	Associative (A)	8
		I was daydreaming about what the purpose of this experiment was about.	2	3	5	Narrative (N)	1
		I am holding a portfolio. I was walking out of art school. Smile on my face holding a hot drink as well.	3.6	3.5	5	Associative (A)	1

		I am sitting down painting. I am holding a paint brush and making strokes on the canvas.	4.4	3	5	Associative (A)	2
		I escaped out of a building with my bestfriend. We drove off to go shopping and we tried things on in our favourite store. She tried on a black dress and I tried on a turtleneck.	4	2	4	Associative (A)	3
		I was at a fair. There was this huge pink fluff of cotton candy. Games on the side. A clown in the backgroun by the ferris wheel and the house of mirrors.	2.4	3	4	Associative (A)	4
		A turkey blt sandwich	2.2	2.5	5	Associative (A)	6
		getting a good job and buying my family nice things. For example, a house for my Mom.	3.6	3	4	Narrative (N)	2
		Meeting a celebrity and singing as an artist myself. Specifically singing with Ariana Grande.	3.6	3	4	Narrative (N)	3
		I got to meet someone I look up to. She is really into fashion. Basically she was helping me pick and choose outfits. I got to meet her dog puga as well.	3.4	4	4	Narrative (N)	4
		There is this whole pile of chocolate glaze donuts sitting on a plate.	2.4	3	5	Narrative (N)	8
		I was by the eiffel tower. The weather was good.	1.8	2	5	Narrative (N)	9
		It was just my boyfriend and i in the future. We are older and surrounded by abut two children.	3.6	2.5	5	Narrative (N)	10
18	1	I was daydreaming about being on a beach. I imagined myself somewhere tropical, like Hawaii or Jamaica. I thought about having my undergrad degree so I could just be done with school and into relaxation, with a drink in my hand and not a care in the world.	3.8	4	4	Associative (A)	1
		Right now I'm not necessarily dreaming	2.8	1.5	5	Associative (A)	3

		about something specific, more so just sleepy. I feel tired and weak at this time.					
		Now I am daydreaming about someone that I love. It is unrequited love, sadly	N/A	N/A	N/A	Associative (A)	4
		I am thinking about how badly I have to pee right now. Nothing major.	1.6	1	5	Associative (A)	5
		I forgot for a couple of minutes but I am thinking of how badly I have to pee again.	1.6	1	5	Associative (A)	9
		I am thinking of something that happened over the weekend. I was asked out on a date by someone who was drunk, and was not sure whether or not it was a legitimate question, or someone just being drunk. It is not just anyone though, it is a good friend of mine. I am a little in my head right now because I am not sure what to think of it. I have not heard from him since, and not sure if I will get asked legitimately or not. It is quite frustrating because the person has not talked to me since the weekend.	2.4	4	5	Narrative (N)	1
20	2	About the same thing that I wrote before. I am daydreaming but forcing myself to focus so I do not miss when the vertical lines show up.	2.4	4.5	5	Narrative (N)	2
		I am thinking about what I am going to make to eat when I go home after this study. I have not eaten since 10 am so I am starving.	2.2	1	5	Narrative (N)	5
		I am now thinking about what I have to do after I eat when I get home. Because it is close to the end of the semester, there is a lot to prepare for.	2.6	2	5	Narrative (N)	7
22	1	I was daydreaming doing this for an hour, getting my 1% and going into psyc class with it right after. I also contemplated the ways this experiment might be using	3.2	2.5	3	Associative (A)	1

		mindgames to make me miss vertical lines.					
		The open sea. There are mild waves rippling under sunlight. A dolphin jumps.	2	1.5	4	Associative (A)	5
		I am daydreaming about the possible ways daydreaming might be related to line identification.	2.5	1	4	Associative (A)	9
		Daydreaming about how I probably missed a vertical line. Then daydreaming about describing that thought in this section. Then describing that. How it loops on forever. Thinking about describing how it loops forever.	2.4	2.5	3	Associative (A)	10
		Whether my daydreams are expected to change after recalling memories, and whether experimenters would find the one memory I recorded weird.	1.8	2	3	Narrative (N)	1
		Playing the game Terraria	2	1.5	4	Narrative (N)	3
		The do re mi song	1	1	4	Narrative (N)	5
		Finishing this experiment	2.4	2.5	4	Narrative (N)	8
24	2	I was daydreaming that my prof excused the 10% assignment that i recieved a 0 because i handed it in wrong	4.2	4.5	5	Associative (A)	1
		my famiy eaing costco desserts togrthrt	2.8	4	4	Associative (A)	8
		new job	2.8	3.5	4	Associative (A)	9
		I was daydreaming that I was accepted into Social Work at Carleton and I was taking social work classes in summer school.	4.2	4	5	Narrative (N)	1
		My daydream was me taking a nap after i finished this experiment	2.8	3	5	Narrative (N)	3
		Was me getting a good grade in my psychology class	5	5	5	Narrative (N)	4
		I was daydreaming that all my grades were high this semester	4.6	5	5	Narrative (N)	5
		I was daydreamig about how I would spend my winter break	3.2	3	5	Narrative (N)	6

26	1	Graduating with a masters degree in 5 or 6 years with a baby and husband	5	5	5	Narrative (N)	7
		Was me begging my prof to let me hand in a 10% assignment that I thought i submitted but i didnt	4.2	5	5	Narrative (N)	8
		My daydream was that I was trying to convince my dad that social work is a good program	5	5	5	Narrative (N)	9
		I was asking myself if having ADHD was going to effect this test and then I started to think about watching boxing and football highlights in my bed and watching michael vick throw a very long pass	3.8	3	5	Associative (A)	1
		thinking of migos in a music video which brought me to my next thought of my student grad trip in cuba because we listened to migos there and then i was on a date with my ex girlfriend because we met there and i was thinking of when we went on a sushi date and she was smiling	4.4	4	5	Associative (A)	2
		i am thinking that i have a test at 1 and how i am going to walk there using the elevator and walking to the classroom	4.6	3	5	Associative (A)	3
		thinking about if there is a camera in the room and visualizing it watching me	3.2	3.5	5	Associative (A)	4
		thinking of an email that i should be sending to my teacher and thinking if she will give me a hint before my test and i get a good mark so my dad is happy	4.4	4.5	5	Associative (A)	5
		thinking about not daydreaming and then i watched a rock group briefly play on stage and then was at nashville north a bar from my hometown	2	4	5	Associative (A)	6
		thinking about how to get this done faster and really focusing on straight lines and still on my test and if i will be late	5	4	5	Associative (A)	7
		golfing and a proffessional chess players	3.6	4	5	Associative (A)	8

brain					
bruno mars and then another song which led me to grade 8 in a winter coat in my friends basement and then i thought what this test is really about	5	4	5	Associative (A)	9
really thinking about the purpose of this while im singing a song and thinking how my brain works visualizing it and laughing that i am talking to myself	3.6	4	5	Associative (A)	10
if i missed a line and that i daydream more than i thought and singing a song in myhead	4.2	3	4	Narrative (N)	1
thinking about a song and it said over seas thought about going overboard on a sip and then realizing pressing v for the vertical lines is probably to get me to focus on something that will gradually become a reflex to put me in a daydream because its too easy	5	4.5	5	Narrative (N)	2
thought of how i control my mind and that i am more aware of my thoughts than most people and thinking about an elevator and a pecil because of the test	5	5	5	Narrative (N)	3
thinking of how to make it look like im smart on this somehow and hoping i get feedback to see im im abnormal	5	4.5	5	Narrative (N)	4
shortening my thought to write less and emails	5	4.5	5	Narrative (N)	5
scared of having a normal brain realizing i dont just because i thought that, then thought about my dad	5	4	5	Narrative (N)	6
realizing one of the lines is always there and wondering if im allowed to swear and then thinking of a lab looking at me	5	4	5	Narrative (N)	7
realizingmy theory of the lines was not accurate	5	3	5	Narrative (N)	8
getting a job with ben shapiro because im negative an dhow having a degree means	4.6	4	5	Narrative (N)	9

a lot						
being late and my teacher and that its cold	5	4.5	5	Narrative (N)	10	

Appendix B : Experiment one and two materials

Personal concerns inventory

Instructions, Part 1

Read through the Areas of Life listed below, and think carefully about each of them. Then check the areas in which you have important goals or things that you would like to change in the future. For now, check only the areas that apply.

- ☐ Home and Household Matters (Area #1)
- ☐ Employment and Finances (Area #2)
- ☐ Partner, Family, and Relatives (Area #3)
- ☐ Friends and Acquaintances (Area #4)
- ☐ Love and Intimacy (Area #5)
- ☐ Self Changes (Area #6)
- ☐ Education and Training (Area #7)
- ☐ Health (Area #8)
- ☐ Spiritual Matters (Area #10)
- ☐ Hobbies, Pastimes, and Recreation (Area #11)
- ☐ Other Areas (not included above) (Area #12)

Instructions, Part 2

You have been given sheets that correspond to each of the Areas of Life that you checked. These are the Areas of Life in which you have important goals about which you might like to do something in the future. On the following sheets, please do three things. First, think carefully about each Area of Life, and jot down in the spaces provided on the left side of the Answer Sheet the important concerns that come to your mind. Notice that each Area of Life has spaces for you to list up to six goals. In some of these Areas of Life, you might have only one goal (or no goal at all). In other Areas of Life, you might have two, three, or more goals. Use as many of the spaces as you need to describe your different goals.

Second, in the spaces at the center of the Answer Sheet describe what you would like to have happen. That is, how would you like things to turn out?

Third, refer to the Rating Scale Sheet. Then choose the numbers that best describe how you feel about each of the goals that you have described. Fill in these numbers at the boxes at the right side of the Answer Sheet.

Rating Scales

Importance: How important is it to me for things to turn out the way I want?

Choose a number from 0 to 10, where

0 is not important at all, and 10 is very important

How likely: How likely is it that things will turn out the way I want?

Choose a number from 0 to 10, where

0 is not likely at all, and 10 is very likely

Control: How much control do I have in causing things to turn out the way I want? Choose a number from 0 to 10, where

0 is no control at all, and 10 is much control

What to do: Do I know what steps to take to make things turn out the way I want? Choose a number from 0 to 10, where

0 is not knowing at all, and 10 is knowing exactly

Happiness: How much happiness would I get if things turn out the way I want? Choose a number from 0 to 10, where

0 is no happiness at all, and 10 is great happiness

Unhappiness: Sometimes we feel unhappy, even if things turn out the way we want. How unhappy would I feel if things turn out the way I want? Choose a number from 0 to 10, where

0 is no unhappiness at all, and 10 is great unhappiness

Commitment: How committed do I feel to make things turn out the way I want? Choose a number from 0 to 10, where

0 is no commitment at all, and 10 is strong commitment

When will it happen? How long will it take for things to turn out the way I want? Choose a number from 0 to 10, where

0 is very short (e.g., days), and 10 is very long (e.g., years or never)

Answer Sheets

Area #1: Home and Household Matters. When you think of this area, what concerns come to mind?

Step 1. Jot down your concerns:

Step 2. Describe what you want to have happen:

Step 3. Choose numbers from the Rating Scale Sheet and fill in the boxes:

Concern #1

What I would like to have happen is . . .

-> Importance:
 -> How likely:
 -> Control:
 -> What to do:
 -> Happiness:
 -> Unhappiness:
 -> Commitment:
 -> When it will happen:

Area #1: Home and Household Matters. When you think of this area, what concerns come to mind?

Step 1. Jot down your concerns:

Step 2. Describe what you want to have happen:

Step 3. Choose numbers from the Rating Scale Sheet and fill in the boxes:

Concern #2

What I would like to have happen is . . .

-> Importance:
 -> How likely:
 -> Control:
 -> What to do:
 -> Happiness:
 -> Unhappiness:
 -> Commitment:
 -> When it will happen:

Note. The Answer Sheets continue in this format, allowing the respondent to list up to six concerns in each of the 12 life areas named in *Instructions, Part 1*.

The same answer sheet will be repeated for all following eleven life areas, that is, employment and finances; partner, family, and relatives; friends and acquaintances; love, intimacy, and sexual matters; self changes; education and training; health and medical matters; substance use; spiritual matters; hobbies, pastimes, and recreation; and other areas (not included above).

CUREB-B Clearance # 108052

Think aloud protocol

For experiment 2 only

Please sit down and trace whatever shapes come to mind using a pen and a blank sheet of paper. While tracing, just say out loud whatever comes to mind whether or not it seems like it is relevant. Keep talking or 'thinking out loud' until a researcher comes to tell you that the task is over. You have five minutes to do this. I will come get you once the time is up.

CUREB-B Clearance # 108052

Narrative task

For experiment 2 only

First, think about the seven most important events that have happened in your life. These may be events that have just happened, or they may have happened a long time ago. Then please write your seven most important memories on these seven cards. Now please arrange these cards in chronological order. Then, use any space on the cue cards to write about your life story using the seven core events that you have identified. You have ten minutes to do this, and I will come to get you once the time is up. After this, you will be asked to complete a computer task. After the computer task, you will be asked to tell your story to another researcher, so please keep your life story in mind while you are completing the computer task.

CUREB-B Clearance # 108052

Involuntary recall task sentences*Example list of overlaid words (for experiment 1 only)*

Event Number	Stimuli/Event Name	Cue-word
1.	start	
2.	NS1	Ecstatic Crowd
3.	NS2	Coffee Jar
4.	NS3	Young free & single
5.	NS4	Going to a party
6.	NS5	Gaining insight
7.	NS6	Pushing a trolley
8.	NS8	Disney World
9.	NS9	Good business
10.	NS11	Bubble-gum
11.	NS12	Holiday romance
12.	NS14	A square shape
13.	NS17	Small scissors
14.	NS18	Healthy glow
15.	NS19	Valentines day
16.	NS23	Sound of a whistle
17.	NS24	Christmas presents
18.	NS25	Window seal
19.	NS26	Address book
20.	NS27	Middle road
21.	NS28	Masking tape
22.	NS29	Glass case
23.	NS30	Tube of superglue
24.	NS35	Going on holiday
25.	NS36	Finding money
26.	NS38	Funny comment
27.	NS40	Lock smiths
28.	NS41	Crossing the road
29.	NS42	Old family photographs
30.	NS43	Busy pub
31.	NS45	Overhead projector
32.	NS46	Garden shed
33.	NS48	Bedside lamp
34.	NS49	Friendly boss
35.	NS50	Stars & stripes
36.	NS51	Favourite painting
37.	NS53	Best seller
38.	NS54	Washing-up gloves

39.	NS55	Station road
40.	NS58	Ideal home
41.	NS59	Hotel porter
42.	NS62	Filing a complaint
43.	NS63	Favourite teacher
44.	NS64	Drawing the curtains
45.	NS65	Bright sunshine
46.	NS66	Wall mirror
47.	NS67	A big hug
48.	NS70	Red pen
49.	NS71	Spot light
50.	NS75	Super smile
51.	NS76	Family pet
52.	NS78	Low rent
53.	NS79	Tumble dryer
54.	NS80	Romantic walk
55.	NS81	Feeling merry
56.	NS83	Web page
57.	NS86	New relationship
58.	NS88	Junior school
59.	NS89	Music concert

Daydreaming probe questionnaire

Which of the following responses best characterizes your mental state just prior to the presentation of this screen?

1. On task
2. Thinking about something other than the task

If participants choose option 2, the following questions will appear on the screen

Please use the space bellow to describe your daydream. **Please describe your daydream in as much detail as you can. If you are imagining many different things** (e.g., your friend sitting on a park bench, pizza, a popular song) **please write keywords** that best represent these thoughts, like in the previous example. **If you are imagining a full scene or story** however, **please write a full description** of what is going on in your mind (e.g., I was daydreaming riding my bike as a young child. I could see myself zooming past the houses in my neighbourhood and waving at my dad as he mowed the lawn. I remember loving the feeling of the summer breeze on my face. I always wanted to go faster, so I would find the steepest hills and try to never use the breaks). You can write as much as you want. When you think it is appropriate, you can also use keywords that best describe your daydreaming experience.

Please use the scale bellow to rate the content of your daydream

1 Not at all	2 Slightly	3 Somewhat	4 A lot	5 A great deal
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Descriptive information of daydreaming content

1. The daydream involved visual imagery
2. The daydream involved inner speech
3. Have you previously experienced this daydream before today?

Specificity of daydream content

4. The content of the daydream was related to something concrete and well-defined (e.g., a precise situation or a particular action)

Emotional characteristics of daydreaming content

5. The daydream was negative
6. The daydream was positive
7. The daydream was neutral
8. The daydream was emotionally intense

Narrative elements of daydreaming content

9. The overall daydream belonged to a structured sequence of smaller thoughts (e.g., like in a story)
10. The content of the daydream was realistic and plausible
11. The content of the daydream was of importance to your life
12. The content of the daydream was related to your personal goals
13. The daydream contained an event that was central to your identity

How confident are you in the accuracy of your answers about your daydream?

1	2	3	4	5
Not at all confident	Not confident	Neutral	Confident	Extremely confident

CUREB-B Clearance # 108052

Self-concept clarity scale (trait)

For each of the following statements, please indicate the extent to which the statement applies to you IN GENERAL. (*Trait instructions*).

1	2	3	4	5
Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree

1. My beliefs about myself conflict with one another (Reversed)
2. One day I might have one opinion of myself and on another day I might have a different opinion (Reversed)
3. I spend a lot of time wondering about what kind of person I really am (Reversed)
4. Sometimes I feel that I am not really the person that I appear to be (Reversed)
5. When I think about the kind of person I have been in the past, I'm not sure what I was really like (Reversed)
6. I seldom experience conflict between the different aspects of my personality
7. Sometimes I think I know other people better than I know myself (Reversed)
8. My beliefs about myself seem to change very frequently (Reversed)
9. If I were asked to describe my personality, my description might end up being different from one day to another day (Reversed)
10. I don't think I could tell someone what I'm really like (Reversed)
11. In general, I have a clear sense of who I am and what I am
12. It is often hard for me to make up my mind about things because I don't really know what I want (Reversed)

Self-concept clarity scale (state)

For each of the following statements, please indicate the extent to which the statement applies to you RIGHT NOW. (*State instructions*).

1	2	3	4	5
Strongly disagree	Disagree	Neither agree/disagree	Agree	Strongly agree

1. My beliefs about myself conflict with one another (Reversed)
2. I spend a lot of time wondering about what kind of person I really am (Reversed)
3. I feel that I am not really the person that I appear to be (Reversed)
4. When I think about the kind of person I have been in the past, I'm not sure what I was really like (Reversed)
5. I do not experience conflict between the different aspects of my personality
6. I know other people better than I know myself (Reversed)
7. I don't think I could tell someone what I'm really like (Reversed)
8. I have a clear sense of who I am and what I am
9. I don't really know what I want (Reversed)

Self-esteem scale

For each of the following statements, please indicate the extent to which the statement applies to you RIGHT NOW. (*State instructions*).

1	2	3	4
Strongly disagree	Disagree	Agree	Strongly agree

1. I feel that I am a person of worth, at least on an equal basis with others
2. I feel that I have a number of good qualities
3. I feel that I am a failure (Reversed)
4. I feel that I am able to do things as well as most other people
5. I feel I do not have much to be proud of (Reversed)
6. I have a positive attitude toward myself
7. I am satisfied with myself
8. I wish I could have more respect for myself (Reversed)
9. I certainly feel useless (Reversed)
10. I think I am no good at all (Reversed)

Self-consciousness scale

For each of the following statements, please indicate the extent to which the statement applies to you RIGHT NOW. (*State instructions*).

0	1	2	3	4
Extremely uncharacteristic	Uncharacteristic	Neither uncharacteristic/ characteristic	Characteristic	Extremely characteristic

Private self-consciousness

I'm trying to figure myself out
 I do not feel aware of myself (Reversed)
 I am reflecting about myself
 I'm the subject of my own fantasies
 I am not scrutinizing myself (Reversed)
 I'm attentive to my inner feelings
 I'm examining my motives
 I have the feeling that I'm off somewhere watching myself
 I'm alert to changes in my mood
 I'm aware of the way my mind works

Public self-consciousness

I'm concerned about my style of doing things
 I'm concerned about the way I present myself
 I'm self-conscious about the way I look
 I worry about making a good impression
 One of the last things I would likely do before I leave my house is look in the mirror
 I'm concerned about what other people think of me
 I'm aware of my appearance

Social anxiety

It would take me time to overcome my shyness in new situations
 I would have trouble working when someone is watching me
 I feel easily embarrassed
 I don't find it hard to talk to strangers (Reversed)
 I would feel anxious speaking in front of a group
 Large groups would make me nervous

Demographics questionnaire

Please indicate your age and gender bellow:

Age: _____

Gender: Female

Male

Other

Ethnicity: Caucasian/white

Black (i.e., African, African American)

South Asian (i.e., Indian, Pakistani)

East Asian (i.e., Chinese, Japanese)

Arabic or Central Asian

Hispanic, Central, or South American

Aboriginal

Other

Appendix C: Recruitment

Announcement of recruiting

Title of Study: Daydreaming, goals, and well-being (*experiment 1*; Daydreaming and the self (*experiment 2*))

Description: We are recruiting volunteers for a study looking at how thinking about the self and daydreaming affects people's well-being. Participants who complete the study will receive **1% towards their psychology course final grade**.

In this study, you will be asked to think about yourself, to complete a simple computer task (i.e., to sort horizontal from vertical line patterns), and to answer a few questions about your daydreaming experience. Questions about your daydreaming experience will appear in the form of short questionnaires throughout the computer task. When these questionnaires appear, the task will be paused. Once you are done reporting your daydream, the task will continue. After this computer task, you will be asked to fill out a short questionnaire, which will ask questions about how you see yourself. You will also be asked to answer a few demographic questions such as age and gender. You will be completing the attention task and the questionnaires in Carleton's Happiness Laboratory. Once you get to the laboratory, you will be assigned to one of two experiments. If you are assigned to experiment 1, you will be asked to write about your goals and to reflect on these. If you are assigned to experiment 2, you will be asked to talk about what is spontaneously going through your head, and to talk about elements of your life story. You will complete these tasks before doing the computer task.

Eligibility: To participate in this study, you should be at least 18 years of age, speak fluent English, and be a full-time or part-time psychology student at Carleton University.

Duration and locale: You can participate in this study by coming to the Carleton Happiness Laboratory, located in HCI 6111. Participating in this study should take you approximately 60 minutes.

Researchers: If you have any further questions, please email Eve-Marie Blouin-Hudon, Ph.D. student, Department of Psychology, evemarieblouinhudon@email.carleton.ca.

This study has received clearance by the Carleton University Research Ethics Board-B (#108052).

Informed consent for Experiment one

Title: Daydreaming, goals, and well-being

Date of ethics clearance: *November 15th, 2017*

Ethics Clearance for the Collection of Data Expires: *November 30th, 2018*

I _____, choose to participate in a study on
Daydreaming, goals, and well-being.

In this study, we are interested in understanding how thinking about your goals relates to daydreaming, and how daydreaming relates to well-being while doing an external task.

The researcher for this study is Eve-Marie Blouin-Hudon in the Department of Psychology at Carleton University. She is working under the supervision of Dr. John Zelenski in the Department of Psychology at Carleton University.

In this study, you will be asked to think about yourself, to complete a simple computer task (i.e., to sort horizontal from vertical line patterns), and to answer a few questions about your daydreaming experience. Questions about your daydreaming experience will appear in the form of short questionnaires throughout the computer task. When these questionnaires appear, the task will be paused. Once you are done reporting your daydream, the task will continue. Before the computer task, you will be asked to write down a few of your goals and to reflect on these. After this computer task, you will be asked to fill out a short questionnaire, which will ask questions about how you see yourself. You will also be asked to answer a few demographic questions such as age and gender. The entire experiment will take approximately **60 minutes** to complete. You can skip questions without penalty. We cannot tell you all about the exact purpose of the study at this point, because it might change your responses. Once you are done the final online questionnaire, you will be presented with a debriefing form explaining our research fully.

You have the right to end your participation in the study at any time, for any reason, up until the end of the experiment. If you withdraw from the study, all information you have provided will be immediately destroyed.

As a token of appreciation, you will receive a 1% credit towards your psychology course,

even if you withdraw from the study.

All research data will be encrypted and kept on a password protected computer in Carleton's Happiness Laboratory. Any hard copies of data (including any handwritten notes) will be kept in a locked cabinet at Carleton University. All data will be destroyed as soon as data is collected, since these elements are not necessary in answering research questions. A data breach would not put you at risk, since no sensitive information will be collected. The only possible personal element to this study is daydreaming content, which will be dummy-coded using numbers (i.e., 1 and 0). As such, the content will hold no personal meaning if there is a data breach, and your anonymity will be protected. The anonymized dataset will be shared on the Open Science Framework (OSF) to ensure transparency of our research. However, this shared dataset will not contain any participant identifier.

Once the project is completed, all research data will be kept for five years and potentially used for other research projects on this same topic. After the data is analyzed and published, it will be made public on the Open Science Framework. However, daydreaming content will be removed from the dataset to respect participants' privacy. That is, no participant will be able to be identified through this public dataset.

If you would like a copy of the finished research project, you are invited to contact the researcher to request an electronic copy which will be provided to you.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board, which provided clearance to carry out the research. If you have any ethical concerns with the study, please contact Dr. Andy Adler, Chair, Carleton University Research Ethics Board-A (by phone at 613-520-2600 ext. 2517 or via email at ethics@carleton.ca).

Researcher contact information:

Name: Eve-Marie Blouin-Hudon

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Supervisor contact information:

Name: John Zelenski

Department : Psychology

Carleton University

Tel: 1 613 520 2600 Ext: 1813

Email: john.zelenski@carleton.ca

Signature of participant

Date

Signature of researcher

Date

This study has received clearance by the Carleton University Research Ethics Board-B (#108052).

Informed consent for Experiment two

Title: Daydreaming and the self

Date of ethics clearance: *November 15th, 2017*

Ethics Clearance for the Collection of Data Expires: *November 30th, 2018*

I _____, choose to participate in a study on Daydreaming, goals, and well-being.

In this study, we are interested in understanding how thinking about your goals relates to daydreaming, and how daydreaming relates to well-being while doing an external task.

The researcher for this study is Eve-Marie Blouin-Hudon in the Department of Psychology at Carleton University. She is working under the supervision of Dr. John Zelenski in the Department of Psychology at Carleton University.

In this study, you will be asked to think about yourself, to complete a simple computer task (i.e., to sort horizontal from vertical line patterns), and to answer a few questions about your daydreaming experience. Questions about your daydreaming experience will appear in the form of short questionnaires throughout the computer task. When these questionnaires appear, the task will be paused. Once you are done reporting your daydream, the task will continue. Before this computer task, you will be asked to say out loud what is spontaneously going through your head, and to tell us important events in your life. After this computer task, you will be asked to fill out a short questionnaire, which will ask questions about how you see yourself. You will also be asked to answer a few demographic questions such as age and gender. The entire experiment will take approximately **60 minutes** to complete. You can skip questions without penalty. We cannot tell you all about the exact purpose of the study at this point, because it might change your responses. Once you are done the final online questionnaire, you will be presented with a debriefing form explaining our research fully.

You have the right to end your participation in the study at any time, for any reason, up until the end of the experiment. If you withdraw from the study, all information you have provided will be immediately destroyed.

As a token of appreciation, you will receive a 1% credit towards your psychology course, even if you withdraw from the study.

All research data will be encrypted and kept on a password protected computer in Carleton's Happiness Laboratory. Any hard copies of data (including any handwritten notes) will be kept in a locked cabinet at Carleton University. All personal stories (*experiment 2*) will be destroyed as soon as data is collected, since these elements are not necessary in answering research questions. A data breach would not put you at risk, since no sensitive information will be collected. The only possible personal element to this study is daydreaming content, which will be dummy-coded using numbers (i.e., 1 and 0). As such, the content will hold no personal meaning if there is a data breach, and your anonymity will be protected. Your goals (*experiment 1* manipulation) and life stories (*experiment 2* manipulation) will be shredded after each participant has finished the study. We will do this to protect participants' privacy, and because this information is not necessary in answering research questions (i.e., simply manipulations). The anonymized dataset will be shared on the Open Science Framework (OSF) to ensure transparency of our research. However, this shared dataset will not contain any participant identifier.

Once the project is completed, all research data will be kept for five years and potentially used for other research projects on this same topic. After the data is analyzed and published, it will be made public on the Open Science Framework. However, daydreaming content will be removed from the dataset to respect participants' privacy. That is, no participant will be able to be identified through this public dataset.

If you would like a copy of the finished research project, you are invited to contact the researcher to request an electronic copy which will be provided to you.

The ethics protocol for this project was reviewed by the Carleton University Research Ethics Board, which provided clearance to carry out the research. If you have any ethical concerns with the study, please contact Dr. Andy Adler, Chair, Carleton University Research Ethics Board-A (by phone at 613-520-2600 ext. 2517 or via email at ethics@carleton.ca).

Researcher contact information:

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Name: John Zelenski

Department : Psychology

Carleton University

Tel: 1 613 520 2600 Ext: 1813

Email: john.zelenski@carleton.ca

Signature of participant

Date

Signature of researcher

Date

This study has received clearance by the Carleton University Research Ethics Board-B (#108052).

Debriefing form for Experiments one and two

Thank you for participating in our study!

Please take time now to read the information on this page.

What are we trying to learn in this research?

Daydreaming has been found to influence people's experience in a variety of ways (e.g., task performance, emotions, well-being, social connection). In this study, we wanted to see how the content of daydreams can allow people to piece together and access information about themselves and in turn, help them understand themselves better. We propose that certain daydreams contain thoughts that are linked together in a random manner (associative daydreams). We also propose that certain daydreams contain thoughts that are more like stories (narrative daydreams).

What are our hypotheses and predictions?

Because narration (i.e., telling a story to oneself) is more closely linked to the self, we hypothesize that narrative daydreams will have a greater influence on the self-concept (i.e., how a person thinks of themselves) than associative daydreams.

Why is this important to scientists or the general public?

Overall, results from these experiments will further the understanding of when and how daydreaming can be beneficial for well-being and more specifically, to self-understanding. This research will also contribute to daydreaming theory by establishing whether this construct can be broken-down into associative and narrative processes, as opposed to being understood as a simple unidimensional construct.

We do not anticipate any negative effects as result of the experiment. However, if you feel any negative emotions, we'd like to take the opportunity to remind you of Carleton University's confidential counselling services – you can make an appointment in their office next to Health Services or call them at 613-520-6674.

We remind you that we would be happy to answer any question that may arise about the study. Please direct your questions or comments to Eve-Marie Blouin-Hudon, Ph.D. student, Department of Psychology, evemarieblouinhudon@email.carleton.ca, or Dr. John Zelenski, Professor, Department of Psychology, john.zelenski@carleton.ca. If you have ethical concerns please contact Dr. Andy Adler, Chair of the Carleton University Research Ethics Board-B, , adler@sce.carleton.ca, (613-520-2600 ext 8785). This study has received clearance by the Carleton University Research Ethics Board-B (#108052).

Where can I learn more?

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This study has received clearance by the Carleton University Research Ethics Board-B (#108052).

Appendix D: Data cleaning

Experiment one data cleaning

For the self-consciousness scale, the Kolmogorov-Smirnov test came back non-significant at ($p = .20$), suggesting normality. The histogram for this variable also shows a relatively normal distribution (with skew and kurtosis close to zero; <https://osf.io/p6kqn/> for output). The Q-Q plot shows a few dots falling off the line, but they are mostly in a straight line across, which is also promising for normality. However, the box-plot shows a potential outlier in ID 271. The z-score for 271 is 4.1 (outlier). I flagged it as a potential problem. If it comes up as an outlier on more variables, I will consider filtering this participant out. Since this variable is not skewing the normality in the self-consciousness scale however, I will not remove it right away. I thus chose to conclude that this variable is close to normality such that I do not need or want to transform it (as it will likely do little to improve the distribution).

For the private self-consciousness subscale, the Kolmogorov-Smirnov test came back significant at ($p = .01$). The histogram for this scale shows a slight positive skew with one data point trailing from the right tail. The Q-Q plot shows a few dots falling off the line, but they are mostly in a straight line across, which is also promising for normality (i.e., there is just one dot falling off the line at the top right corner). The box-plot does suggest two outliers in participants ID 271 and ID 71, which may explain the slight positive skew. The z-score for participant ID 271 is 4.31 (outlier), while participant ID 71 has a z-score of 2.62 (not an outlier). Since the variable is not aggressively skewed, I chose to keep participant ID 271 in mind as a case to be removed if they are problematic on multiple other scales.

For the public self-consciousness subscale, the Kolmogorov-Smirnov test came back non-significant at ($p = .20$), which suggests normality. Although the Q-Q plot also suggests

normality, participant ID 271 is once again a suggest outlier on the box-plot, along with participants ID 29 and ID 193. I already know that participant ID 271 has a z-score above 3, while participant ID 29 has a z-score of -2.60 (not an outlier), and participant ID 193 also has a z-score of -2.60 (not an outlier). Because this variable is normal, I chose not to opt for transformation, but I am keeping a close eye on participant ID 271, since this is the second time that they are an outlier on a scale.

For the social anxiety subscale, the Kolmogorov-Smirnov test came back non-significant at ($p = .20$), which suggests normality. Furthermore, both the Q-Q plot and the boxplot demonstrate normality, with no potential suggested outliers. As such, I chose not to transform this variable.

For the state self-concept clarity scale, the Kolmogorov-Smirnov test came back significant at ($p = .02$), which suggests non-normality. The histogram for this variable shows a very slight negative skew with a few extreme scores on the left tail. The Q-Q plot confirms this positive skew with dots trailing off the bottom left of the line (but only two dots). Finally, the box plot indicates one potential outlier with ID 254. The z-score for ID 245 is -2.5 (not an outlier). Since the distribution is only very slightly negatively skewed, I did not opt for transformation.

For the trait self-concept clarity scale, the Kolmogorov-Smirnov test came back significant ($p = .04$). The histogram for this variable shows a very slight negative skew with a few extreme scores on the left tail. The Q-Q plot confirms this positive skew with dots trailing off the bottom left of the line. Finally, the box plot indicates no potential outliers. Since the distribution is only very slightly negatively skewed, I did not opt for transformation.

For the self-esteem scale, the Kolmogorov-Smirnov test came back significant ($p = .03$). The histogram for this variable shows a very slight negative skew with a few extreme scores on the left tail. The Q-Q plot confirms this positive skew with dots trailing off the bottom left of the line. Finally, the box plot indicates one potential outlier with ID 175. The z-score for ID 175 is -3.0 (outlier). Since the distribution is only very slightly negatively skewed, I will did opt for transformation (especially that the z-score is right at the cusp of the 3 cut-off point). However, I kept note of this outlier and considered removing this participant if it was problematic on multiple other scales. If just a very slight problem for this scale, then this participant should stay in the sample for the final analyses.

For the self-rated emotional self daydreaming scale, the Kolmogorov-Smirnov test came back non-significant ($p = .20$), suggesting normality. However, the box-plot suggests that participant ID 77 may be an outlier. The z-score for this participant is -0.66 (not an outlier). As such, I conclude that this variable is normally-distributed.

For the self-rated realistic narrative daydreaming scale, the Kolmogorov-Smirnov test came back significant ($p = .04$). However, the histogram for this variable shows a very slight positive skew with a few extreme scores on the right tail. The Q-Q plot confirms this positive skew with dots trailing off the top right of the line. Finally, the box plot does not indicate any significant outliers and suggests a distribution that is extremely close to normal. Because of this, I chose not to transform this variable.

For the coder-rated temporal associative daydreaming scale, the Kolmogorov-Smirnov test came back significant at $p = .03$, suggesting non-normality. The histogram for this variable also shows a relatively normal distribution (with skew and kurtosis close to 0). The Q-Q plot shows a few dots falling off the line, but they are mostly in a straight line across,

which is also promising for normality. Finally, the box-plot shows potential outliers for participant ID 29, ID 61, ID 109, and ID 201. The z-scores for these participants are all below 3. I thus concluded that this variable is close to normality such that I do not need or want to transform it (as it will likely do little to improve the distribution).

Finally, for the coder-rated narrative daydreaming scale, the Kolmogorov-Smirnov test came back non-significant at $p = .200$, suggesting normality. Although the Q-Q plot only shows a few dots trailing off the bottom left of the line, the box plot does suggest that participant ID 6, ID 34, ID 75, ID 95, ID 171, and ID 226. The z-scores for these participants are all below .3. As such, I will not transform this scale.

To test for multicollinearity, I chose to do a tolerance test, which demonstrates how much variance in a particular predictor variable is independent of other independent variables (Cohen & Cohen, 1983; Cohen, Cohen, West, & Aiken, 2003). As a rule of thumb, if the tolerance value is less than .20 or .10, then there is multicollinearity. To do this, I squared all of the correlations between predictor variables (i.e., daydreaming scales) and subtracted them from one. As can be seen in Table 1, no combinations of predictor variables demonstrate multicollinearity. It is thus safe to include these variables in the same statistical models if needed. As can be seen in Table 2, correlations of each daydreaming scale at each daydreaming probe do not put the data at risk of multicollinearity (although even if there had been multicollinearity between daydreaming probes, these would likely not have drastically influenced multilevel analyses, since these will be modeled at level one in a two-level model; e.g., Kreft & de Leeuw, 1998; Kubitschek & Hallinan, 1999; Shieh & Fouladi, 2003).

I chose to create scatterplots between each self-concept and daydreaming scale in order to assess linear relationships. Although the square correlation between most scales were

small, the scatterplots did not have any visible shape (i.e., like a ‘boot’ or a ‘fanning out’ indicating a non-linear relationship).

Table 1.

Tolerance test for experiment one predictor variables.

Variable 1	Variable 2	R	R ²	Tolerance
Emotional self	Realistic	.52**	.27	1-.27 = .73
Emotional self	Associative	.21**	.04	1-.04 = .96
Emotional self	Narrative	.10	.01	1-.01 = .99
Realistic	Associative	.26**	.07	1-.07 = .93
Realistic	Narrative	.06	.00	1-.00 = 1.00
Associative	Narrative	-.04	.00	1-.00 = 1.00

Furthermore, when testing the quadratic relationship, the squared correlation was either smaller or almost the same as the linear relationship, and the line did not bend much more than in the linear version. This indicates that although small, relationships between scales are relatively linear and do not violate this assumption.

The only exception to this was the relationship between coder-rated narrative daydreaming and trait self-concept clarity. For these scales, it is clear that the line bends into a ‘u’ shape – an indicator of a quadratic relationship. Because of this, I chose not to include trait self-concept clarity in the analyses for hypothesis three, because I want to include all daydreaming scales in one model to determine how much unique variance predicts each self-concept scale. If I were to include coder-rated narrative daydreams in a model with trait self-concept clarity however, the results may be biased. Since trait and state self-concept clarity are extremely highly correlated, and that other self-concept scales were measured at the state level, I conclude that including only the state self-concept clarity scale in analyses will nonetheless adequately align with hypotheses.

Finally, I checked for heteroscedasticity using the residuals from regression coefficients to determine whether the regression model's ability to predict low and high values of the dependent variable is consistent (Cohen et al., 2003). This is also important for multilevel modeling at level one in order to trust the outcome of the linear relationship (Goldstein, 2003; Hox, Moerbeek, & Van de Schoot, 2017; Nezlek, 2008). Results indicated that all residuals of combinations of broad scale variables are homoscedastic, which means that the error terms (i.e., the random 'noise' or variability between variables) is the same across all values of the independent variable. The same steps were taken for all variables in each condition by splitting the dataset by condition and re-running all data-cleaning steps. No major issues were found between conditions (<https://osf.io/p6kqn/> for output and syntax).

Zero-order Pearson correlation matrix experiment one daydream scales over all ten daydream probes.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40				
1.	-																																											
2.	.72	-																																										
3.	.13	.07	-																																									
4.	.35	.45	.23	-																																								
5.	-.04	.22	.23	.07	-																																							
6.	.41	-.29	.45	.15	-.01	-																																						
7.	.32	.25	.38	.38	.47	.38	-																																					
8.	.38	.17	.56	.56	.33	.38	.48	-																																				
9.	.18	.39	.53	.46	.35	.21	.57	.48	-																																			
10.	-.01	-.01	.04	.54	.24	.15	.34	.22	.33	-																																		
11.	.34	-.03	.20	.09	.14	.30	.06	.18	.05	-.09	-																																	
12.	.62	.29	.43	.39	.12	.24	.38	.03	.60	.25	.33	-																																
13.	.26	.03	.52	.29	.02	.40	.53	.38	.44	.14	.72	.53	-																															
14.	.32	.07	.43	.47	.11	.16	.45	.59	.27	.43	.27	.48	.45	-																														
15.	-.05	.11	.06	-.03	.50	-.13	.48	.00	.18	.33	.34	.32	.27	.31	-																													
16.	.47	-.23	.12	.04	-.04	.54	.18	.26	.39	.08	.20	.17	.35	.17	.32	-																												
17.	.17	.02	.35	.06	.31	.43	.61	.43	.49	.29	.32	.04	.57	.48	.74	.59	-																											
18.	.61	.23	.44	.45	.26	.30	.44	.59	.56	.47	.29	.43	.62	.61	.34	.56	.49	-																										
19.	.32	.09	.48	.17	.30	.31	.45	.38	.66	.23	.11	.40	.26	.31	.26	.57	.40	.44	-																									
20.	.22	-.04	.06	.19	.16	.16	.40	.07	.36	.61	-.05	.23	.30	.32	.64	.34	.48	.52	.40	-																								
21.	.05	-.11	.27	.27	.27	.20	.16	.03	.32	.10	.18	.04	.26	.06	.05	.20	.10	.18	.15	-.00	-																							
22.	.31	.17	-.18	.23	.08	-.48	-.16	-.13	-.21	-.04	.75	.16	-.17	.23	.41	-.45	-.18	-.02	-.13	.01	.79	-																						
23.	.28	.30	-.01	.13	.12	.07	.11	-.00	-.10	.12	.14	.43	.17	-.11	.13	.09	.07	.27	.05	.25	.26	.35	-																					
24.	.20	.32	-.03	.03	.33	.01	.00	.37	.33	-.11	.22	.29	-.04	.16	.27	.14	.05	.39	.50	.22	.27	.31	.36	-																				
25.	-.07	.28	.19	.05	.35	-.03	.23	.20	-.06	-.25	-.15	-.07	-.17	.12	.12	-.13	.05	.00	-.10	-.30	.13	.31	.45	.35	-																			
26.	-.02	-.19	.12	.10	-.02	.19	-.22	-.04	-.09	-.24	.20	.01	.35	.11	-.03	.16	.05	-.02	.11	.02	.36	.08	.58	.26	.28	-																		
27.	-.10	.13	-.10	.26	-.22	-.03	.03	-.03	-.24	-.07	-.03	.24	.13	.01	.09	-.16	-.08	-.05	-.30	-.03	.37	.53	.43	.35	.14	.48	-																	

29.	-.24	-.28	-.13	.15	-.26	.26	.06	.19	.05	-.02	-.16	-.24	.07	.08	.03	.20	.11	.14	.06	.16	-.04	-.08	.00	.15	-.12	.01	.64	.30	-											
30.	-.06	.11	-.04	-.36	-.09	-.28	-.06	-.21	.10	.08	-.07	.20	-.19	-.28	.11	.01	.02	.03	.36	.12	.27	.49	.45	-.01	.03	-.14	.09	.37	-.05	-										
31.	.21	.07	-.01	.02	-.06	.48	.25	.10	.27	-.15	.19	.12	.29	.30	.07	.43	.04	.27	.07	-.17	.03	-.09	-.20	-.00	-.44	.20	.40	.55	.39	-.07	-									
32.	-.28	.03	-.08	-.15	.23	.04	.04	-.19	-.09	.15	.16	-.04	-.32	-.48	-.04	-.13	-.03	-.24	-.24	.22	.03	-.09	-.50	-.45	-.39	-.50	-.35	-.38	-.28	-.12	.58	-								
33.	-.36	-.04	.13	-.03	.02	.24	.27	-.21	.20	.02	-.09	.13	.26	-.24	-.01	.23	.14	-.00	-.06	.18	-.05	.60	.11	-.16	.13	.10	.04	-.03	.22	-.17	.51	.41	-							
34.	.32	.06	.09	.31	.40	.26	.05	.29	.37	-.17	.33	.32	.08	.44	.17	.42	.03	.19	.44	-.19	.29	.27	-.13	.15	.27	.43	.02	.08	-.19	-.28	.63	.05	.14	-						
35.	.45	.19	.21	-.14	.33	.20	.23	-.06	.08	.11	.01	.10	.05	-.02	.21	-.05	.23	.16	.09	.13	-.24	-.12	-.08	.04	.07	-.12	-.10	-.21	-.09	-.36	.56	.54	.44	.36	-					
36.	.27	-.19	.14	-.20	-.15	.42	-.04	.04	.23	-.03	.15	.03	.24	-.11	-.20	.28	.12	-.07	.19	-.02	.14	-.44	-.15	.02	-.08	.21	-.29	.26	-.06	-.06	.59	.30	.43	.52	.42	-				
37.	.19	-.03	.11	-.24	.22	.40	.26	.17	.30	.13	.04	.03	.19	.19	.14	.30	.17	.25	.42	.14	-.02	-.64	-.24	.14	.21	-.33	-.20	.23	-.04	-.04	.59	.17	.46	.33	.49	.52	-			
38.	.10	-.19	.07	.41	.18	.12	.18	.25	.16	.13	-.10	-.10	.03	.32	-.14	.07	-.07	.21	-.10	.08	.08	-.27	-.07	-.00	-.05	-.11	.03	.28	.11	-.05	.71	.26	.13	.69	.41	.39	.27	-		
39.	-.10	-.02	.11	-.14	.33	-.13	.14	.18	.25	.11	-.27	.20	-.07	-.27	-.00	-.10	-.05	.08	.29	.02	-.21	-.64	-.22	.12	.03	-.26	-.10	-.15	.03	.03	.29	.17	.48	.16	.33	.32	.51	.42	-	
40.	-.20	-.12	-.02	.06	.07	.11	.26	.05	.26	.35	-.36	.11	.09	.09	.33	.15	.23	.29	.43	.29	-.01	-.39	-.07	.01	-.46	-.16	-.16	.02	.06	.12	.35	-.08	.37	.14	.08	.31	.51	.30	.45	-

Note. Correlations in bold = $p < .01$ and $p < .05$. 1-10 = Emotional self daydreaming probe 1...10; 11-20 = Realistic daydreaming probe 1...10; 21-30 = Narrative daydreaming probe 1...10; 31-40 = Associative daydreaming probe 1...10.

Experiment two data cleaning

To explore normality, I chose to look at the Kolmogorov-Smirnov as in experiment one. For the self-consciousness scale, the Kolmogorov-Smirnov test came back non-significant at ($p = .20$), suggesting normality. The histogram for this variable also shows a relatively normal distribution (with skew and kurtosis close to zero; <https://osf.io/p6kqn/>). The Q-Q plot shows a few dots falling off the line, but they are mostly in a straight line across, which is also promising for normality. However, the box-plot shows potential outliers in ID 86, ID 96, ID 138, and ID 232. The z-score for ID 86 is 3.37 (outlier), the z-score for ID 96 is 2.66 (not an outlier), the z-score for ID 138 is 2.68 (not an outlier), and the z-score for ID 232 is -2.54 (not an outlier). Knowing this, I flagged participant ID 86 as a potential problem. If it comes up as an outlier on more variables, I will consider filtering this participant out. Since this variable is not skewing the normality in the self-consciousness scale however, I will not remove it right away. I thus chose to conclude that this variable is close to normality such that I do not need or want to transform it (as it will likely do little to improve the distribution).

For the private self-consciousness subscale, the Kolmogorov-Smirnov test came back non-significant at ($p = .20$), suggesting normality. The histogram for this scale shows a fairly normal distribution. The Q-Q plot shows a few dots falling off the line, but they are mostly in a straight line across, which is also promising for normality. The box-plot does suggest one potential outlier in participants ID 84. The z-score for participant ID 84 is 3.65 (outlier). Since the variable is relatively normal on all other indicators, I chose to keep participant ID 84 in mind as a case to be removed if they are problematic on multiple other scales.

For the public self-consciousness subscale, the Kolmogorov-Smirnov test came back non-significant at ($p = .06$), which suggests normality. Although the Q-Q plot also suggests normality, participant ID 108 is a suggested outlier on the box-plot. The z-score for participant ID 108 is -2.77 (not an outlier). Because this variable is normal, I chose not to opt for transformation.

For the social anxiety subscale, the Kolmogorov-Smirnov test came back significant at ($p = .00$), which suggests non-normality. The histogram shows an extremely slight positive skew, while both the Q-Q plot and the boxplot demonstrate normality, with no potential suggested outliers. As such, I chose not to transform this variable.

For the state self-concept clarity scale, the Kolmogorov-Smirnov test came back significant at ($p = .01$), which suggests non-normality. The histogram for this variable shows an extremely slight positive skew. The Q-Q plot confirms this positive skew with a few dots trailing off the top right of the line (but only two dots). Finally, the box plot indicates no potential outliers. Since the distribution is only very slightly positively skewed, I did not opt for transformation.

For the trait self-concept clarity scale, the Kolmogorov-Smirnov test came back significant ($p = .01$). The histogram for this variable shows an extremely slight positive skew with a few extreme scores on the right tail. The Q-Q plot confirms this positive skew with dots trailing off the top right of the line. Finally, the box plot indicates no potential outliers. Since the distribution is only very slightly positively skewed, I did not opt for transformation.

For the self-esteem scale, the Kolmogorov-Smirnov test came back significant ($p = .05$). The histogram for this variable shows a very slight positive skew with a few extreme scores on the right tail. The Q-Q plot confirms this positive skew with dots trailing off the top

right of the line. Finally, the box plot indicates one potential outlier with ID 90. The z-score for ID 175 is -3.02 (outlier). Since the distribution is only very slightly positively skewed, I will did opt for transformation (especially that the z-score is right at the cusp of the 3 cut-off point). However, I kept note of this outlier and considered removing this participant if it was problematic on multiple other scales.

For the self-rated emotional self daydreaming scale, the Kolmogorov-Smirnov test came back non-significant ($p = .20$), suggesting normality. Furthermore, the box-plot does not suggests any outliers. As such, I conclude that this variable is normally-distributed.

For the self-rated realistic daydreaming scale, the Kolmogorov-Smirnov test came back significant ($p = .07$). However, the boxplot suggests outliers for participant ID 168, ID 216, and ID 222. The z-score for ID 168 is -2.86 (not an outlier), the z-score for ID 216 is -3.60 (outlier), and the z-score for ID 222 is -2.40 (not an outlier). Since the distribution is relatively normally-distributed on all indicators, I will simply take note of this outlier and remove it if it is problematic on multiple variables.

For the coder-rated temporal associative daydreaming scale, the Kolmogorov-Smirnov test came back significant ($p = .04$), suggesting non-normality. The histogram for this variable also shows a relatively normal distribution (with skew and kurtosis close to 0). The Q-Q plot shows a few dots falling off the line, but they are mostly in a straight line across, which is also promising for normality. Furthermore, the box-plot shows no potential outliers. I thus concluded that this variable is close to normality such that I do not need or want to transform it.

Finally, for the coder-rated narrative daydreaming scale, the Kolmogorov-Smirnov test came back significant ($p = .04$). However, the histogram shows a relatively normal

distribution with a very slight positive skew. Although the Q-Q plot only shows a few dots trailing off the top right of the line, the box plot does suggest that participant ID 24, ID 34, ID 70, ID 171, ID 226, and ID 250. All z-scores are under 3, which suggest that these variables are not outliers. As such, I conclude that this scale is normal.

To test for multicollinearity, I chose to do a tolerance test, which demonstrates how much variance in a particular predictor variable is independent of other independent variables (Cohen et al., 2003). Like in experiment one, I squared all of the correlations between predictor variables (i.e., daydreaming scales) and subtracted them from one. As can be seen in Table 1, no combinations of predictor variables demonstrate multicollinearity. It is thus safe to include these variables in the same statistical models if needed. As can be seen in Table 2, correlations of each daydreaming scale at each daydreaming probe also do not put the data at risk of multicollinearity.

Table 1.

Tolerance test for experiment two predictor variables.

Variable 1	Variable 2	R	R ²	Tolerance
Emotional self	Realistic	.51**	.26	1-.26=.74
Emotional self	Associative	.24**	.06	1-.06=.94
Emotional self	Narrative	.12	.01	1-.01=.99
Realistic	Associative	.34**	.12	1-.12=.88
Realistic	Narrative	.10	.01	1-.01=.99
Associative	Narrative	.00	.00	1-.00=1.00

To assess linear relationships, I created scatterplots between all combinations of all variables. Although the square correlation between most scales were small, the scatterplots did not have any drastically visible shape (i.e., like a ‘boot’ or a ‘fanning out’ indicating a non-linear relationship). Furthermore, when testing the quadratic relationship, the squared

correlation was either smaller or almost the same as the linear relationship, and the line did not bend much more than in the linear version. This indicates that although small, relationships between scales are relatively linear and do not violate this assumption.

Zero-order Pearson correlation matrix experiment two daydream scales over all ten daydream probes.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40		
1.	-																																									
2.	.48	-																																								
3.	.48	.41	-																																							
4.	.28	.51	.38	-																																						
5	.12	.26	.37	.66	-																																					
6.	.21	.30	.34	.36	.61	-																																				
7.	-.02	.14	.14	.18	.21	.42	-																																			
8.	.36	.28	.24	.15	.33	.29	.23	-																																		
9.	.12	-.16	.41	.17	.35	.45	.15	.29	-																																	
10.	.35	.26	.48	.18	.41	.38	.34	.60	.27	-																																
11.	.45	.15	.10	-.04	.17	.13	-.35	.11	.06	.29	-																															
12.	.33	.29	.16	.17	.25	.35	.29	.23	.19	.52	.38	-																														
13.	.36	.18	.47	.22	.38	.04	-.21	.19	.18	.15	.36	.21	-																													
14.	.48	.30	.16	.50	.21	.07	-.05	.03	.10	-.06	.28	.27	.49	-																												
15.	.03	.27	.26	.32	.44	.34	.32	-.12	.27	.03	.26	.38	.16	.03	-																											
16.	.26	-.11	.26	.29	.29	.46	.23	.05	.27	.13	.12	.43	.20	.33	.49	-																										
17.	.06	-.05	.21	.27	.38	.51	.54	.29	.11	.21	.05	.20	.08	.16	.49	.51	-																									
18.	.19	.17	.19	.14	.06	.09	.05	.41	.14	.13	.16	.22	.16	.18	.09	.18	.21	-																								
19.	.55	.17	.35	.22	.09	.08	.00	.22	.45	.20	.32	.22	.15	.15	.15	.32	.27	.27	-																							
20.	.25	.18	.22	.04	.18	.19	.26	.45	.01	.55	.34	.29	.05	.12	.08	.19	.38	.42	.36	-																						
21.	.19	.17	.17	.07	-.07	-.06	-.14	.04	-.23	-.05	.28	.04	.09	.12	.12	-.04	-.11	-.01	.04	-.05	-																					
22.	.04	.22	.14	-.09	-.11	.01	.22	.16	-.07	.07	-.05	.29	-.10	.05	-.09	-.07	.07	.04	-.14	-.18	.25	-																				
23.	.17	.36	.35	.42	.18	.23	-.00	.09	.04	.17	-.07	.20	.22	.15	.22	.18	.03	.02	.05	-.05	.37	.23	-																			
24.	.01	-.17	.09	.08	-.11	-.09	-.29	.17	-.14	-.18	.02	-.16	.06	.09	-.08	-.16	-.12	-.08	-.21	-.22	.41	.02	.62	-																		
25.	.11	.11	.06	.10	.06	-.11	-.22	-.00	-.22	-.03	.03	.06	.25	-.05	-.02	-.03	-.04	-.06	-.10	-.18	.19	.22	.52	.48	-																	
26.	.12	-.04	-.01	-.09	-.03	.14	-.10	-.22	-.22	-.24	.12	-.00	-.04	.10	-.05	.18	.09	.04	-.01	-.09	.14	.19	.38	.30	.27	-																
27.	.18	.02	-.18	.21	-.06	.07	.16	.03	-.05	-.05	-.10	.16	.16	.23	.03	-.09	.10	-.11	.02	.05	.11	.14	.31	.23	.37	.16	-															

Note. Correlations in bold = $p < .01$ and $p < .05$. 1-10 = Emotional self daydreaming probe 1...10; 11-20 = Realistic narrative daydreaming probe 1...10; 21-30 = Narrative daydreaming probe 1...10; 31-40 = Associative daydreaming probe 1...10.

Finally, I checked for heteroscedasticity using the residuals from regression coefficients to determine whether the regression model's ability to predict low and high values of the dependent variable is consistent (Goldstein, 2003; Hox et al., 2017; Nezlek, 2008). Results indicated that all residuals of combinations of broad scale variables are homoscedastic, which means that the error terms (i.e., the random 'noise' or variability between variables) is the same across all values of the independent variable. The same data cleaning steps were taken for all variables in each condition by splitting the dataset by condition and re-running all data-cleaning steps.