



## Episodic memories as proxy or independent representations: A theoretical review and an empirical test of distinct episodic memories on work outcomes

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### ABSTRACT

Prevailing views on the role of episodic memories have mostly underscored how memories are bound by the conceptual self upon memory retrieval (memories-as-proxy hypothesis). However, there has been much less focus on how episodic memories can remain independent of the conceptual self (memories-as-independent-representations hypothesis). This is highly relevant for the understanding of the mechanistic of how memories can guide actions, behaviors, and key outcomes, independently of the conceptual self. In this article, I describe new ideas and existing ones that have received less attention in the literature to support this latter hypothesis. An empirical covariance-based study also contrasted these two hypotheses by assessing two memories relative to the work domain and examined how they can each uniquely be associated with key work outcomes (motivation, burnout, turnover intentions), independently of self-conceptual measures. Results supported the view of memories as independent representations and I suggest future research avenues for this under-investigated perspective.

The role of episodic memories in orienting behavior, well-being, and key life outcomes such as adjustment in romantic relationships or at work has remained mostly unexplored. This is potentially due to a lack of theory explaining how episodic memories can have a directive, but also specific and unique effect on such outcomes—an effect that can operate independently of the conceptual self (Kuwabara & Pillemer, 2010). Indeed, several prevailing theories on episodic and autobiographical memory mostly focus on describing how the conceptual self represents the boundaries through which the recall of episodic and autobiographical memories occurs. Memories therefore reflect the construction of the self. This mainly implies that episodic memories are, at best, at the service of the conceptual self and do not have much of a role other than serving the self by providing event-specific knowledge (Conway & Pleydell-Pearce, 2000). Here I describe new ideas and underscore recent theoretical suggestions that may have received less attention in the field of memory to highlight the many ways through which episodic memories can have a directive effect on important life outcomes independently of the conceptual self. I then tested empirically this independence effect in the work domain by investigating in a covariance-based study how distinct work-related episodic memories can be associated with key work outcomes such as work motivation, turnover intentions, and burnout, independently of self-conceptual

measures. This paper detracts a bit from traditional empirical article in that I present a detailed theoretical review of the various ways that memories can direct outcomes prior to presenting the study.

There is now a growing literature on the functions of autobiographical memories, which are typically described in three categories: self, social, and directive (Pillemer, 1992; Bluck, 2003). These functions, although initially elaborated in the 1990's, are still extensively used to this day (e.g., Burnell, Rasmussen, & Garry, 2020; Rasmussen, Ramsgaard, & Berntsen, 2015). These functions refer to how people use their autobiographical memories to achieve identity, social and intimacy outcomes, or to facilitate decision making. However, this literature has typically focused on how people deliberately and agentically recruit memories to serve these functions (Kihlstrom, 2009). Little research (but see Biondolillo & Pillemer, 2015; Kuwabara & Pillemer, 2010; Philippe & Bernard-Desrosiers, 2017) has focused on the nonagentical function of memories or on their automatic directive function occurring outside of awareness (Pillemer, 1992, 2003). The automatic effect of memories appears to reflect the way the brain analyzes the external environment rather than the way an individual deliberately recruits particular memories to serve a specific goal. Stated differently, the present paper is concerned with *how* memories are encoded and organized in the brain, and how they influence behaviors outside of people's awareness, as

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opposed to *why* people remember experiences (Bluck & Alea, 2011). Given the more automatic and mechanistic focus of the present paper, as opposed to a deliberate and functional use of memories, this categorization of memory functions will not be extensively used here. However, the main argument of this paper could be subsumed under the automatic directive function of memories (Pillemer, 1992, 2003).

## 1. Prevailing views on the role of episodic memories

I define episodic memories in line with the most accepted definition in the memory literature, that is, as experience-near representations (sensory, affective, conceptual) of unique past events that are believed to have been personally experienced (Conway, 2009; Cabeza & St Jacques, 2007). These representations are often accompanied by fragments of visual images, which when recalled lead to the mental construction of a scene (Rubin & Umanath, 2015) and a sense of reliving (Tulving, 2002). These episodic representations were initially theorized to be processed in a repertoire of information existing within separate brain regions from autobiographical knowledge (Klein, Cosmides, Tooby, & Chance, 2002), that is, personal knowledge such as lifetime periods and general events, but also more generic and cultural semantic knowledge (Conway & Loveday, 2015). In neuropsychological terms, episodic memories are context-specific and rely on the hippocampus, whereas autobiographical knowledge is processed by extra-hippocampal neocortical structures (Winocur, Moscovitch, & Bontempi, 2010). However, those two repertoires would be in constant interactions, creating temporary and specific patterns of activation (Cabeza & Moscovitch, 2013). Some specific patterns of activation over the episodic memory repertoire and the autobiographical knowledge base can produce what is called an autobiographical memory (Conway & Loveday, 2015). In contrast, Rubin (2006) proposed that episodic memories are not confined to a specific repertoire, but are the result of the interaction of multiple basic systems of the brain, mostly corresponding to the five senses, but also language, narrative, and emotion and functional systems, such as explicit memory and search-and-retrieval systems. An autobiographical memory would be the coactivation of the representations situated in multiple systems, including the visual, emotion, linguistic, narrative, and emotion systems, and coordinated by the explicit memory and search-and-retrieval systems. Whether the repertoires or the multiple basic systems theory is used, both theories agree that certain episodic information (e.g., visual information) is located in a different system (or repertoire) than other type of information (e.g., semantic or conceptual).

In the present paper, when I will refer to episodic memory, I am mostly concerned with a past event that is believed to have been personally experienced, which can be recalled as the mental construction of a scene, which comes with a sense of reliving, and importantly, which is characterized by records of sensory-perceptual-conceptual-affective processing (Conway, 2009) or, in Rubin's terms (2006), characterized by representations from the basic sensory systems of the brain, but that may or may not include complex representations from the linguistic, narrative, and explicit memory systems.

There is a consensus in the memory literature regarding the role of episodic memories or episodic sensory detail information during deliberate recall and in how they can serve to build the conceptual self (Conway, 2009; Conway & Pleydell-Pearce, 2000). However, their role in orienting behavior independently of the conceptual self has been mostly overlooked. This is the argument I develop in this paper. Here, I describe several specific roles that episodic memories or episodic components can have, beginning with the prevailing view and then highlighting some of their other overlooked effects.

### 1.1. Episodic memories as images facilitating goal progress and monitoring

A prevailing perspective about episodic memories in the memory

literature is that they serve to track and update goal progress. Conway and Pleydell-Pearce (2000) proposed a mental structure they termed the working self which consists in a complex hierarchy of associated goals and subgoals similar to what Kruglanski et al. (2002) described as goal systems. They suggest that memories are mediated by goals from that system. For example, if a person has the goal to find his car back in a parking lots, he will form a mental image of the location of his car. Conway, Meares, and Standart (2004) proposed that visual imagery of episodic memories serves to mentally represent information about goals. As such, the visual imagery of this person's car in the parking lots with the relevant contextual information will be formed in episodic memory to sustain the find-the-car goal (e.g., the shops that are close by, signs and posts in the parking lots within the area where the car is parked). These mental representations will be activated and retrieved later when it will be time to find the car. Once the car is found, the episodic memories that have been created to sustain the find-the-car goal will be degraded and new episodic memories will be temporally created to track progress (the car has been found). Such progress monitoring and memory degradation are essential since keeping memories of the car parked without updating them as a function of goal progress would run the risk of confusing the car owner when his car would be parked in a different parking lot at a different time. In other instances, it could produce repetitive actions (e.g., have I locked my car doors or not?).

### 1.2. Episodic memories as providing sensory-near details to conceptual self-knowledge

Another prevailing perspective is that episodic memories are preserved for a very short amount of time (hours or days) and that people quickly lose access to them after that period or memory traces rapidly degrade (Conway & Pleydell-Pearce, 2000). Some episodic memories can nonetheless be preserved over a longer period of time if they associate with autobiographical knowledge (Conway & Pleydell-Pearce, 2000). Autobiographical knowledge (AK) is constructed of abstract representations arranged in a hierarchical manner (Conway, Singer, & Tahini, 2004) and contains general events (summary representations of multiple similar events), life periods (e.g., high school years), life themes (e.g., work, relationships), and the conceptual self (e.g., traits, self-schemas, scripts, life stories). When episodic memories link to such abstract representations contained in AK, episodic memories provide specificity (context-specific) and sensory details (e.g., emotions and imagery) to the retrieved autobiographical memories (Conway, 2009), while AK provides the semantic knowledge, schemas, sociocultural scripts, and coherent meaning with the self.

### 1.3. The conceptual self as boundaries for episodic memories

It has been suggested that AK constitutes the boundaries of episodic memories, yielding a delicate balance between correspondence with what actually occurred in past events (episodic memories) and coherence with existing AK and the conceptual self (Conway, Singer, & Tagini, 2004). Rathbone, Moulin, and Conway (2008) report that people retrieve episodes of their lives as a function of their self and to support the self (see also Conway, Meares, & Standart, 2004). Similarly, particularly emotional and significant memories such as self-defining memories would be selected as anchor points to represent specific concerns, self-images, or self-aspects (Conway, Singer, & Tagini, 2004; Singer & Salovey, 1993). Thus, AK and the conceptual self would act as boundaries to the retrieval process of episodic memories, such that people would recall memories that reflect and correspond to the current state of their AK and conceptual self. In other words, retrieved memory content is constantly tinted by conceptual self-knowledge. For example, an agentic person will be more likely to retrieve agentic memories, whereas communal people will tend to recall memories of communion (Woike, Mcleod, & Goggin, 2003). Memories we recall are also thought to reflect our traits, schemas, attitudes, and other general

self-knowledge from the conceptual self (Markus, 1977). Similarly, personal life stories are composed of a selection of specific episodic memories which provide coherence and meaning to a person's identity and lifetime development (McAdams, 2001). Moreover, episodic memories would be uniquely selected and even distorted to represent and correspond to the person's actual conceptual self and AK (Conway, Singer, & Tagini, 2004).

## 2. Memories as independent representations

Overall, according to the prevailing view, most episodic memories integrated in long-term memory act as a proxy for conceptual self-knowledge, only providing specificity through situation detail, emotions, and visual imagery and other sensory cues. I label this view the *memories-as-proxy hypothesis*, which illustrates a top-down process, where higher conceptual self-knowledge influences lower episodic information, especially within the reconstructive and retrieval process. According to this hypothesis, memories should not orient behavior independently of the conceptual self, since they are bound by the self. However, this perspective is mostly focused on a top-down retrieval process. It does not address what is sometimes called the directive function of memory (Pillemer, 2003), that is, when memories are triggered by external cues by specific situations and enter or not consciousness (bottom-up process, Mace & Unlu, 2020). Involuntary or intrusive memories (Berntsen & Hall, 2004) also relate to this phenomenon, although an important characteristic of these types of memory is that they enter consciousness, whereas this may not be necessary for a directive function to occur (e.g., Kuwabara & Pillemer, 2010). The prevailing view also does not consider what happens when certain episodic memories are only weakly embedded in AK or not part at all of the conceptual self (Winocur et al., 2010). I now describe the *memories-as-independent-representations* hypothesis, which posits that memories can influence subjective feelings, behaviors, and outcomes independently of the conceptual self.

### 2.1. Episodic memories as information in progress of integration

Episodic memories are thought to be central to knowledge acquisition, notably self-knowledge, and the development of identity. Knowledge would be gradually abstracted from episodic memories and would become general long-term conceptual self-knowledge, which would eventually lose its connection with the episodic memories (Conway, 2009). However, what has not always been clearly acknowledged is that it takes time for episodic information to gradually integrate AK and the conceptual self. These memories remain in long-term memory because they correspond to important goals or concerns for the person, although they are not yet fully integrated in AK. Conway, Singer, and Tagini (2004) suggest that some episodic memories may take more than two years to be integrated (see also Linton, 1986). It is probably the case for memories that represent first times, standing-out experiences, or memories that are not schematic of previous experiences or which contradict an internalized schema (Williams, Conway, & Cohen, 2008). Moreover, the integration of relevant episodic information to AK can be conflictual, and this is perhaps more dramatically illustrated by trauma memories (for clinical illustrations, see Conway, Meares, & Standart, 2004). In less dramatic cases, these memories are often self-defining memories, which anchor life issues and aspects core to the person's personality, self, and integrative meaning (Blagov & Singer, 2004; Singer & Salovey, 1993). Yet, they are "in the process" of integrating the conceptual self. Meanwhile, such episodic memories enclose information about the *person*, but not yet about his or her *self* as a stable and integrated entity. When these memories provide information to guide actions and behavior, they will operate independently of the stable representations of the conceptual self.

### 2.2. Episodic memories as AK-Diverging information

Most novel episodic memories that conform to already existing self-knowledge are probably forgotten, since they provide no new information about the external world and oneself than what has already been encoded. So critically, what is typically preserved in episodic memory is initially AK-diverging information. Evidence supports this view. Klein, Loftus, Trafton, and Fuhrman (1992) showed that only abstract information from the conceptual self is required to make trait self-judgments for contexts in which one has a sufficient amount of experience (e.g., the context of university for a senior student). However, episodic memory information is recruited to make trait self-judgments for contexts in which one has little experience (e.g., the context of university for a freshman). In other words, episodic memories are spontaneously used when there exists no information yet at the conceptual level (Klein et al., 2002; Pillemer, 2003). In those circumstances, they are likely to guide behaviors independently of the conceptual self.

Brown's transition theory (2016) suggests that repeated common experiences strengthen schematic information (personal semantic knowledge) in a Hebbian learning process (i.e., units that fire together wire together). Conversely, major life transitions signal and create the formation of new sets of schematic information. Strongly emotional collective or personal events often begin the internalization of new representations about oneself and the world (e.g., a child birth, a natural disaster in one's community) for which there was no prior knowledge to organize the novel representations. It therefore sets new representational units around which novel information may be associated to form new schematic personal knowledge. Transition theory is coherent with the free energy principle (i.e., active inference, Friston, 2010; Parr & Friston, 2019) and predictive coding (Barron, Aukstulewicz, & Friston, 2020) in that when mundane experiences are well predicted by current internal representations of the self and the world, it does not necessitate changes to these representations (no prediction error, see the general discussion for a detailed treatment of this concept). Moreover, adequate prediction of the mundane (i.e., well-predicted) experiences strengthens these internal representations. However, novel, surprising, unpredicted, or uncertain events that could not be well predicted by the current sets of representations or beliefs often call the person to change his/her prior representations to adapt them to this new understanding of the reality or new reality. As such, transition events and their episodic memories, sometimes also called turning points (McAdams, 2001), consist of important AK-diverging information, which can mark the beginning of a new era of schematic knowledge. During this transition time, such episodic memories are likely to influence the person's behavior, independently of schematic and self-conceptual information. Moreover, many transitions may not necessarily lead to the construction of schematic knowledge, because of the absence of the repetitive nature of the events (e.g., car accident, robbery, panic attack), which are often traumatic in nature. In consequence, these episodic memories may be part of the person's memory, but remain fairly independent of this person's explicit schematic or self-conceptual knowledge.

### 2.3. Episodic memories as goal-related but not always self-related

The self-memory system theory (SMS) suggests that the hierarchy of goals of the working-self mediates the encoding of memories (Conway, Singer, & Tagini, 2004). This perspective has conceptualized goal systems as being part of the conceptual self and consequently, goals in the SMS has mostly been defined as deliberate goals. I argue, however, that there are more macroscopic and universal goals that compose goal systems which refer to human innate psychological needs and to which people are naturally oriented. Three psychological needs have consistently been shown to sustain people's well-being, growth, and health at all ages (Ryan & Deci, 2017) and across cultures (Tay and Diener, 2011). These needs are autonomy, competence, and relatedness. Autonomy refers to the need to feel volitional and authentic in one's actions.

Competence is defined as the need to feel effective and efficacious. Relatedness refers to the need to feel connected and cared for by others and to care for others in turn. In all human experiences and life episodes, at least one and most often all three needs will be highly featured. Although people do not necessarily have such goals as explicit goals (e.g., “I want to satisfy my competence”), they do formulate sub-goals that indirectly seek to satisfy those needs (e.g., “I want to win that board game”). Similarly, people do not formulate explicit goals about avoiding the thwarting of these needs (e.g., “I try to avoid looking like a fool in front of others” or “I try to avoid losing my friends”), but they do constantly strive for reducing such thwarting and engage in actions reflecting those goals.

Given the importance of these needs in human life, it seems logical that the human goal system is wired to approach experiences that will satisfy these needs and avoid those associated with their thwarting, regardless of the content of the conceptual self. It would therefore seem highly adaptive from an evolutionary standpoint for episodic memories to actively encode situations that satisfy or thwart these needs (Klein et al., 2002). Episodic memories of life events that have been need satisfying or need thwarting will therefore keep strong ties with goal systems and will serve to quickly inform what should be approached and avoided in the environment at a later similar occasion (Dweck, 2017; Philippe, Koestner, Lecours, Beaulieu-Pelletier, & Bois, 2011).<sup>1</sup> Research has indeed shown that need satisfaction is a key goal-affective component of memories and one that predict outcomes better than many other memory characteristics, such as valence, vividness, or significance (e.g., Philippe, Koestner, Beaulieu-Pelletier, & Lecours, 2011, 2015).

Episodic memories could be initially encoded because they are goal-relevant (notably relevant for the person’s autonomy, competence, and relatedness), yet they may not necessarily be integrated in AK or conceptual self, even if they keep ties with goal systems. As such, some episodic memories may remain in long-term memory without becoming strong descriptors of an individual’s self or identity (i.e., trait self-knowledge). For instance, an episode of interpersonal rejection—thwarting the need of relatedness—could be encoded as highly goal-relevant and as situations to avoid in the future, without updating trait self-knowledge (“I am rejectable”) or worldviews (e.g., “people are mean”). These episodes could also be integrated in AK structures, but at different construal levels (Brewin, Gregory, Lipton, & Burgess, 2010; Stillman et al., 2017). Conway (2009) suggested that episodic memories that are recalled have a frame, that is, conceptual and semantic contextualizing knowledge. However, they may not necessarily be integrated in AK, in terms of general events, life period, or in the self. Moreover, some episodic memories may be integrated in AK as part of general event representations, or as anchoring a specific life period, yet without serving as self-descriptors for traits and schemas. As such, some long-term episodic memories could be recalled, without having any link with conceptual self-knowledge, other than a feeling of auto-noetic consciousness (Tulving, 2002) and a mental construction of a scene (Rubin & Umanath, 2015). In all these cases, some long-term episodic memories would not fully integrate AK or the conceptual self, but would keep ties with goal systems, potentially because they remain informative in regard of macroscopic human needs and goals. Such episodic memories would therefore contain information that do not overlap with higher-level representations of the conceptual self.

#### 2.4. Episodic memories as quick cues for action tendencies

Episodic memories can serve to quickly appraise the external world and serve basic approach and avoidance actions. When they serve this function, they are rarely accompanied by auto-noetic consciousness, time traveling, or reminiscence experiences (Pillemer, 2003), except in the

cases of involuntary recall (Berntsen & Hall, 2004). In most cases, this activation occurs outside of people’s awareness (Conway, 2009; Philippe, Koestner, Beaulieu-Pelletier, Lecours, & Lekes, 2012). This function of memory was initially called the directive function of memory by Pillemer (1992, 2003). It is mostly based on the associative nature of memory (Brewin et al., 2010), such that external cues that match the content of an episodic memory will trigger this memory and its goal-affective information (e.g., its level of need satisfaction), which will serve to orient action and behavior in the situation that triggered the memory (Philippe et al., 2012; Singer & Conway, 2011). Some researchers believe that this one of the most basic function of the memory system and one that is probably common to many animal species (Allen & Fortin, 2013; Berntsen, 2010; Martin-Ordas et al., 2013). The sensory-based components of episodic memories make it so that they can be triggered easily again later by external cues, which quickly inform that a similar situation is occurring and direct the type of behavior that should be adopted. This function is also at the heart of what has been called implicit memory (Schacter, 1987) and of involuntary memory (Berntsen, 2010; Mace, 2005). However, implicit and involuntary memory are distinct on at least one important aspect of interest for the present article. Involuntary memories have been mostly studied as conscious involuntary memories, that is memories that comes to mind spontaneously. Implicit memory is more concerned with information that has been once encountered but that cannot be consciously retrieved (Roediger III, 1990). Yet this information remains encoded in memory and can affect decision and action whenever it is reactivated by external cues. Overall, however, involuntary memories may only represent the effect of implicit memories that enter consciousness in certain conditions of diffuse attention.

Implicit memory is probably well illustrated by Claparède’s classical amnesic patient who refused to shake hands with him after he pricked her with a pin hidden in his hand, even though she claimed she did not remember meeting him before (Claparède, 1911/1951; see also Korsakoff, 1889). The threatening event had been encoded as an episodic memory and was guiding the amnesic patient’s action in future similar situations. However, given her amnesia and incapacity to form frames and integrate the episodic memory into her AK (or medial prefrontal cortex), the memory remained inaccessible through conscious reminiscence, but the emotional or procedural information could be reactivated by context-specific cues processed by the hippocampus. This appraisal function of memory is also well illustrated by Larry L. Jacoby’s work on the concept of memory as a tool as opposed to memory as an object. Memories for old words that were presented in a session before (up to five days before) facilitated the perceptual identification of those words in tasks in which they were very briefly flashed (Jacoby, 1983). However, it was not necessary for participants to recognize those words as being learned in a prior session to facilitate their perceptual identification. Words that were recognized as old facilitated performance in the perceptual identification task as much as words that were not recognized as old (Jacoby & Witherspoon, 1982). Presumably, conceptual knowledge was unnecessary to perform the task, only episodic memory traces.

However, these studies were limited by the fact that using words as targets may not entirely correspond to the full notion of what an episodic memory is (McDermott, Szpunar, & Christ, 2009). Moreover, the notion that the memories of the target stimuli are inaccessible to conscious retrieval is unnecessary to demonstrate that memories can affect behaviors outside of people’s awareness. Other studies have shown that activation of real-life episodic memories, that could still be consciously retrieved, could situationally influence people’s well-being outside of their awareness. Philippe and colleagues (Philippe et al., 2012; Philippe & Bernard-Desrosiers, 2017) used keywords derived from participants’ episodic autobiographical memory description of a specific and significant life event to prime them with these keywords outside of their awareness days later. They found that priming a need satisfying memory immediately increased situational well-being, whereas priming a need thwarting memory led to decreases in situational well-being, as

<sup>1</sup> Other needs and goals related to physical survival (avoidance of death or of painful experiences) are other probable macroscopic human goals.

compared to control yoked groups. Although clear effects were found on well-being, all participants included in the analyses reported not having seen any words from their memory described in a previous session during the priming task and none could identify the correct purpose of the study or even draw a rational parallel between the two testing sessions. Thus, external cues rapidly trigger episodic memories to direct emotion, decision, action. However, no conscious reminiscence of this activation is necessary.

Memories that are frequently used or frequently triggered by external cues are expected to have recurrent situational effects, which over time can build or hinder important personal psychological and social resources. Longitudinal studies have shown that need satisfaction in such memories can predict increases over time in well-being (Philippe et al., 2012; Philippe & Bernard-Desrosiers, 2017), romantic relationship quality (Philippe, Koestner, & Lekes, 2013), or work satisfaction and motivation (Philippe, Lopes, Houffort, & Fernet, 2019), whereas need thwarting in such memories was shown to lead to relationship breakups (Philippe et al., 2013) and burnout (Philippe et al., 2019) over time.

### 3. The present research

When episodic memories are bound by the conceptual self, their content reflects the self. What can be retrieved as an episodic memory through deliberate recall is necessarily anchored to a representation of the conceptual self and these self-representations will shape and taint the content of the episodic autobiographical memory retrieved. As such, the information contained in memories should not predict personal outcomes that is not already predicted by conceptual self-knowledge. Moreover, memories retrieved for a common theme or domain would be likely to contain similar information since they are bound by the same self-conceptual domain.

When episodic memories represent independent cognitive representations, there is an important distinction to draw between the I and the self. An episodic memory will most of the time be accompanied by this autothetic consciousness of the I (Wheeler, Stuss, & Tulving, 1997). Nevertheless, each episodic memory does not necessarily overlap with the self in the form of trait self-knowledge or as descriptors of the self. One can recall having performed a certain action, but this action may or may not represent his/her self. In other words, one would not self-describe him/herself as a function of this action. In psychology, most measures are obtained through self-reports, which almost always target trait self-knowledge and general self-perceptions. These measures reflect the conceptual self. However, as illustrated in the Introduction, many episodic memories may not be fully integrated in AK and may not describe an individual's conceptual self, while still influencing his/her subjective feelings, actions, and behavior through their goal-affective components (e.g., level of need satisfaction).

One way to test the memories-as-proxy hypothesis is by pitting two memories against each other in a covariance-based analysis. When predicting a key outcome (e.g., burnout), if the two memories are correlated and their predictive effect cancels each other or that only one memory remains a significant predictor of the outcome, then this provides evidence that memories represent a more general person-level variable. Indeed, this would show that information contained in one memory is redundant with the information contained in another memory, as both correspond to information represented at the level of the conceptual self. Moreover, the predictive variance of these memories should overlap with related self-conceptual measures.

The memories-as-independent-representations hypothesis stipulates that each memory is fairly independent of one another and therefore each can have a unique effect on outcomes as a function of its level of need satisfaction. It is therefore expected under this hypothesis that each memory would predict an independent and unique portion of variance in outcomes. There should also be a weak or non-significant correlation between the levels of need satisfaction of the two different memories.

Moreover, they should predict outcomes independently of related self-conceptual measures.

#### 3.1. Work as a target domain of investigation

A specific single domain was selected to investigate this question to avoid the alternative explanation that two distinct memories could each predict some common outcome because they are from distinct domains and tap into different self-aspects (e.g., McConnell et al., 2011). The domain of work was selected because it is a core area of most people's lives affecting their functioning, associated with a realm of emotional and significant experiences, and with known and well defined and researched outcomes. Three such outcomes were selected, employee motivation, burnout, and turnover intentions. Motivation (Gagne et al., 2014) and burnout (Schaufeli, 2017) are two of the most studied aspects related to work research. Burnout reflects an affective strain reaction to ongoing stress (Maslach, 1982) whose core content is emotional exhaustion (Halbesleben & Bowler, 2007). It has been consistently related to substantial individual and organisational costs (Demerouti, Bakker, & Leiter, 2014; Halbesleben & Bowler, 2007; Riketta, 2008), making it a particularly important outcome of work research. Motivation was assessed from a self-determination theory perspective, one of the most used perspective on motivation in the workplace (Deci et al., 2016) and one for which scales with strong evidence of validity and reliability exist (e.g., Gagne et al., 2014; Tremblay, Blanchard, Taylor, Pelletier, & Villeneuve, 2009). Finally, turnovers have been a long-time studied issue, one with important consequences for organizations (e.g., Staw, 1980).

#### 3.2. Hypotheses

The memories-as-proxy hypothesis would predict that:

- 1) Need satisfaction in each of two work-related memories should be at least moderately or strongly positively associated.
- 2) Need satisfaction in one work-related memory should be associated with employee motivation, burnout, and turnover intentions, but a second work-related memory should not predict additional variance in these outcomes (or vice versa).
- 3) Need satisfaction in work-related memories should be at least moderately or strongly associated with need satisfaction experienced at work in general (a self-conceptual measure) and these memories should not account for variance in outcomes after controlling for this latter variable.

The memories-as-independent-representations hypothesis would predict that:

- 1) Need satisfaction in each of two work-related memories should be uncorrelated or weakly positively correlated since they correspond to two independent episodic experiences.
- 2) Need satisfaction in a work-related memory should be associated with employee motivation, burnout, and turnover intentions, and a second work-related memory should predict additional variance in these outcomes, over and above the variance accounted by the first memory.
- 3) Need satisfaction in work-related memories should predict variance in outcomes, even after controlling for need satisfaction experienced at work in general (a self-conceptual measure).

Note that supporting evidence for the memories-as-representations hypothesis would not invalidate the memories-as-proxy hypothesis. There is ample evidence for the existence of top-down processes of memory (see Conway & Pleydell-Pearce, 2000). However, the memories-as-representations hypothesis specifies that there are also important bottom-up and heterarchical processes (i.e., memories

affecting outcomes independently of higher-level self-knowledge) that can affect key outcomes in people's lives independently of the organization of their conceptual self (Milyavskaya, Philippe, & Koestner, 2013). For this, there is very little evidence.

#### 4. Method

**Participants.** A power analysis revealed that a sample of 101 participants was needed to detect small to medium effect sizes in  $R^2$  increase (0.07) using two or more predictors in multiple regression analyses. Accordingly, 106 workers (65.1% females) were recruited to take part in this study. Workers were employees of Cegep organizations in Quebec, Canada (similar to American colleges). Types of employee included administrative support staff (35%), professionals (25%), teachers (37%), and executives (3%). They were aged 42.33 years on average ( $SD = 11.83$ ), worked on average 36.39 h per week ( $SD = 5.91$ ), and had 12.90 years of experience in their current job ( $SD = 10.22$ ).

##### 4.1. Measures

**Work-related memories.** Instructions were derived from past research on self-defining memories (Singer & Salovey, 1993) and related research (Sutin & Robins, 2005; Philippe et al., 2019). Participants were asked to describe in detail two memories related to their work. They were told that they could describe memories related to their choice, orientation, or reorientation of career or any other significant memory related to their work. The chosen memories had to be at least three months old to ensure that the memories were not recalled because of a recency effect—thereby increasing the likelihood that the memories were significant and important for the participants rather than just recent. Next, participants were asked to rate the level of need satisfaction they experienced during the event of each of their work memories. Past research has shown that need satisfaction in memory is a better predictor than valence, emotions, and many other memory characteristics (see Philippe, Koestner, Beaulieu-Pelletier, & Lecours, 2011, 2015). Past research (Philippe, Koestner, Beaulieu-Pelletier, & Lecours, 2011, Study 1) has also shown a large correlation ( $r = 0.70$ ) between need satisfaction in memory as rated by the participants themselves and as coded by independent judges from memory narratives. Therefore, participants' ratings were used. Two items assessed each of the three needs (Philippe, Koestner, Beaulieu-Pelletier, & Lecours, 2011): "I felt free to do things and to think how I wanted" (autonomy), "I felt competent or capable" (competence), and "I felt connected to one or more people" (relatedness). Participants indicated their degree of agreement with each item, on a 7-point Likert scale, ranging from  $-3$  (Strongly disagree) to  $+3$  (Strongly agree), with 0 representing do not agree nor disagree or not applicable. Per definition, a score above zero represents a need satisfying memory, whereas a score of zero or below represents a need thwarting memory. An index representing the level of need satisfaction in each work-related memory was computed by averaging item scores for each memory separately. Cronbach's alpha coefficient for this index was 0.80 and 0.88 for the first and second memories, respectively.

Excerpt of a need satisfying memory ( $>0$  on the scale of memory need satisfaction):

"When my boss learned that I that I got tenure, she bought me candies, and with another colleague, they put these all over my desk before I arrive in the morning. And all people from my department came to congratulate me."

Excerpt of a need thwarting memory ( $\leq 0$  on the scale of memory need satisfaction):

"A colleague confronted me aggressively because I had talked about one of her students during lunch time in front of other colleagues. This student was angry against my colleague and I wanted to let her know about this. She really did not like that I do it in front of other colleagues and she yelled at me just before I get into class. I was evaluated at that

time and this event added an extra stress to my work."

**Work need satisfaction.** The 18-item Work-Related Basic Need Satisfaction scale (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010) was used to measure the three psychological needs of autonomy, competence, and relatedness as experienced at work in general. A sample item assessing relatedness is "At work, I feel part of a group", an item measuring competence is "I really master my tasks at my job", and an item tapping into autonomy is "The tasks I have to do at work are in line with what I really want to do." These items measure need satisfaction at work at the conceptual level of the self and are distinct from the assessment of need satisfaction in a specific work episode, as explained in the work-related memory measure presented above. An index averaging all three needs at work was computed, as it is commonly done by self-determination theory researchers (see Ryan & Deci, 2017). Cronbach's alpha coefficient for this index was 0.85. All items of this scale and of the scales presented below were responded to on a 7-point Likert scale.

**Self-determined motivation at work.** The Work Extrinsic and Intrinsic Motivation scale (WEIMS; Tremblay et al., 2009) was used to measure self-determined motivation at work. This scale assesses six forms of motivation with three items each, along a continuum of self-determination: intrinsic motivation (e.g., "I do this work ... because I derive much pleasure from learning new things"), integrated motivation (e.g., "... because it has become a fundamental part of who I am"), identified regulation (e.g., "... because I chose this type of work to attain my career goals"), introjected regulation (e.g., "... because I want to be a winner in life"), external regulation (e.g., "... for the income it provides me"), and amotivation (e.g., "I don't know, too much is expected of us"). Cronbach's alpha coefficients of each subscale were all  $>0.70$ . A weighting algorithm is typically applied to the scale (Ryan & Deci, 2017; Sheldon, Osin, Gordeeva, Suchkov, & Sychev, 2017) to reflect the theoretical continuum of self-determination: (intrinsic\*3) + (integrated\*2) + (identified\*1) - (introjected\*1) - (external\*2) - (amotivation\*3).

**Burnout.** The Maslach Burnout Inventory (BMI; Maslach, Jackson, & Leiter, 1996) was used to measure burnout. In this study, the 8-item emotional exhaustion subscale was used, as it is generally considered the hallmark of burnout (e.g., Halbesleben & Bowler, 2007; Piko, 2006). A sample item is "I feel emotionally drained from my work". Alpha in this study was 0.91.

**Turnover intentions.** Three items from past research (Michaels & Spector, 1982) were used to measure turnover intentions (e.g., "I seriously consider quitting my job"). They were measured on a 1 (*do not agree at all*) to 5 (*totally agree*) Likert scale and dichotomized in two groups as to whether employees responded having no intention at all of turning over (scoring 1 on all items) or some intentions (scoring at least 2 on at least one item). This statistical transformation is often performed on employee turnover intention measures due to the typical left-skewed distribution of this variable (e.g., Gaudenz, De Geest, Schwendimann, & Zúñiga, 2017; Tham, 2007). Alpha was .85.

##### 4.2. Procedures

Participants were contacted by email by their institution and invited to take part in an online study on quality of work life. We made sure that participants were not pressured by their institution to respond to the questionnaire and that no superiors or other employees would have accessed to their data. All participants were francophone, and all scales were in French. Importantly, participants completed all outcome measures before describing their memories and rating them for need satisfaction. Research has shown that this order should be prioritized, given that describing memories first is likely to bias the subsequent completion of outcome scales, whereas the opposite (outcome scales first and memories after) does not appear to bias the type of memories selected (Philippe, Bouizegarene, Guilbault, Rajotte, & Houle, 2015). Upon completing the questionnaire, Participants were entered into a draw for

three prizes of \$125 CAD. This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of the University of Quebec at Montreal.

### 5. Results

Table 1 reports the means, standard deviations, and correlations among all study variables. These results revealed that, on average, participants tended to report need satisfying work-related memories (score higher than 0 on the scale). However, for both memories, the standard deviations were high, implying that a sizeable number of participants also reported need thwarting memories. Indeed, descriptive results further showed that 54.7% of the participants reported two need satisfying memories (need satisfaction scores higher than 0 on both memories), 22.6% reported a need satisfying memory first and a need thwarting memory second, 14.2% a need thwarting memory first and a need satisfying memory second, and 8.5% reported two need thwarting memories. Overall, reporting a need satisfying or need thwarting memories first or second was not related to the outcomes. Thus, the order in which the memories were reported will not be further considered.

Results also showed that need satisfaction in each memory were not significantly correlated. They were, however, both significantly correlated with need satisfaction at work in general. Need satisfaction in both memories were also significantly associated with the work outcomes in the expected direction.

A first set of hierarchical multiple regressions was first conducted to examine whether need satisfaction in the second memory would contribute to predict a portion of variance in the work outcomes over and above need satisfaction in the first memory. Need satisfaction in the first memory was therefore entered at Step 1 and need satisfaction in the second memory at Step 2, and both were regressed on each work outcome separately (self-determined motivation, burnout, and turnover intentions). Table 2 reports these results. Overall, results revealed that need satisfaction in the first memory was significantly and positively associated with self-determined motivation and negatively associated with burnout and turnover intentions. Moreover, need satisfaction in the second memory accounted for a significant portion of variance in each of these outcomes, over and above need satisfaction in the first memory. Both memories accounted together between 10% and 17% in each outcome. In all cases, both memories were significantly associated with the work outcomes when entered together at Step 2.

Results as depicted in Table 2 may appear to indicate that the first memory explains more variance than the second memory. However, this is due to regressions cancelling out shared variance among the two memories variables. If the memories are entered in a reverse order (second memory first and first memory second), they predict 6% and 5% of self-determined motivation, 6% and 8% of burnout, and 8% and 9% of turnover intentions, respectively. Thus, the contribution of each memory to the work outcomes appears to be quite equivalent. The only

**Table 1**  
Means, standard deviations, and correlations among study variables.

Variables	M	SD	1	2	3	4	5
Need satisfaction in memory 1	1.14	1.40	-				
Need satisfaction in memory 2	0.92	1.64	.17	-			
Need satisfaction at work	5.48	0.75	.46**	.25**	-		
Self-determined motivation at work	7.51	4.43	.25**	.24*	.40**	-	
Burnout	2.81	1.26	-.32**	-.25**	-.42**	-.24*	-
Turnover intentions	0.74	0.44	-.32**	-.28**	-.53**	-.51**	.20*

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

**Table 2**  
Hierarchical multiple regressions of work outcomes on need satisfaction in two distinct work-related memories.

Variables	Steps	Self-determined motivation	Burnout	Turnover intentions <sup>1</sup>	Work need satisfaction
Need satisfaction in first work-memory		$\beta = .25^{**}$	$\beta = -.32^{**}$	$B = -.70^{**}$	$\beta = .46^{**}$
	Step 1	6.95**	11.81**	12.86**	28.51**
	F(1, 104)/ $\chi^2(1)$ R <sup>2</sup>	.06	.10	.11	.22
Need satisfaction in second work-memory		$\beta = .20^*$	$\beta = -.20^*$	$B = -.44^*$	$\beta = .17^*$
	Step 2	4.62*	4.65*	7.44**	4.01*
	F(1, 103)/ $\chi^2(1)$ R <sup>2</sup>	.04	.04	.06	.03

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

<sup>1</sup>A hierarchical logistic multiple regression was used given the dichotomous nature of the turnover dependent variable and step Chi-square and Cox and Snell R<sup>2</sup> are reported for this regression. Reported beta coefficients are unstandardized for turnover intentions, but standardized for the other work outcomes.

unbalanced case was for need satisfaction at work, of which the second and first memory explained 6% and 18%, respectively.

An alternative explanation for the above results could be that one memory may tap into a specific work goal and the second memory represents another distinct work goal. Thus, both memories could independently predict work outcomes, because each of these two goals have distinct consequences for work outcomes. For example, one memory could be about satisfying one's need of autonomy by illustrating how an employee's work provides him/her with opportunities whereas the second memory could be about satisfying relatedness, exemplifying how one gets along well with his/her colleagues. Given that the needs for autonomy, competence, and relatedness are macroscopic human needs, which are intimately related to goals, each need could be linked to a specific memory in a particular domain such as work. To investigate this issue, the score of each need in the first memory was entered at Step 1 and the score for the same need in the second memory was entered at Step 2. These variables were regressed on each work outcome in separate regressions. Results revealed that each need in the second memory contributed to additional variance in the prediction of each work outcome (at least at  $p < .10$ ), over and above the same need in the first memory. This was true for either autonomy, competence, or relatedness. The only exception was that competence in both memories was not significantly associated with self-determined motivation. Thus, overall, these results suggest that need satisfaction in each memory uniquely impacts work outcomes.

A second set of hierarchical multiple regressions was conducted to examine whether need satisfaction in the work-related memories would still predict the work outcomes after controlling for need satisfaction at work at the conceptual level and for other common demographics. Correlational results revealed that age and years of experience were highly associated ( $r = 0.72$ ), as well as type of employment and education,  $F(3, 102) = 9.89$ , 23% of common variance). To avoid collinearity, the demographics that were the most correlated with the outcomes were preserved for the analyses, that is, age and education. Number of working hours per week and sex were also controlled for. These demographics were entered at Step 1 and need satisfaction at work in general was entered at Step 2. The two memories were

combined into a single score and entered at Step 2 to examine the contribution of need satisfaction in work-related memories over and above demographics and need satisfaction at work in general.

Results of these regressions are shown in Table 3. As can be seen, need satisfaction at work accounted for a substantial portion of variance in all three work outcomes, but need satisfaction in the work-related memories accounted for a significant percentage of variance in these outcomes, over and above the demographics and need satisfaction at work (see Table 3). Finally, we also re-analyzed the data while controlling for self-determined motivation, given that this variable has often been modeled as a predictor of outcomes such as burnout and turnover intentions (e.g., Fernet, Austin, & Vallerand, 2012; Gillet, Gagné, Sauvagère, & Fouquereau, 2013). Results remained unchanged, therefore confirming that although memories predict self-determined motivation at work, they are not a proxy for this variable. Overall, these findings suggest that need satisfaction measured at the episodic level does not fully overlap with information at the conceptual level of the self and predicts variance in important work outcomes that is not captured by this conceptual level.

### 6. General discussion

The purpose of the present research was to compare two distinct conceptualizations pertaining to the organization of episodic memories. A prevailing view in the literature has been to conceptualize episodic memories as proxy representations for the conceptual self, mostly providing sensory-based representations and details of lived experiences. Within that perspective, the conceptual self acts as boundaries for the retrieval of autobiographical and episodic memories and tints and distorts memory information, such that retrieved memories are mostly a proxy for self-conceptual information. Within that structure, episodic and autobiographical memories are hierarchically fully subsumed to conceptual self-knowledge. An understudied view is the memories-as-independent-representations hypothesis, which specifies that episodic memories are not necessarily fully integrated into the autobiographical knowledge base (e.g., Rubin, 2006; Winocur et al., 2010). They can be partially integrated, only related to goal structures, only associated with semantic knowledge through their frame (Conway, 2009), or fully

dissociated from both semantic and conceptual knowledge and goal structures. Within the framework of Rubin and Umanath (2015), such memories would be event memories that can be recalled with a mental construction of a scene, and that may be integrated or not at different levels of the self, but typically not in high-level representations of the conceptual self. This implies a heterarchical structure where episodic memories (or event memories) participate in developing higher level structures (autobiographical knowledge and conceptual self), but also remain fairly independent of those structures and can have unique influence on behavior, decision making, and outcomes (Milyavskaya et al., 2013). This can be contrasted to a stricter hierarchical perspective where all structures at the bottom of the hierarchy are fully subsumed under the upper levels and only participate in building the upper more abstract levels (Berntson & Cacioppo, 2008).

The present research provides evidence supporting the memories-as-independent-representations hypothesis. Results showed that information contained in each of two distinct memories from the work domain was uniquely and independently associated with key work outcomes. Moreover, information in these memories were only moderately associated with a related self-conceptual measure and the association between these memories and the work outcomes remained significant after controlling for that self-conceptual measure and other demographic variables. The fact that episodic memories can have heterarchical effect on outcomes, independent of self-conceptual measures, does not invalidate the memories-as-proxy hypothesis. There are many top-down processes, and these have been vastly studied in the memory literature. There are also essential bottom-up processes that incorporate episodic memories into the conceptual system. For instance, thinking about one's memories in a self-referential manner will activate pre-frontal regions associated with autobiographical reasoning (D'Armenteau et al., 2014), which will help to organize these life episodes in a coherent manner and forge key life stories (McAdams, 2001). However, the present findings highlight the necessity of developing a less rigid conceptualization of how episodic memories relate to AK and to the conceptual self and of allowing for some independence in how the episodic and AK repertoires relates to one another (Winocur et al., 2010). For instance, Conway (2009) reports that episodic memories are lost quickly unless they become integrated with AK and the conceptual system. The memories-as-independent-representations perspective underscores that this structural organization might be too restrictive and that episodic memories may remain accessible and functional even when they are not fully integrated in the conceptual system (Rubin, 2006; Winocur et al., 2010).

In developing such a distinct model, it seems useful to conceptualize (Rasmussen et al., 2015) goal structures as related, but relatively independent of the conceptual self, which could allow for some episodic memories to remain associated with goal structures through macroscopic goals (i.e., innate needs), while not being integrated or only partially integrated into the conceptual self. Similarly, episodic memories that remain accessible without being fully integrated into the conceptual system could be conceptualized as AK-diverging information. In that sense, episodic memory may serve a prediction error function (e.g., Sinclair & Barens, 2018) or a surprisal reduction function (Friston, 2010). Such a function has been identified in certain brain regions, such as the striatum, which is activated when there is a prediction error about a particular rewarding stimulus (Diederer, Spencer, Vestergaard, Fletcher, & Schultz, 2016). When, for instance, stimuli A, which has been learned to be rewarding, stops providing reward or provides a lower reward than expected, the striatum will trigger a prediction error, that is, it signals a change in the external environment that may require a new adaptive behavior or an update of encoded conditional rules. When stimuli A, which has been learned to deliver a reward does actually deliver one, the striatum remains silent, as the prediction is correct. Episodic memories may play such a role by specifically encoding events that are relevant to the person's goal system but that diverge from information already stored in the AK and conceptual self.

**Table 3**

Hierarchical multiple regressions of work outcomes on need satisfaction in work-related memories, controlling for demographics and need satisfaction at work in general.

Variables	Steps	Self-determined motivation	Burnout	Turnover intentions <sup>†</sup>
Age		.13	-.02	-.02
Sex		-.22*	.01	.76
Number of working hours		.13	.15	-.02
Education		.18	-.03	.09
	Step 1 $F(4, 101)/\chi^2(4)$	3.33*	0.55	3.71
	$R^2$	.12	.02	.03
Need satisfaction at work		.38**	-.43**	-3.18**
	Step 2 $F(1, 100)/\chi^2(1)$	18.22**	21.17**	40.84**
	Change $R^2$	.14	.17	.31
Need satisfaction in work-related memories		.22*	-.22*	-.77*
	Step 3 $F(1, 99)/\chi^2(1)$	5.30*	4.59*	5.86*
	Change $R^2$	.04	.04	.07

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

<sup>†</sup>A hierarchical logistic multiple regression was used given the dichotomous nature of the turnover dependent variable and step Chi-square and Cox and Snell  $R^2$  are reported for this regression. Reported beta coefficients are unstandardized for turnover intentions, but standardized for the other work outcomes.



Following the accumulation of similar episodic memories (and confirmation of a general rule), general events can be formed, as well as other AK abstractions (Brown, 2016). With complex situations, this integration can take time and sometimes may be difficult to achieve, such as in cases of maltreatment or trauma episodes (Smyth, True, & Souto, 2001). During this process of integration, these episodic memories may be more frequently triggered and used to appraise the external reality as a way to achieve an accumulation of other similar experiences to eventually form general events, schemas, and rules, and therefore more fully integrate the AKB. There are indeed theoretical suggestions that frequent reminiscences, flashbacks, and mental intrusions would be attempts at integrating the episodic information in AKB (Brewin, Dalgleish, & Joseph, 1996; Krans, Naring, Becker, & Holmes, 2009). While this phenomenon is more typically associated with posttraumatic stress, it may be a common process of many types of memories (e.g., Kaap-Deeder, Vansteenkiste, Petegem, Raes, & Soenens, 2016; Holmes, James, Coode-Bate, & Deeprose, 2009). It is worth noting that this perspective considers integration as the attempt to encode, organize, and reconstruct the event memory coherently with one's self, beliefs, and worldviews. When integration is defined as an event memory taking an overwhelming part of one's identity in an incoherent fashion with other self representations and beliefs, than this rather leads to greater posttraumatic symptoms (Rubin, Berntsen, & Bohni, 2008). This latter definition of integration would actually be considered as a poor integration according to the former definition. During their integration process, these episodic memories are likely to influence subjective experiences, actions, and behaviors independently of the conceptual self in which they are not yet integrated. Future research will be needed to test these theoretical perspectives.

The present research has some limitations. The test of the memories-as-independent-representations hypothesis was based on a covariance interpretation, which consisted in controlling for another memory, a self-conceptual measure, and for potential confounders (demographics). Future research could use experimental designs to further differentiate between the memories-as-proxy and memories-as-independent-representations hypotheses. Similarly, the associations between memories and the work outcomes were based on a cross-sectional design. Therefore, the present data cannot be interpreted as a causal effect of memories on work outcomes and even preclude an interpretation of the direction of the effect. Longitudinal studies would be needed to replicate the present findings in order to interpret the directive effect of memories on work outcomes (but see Philippe et al., 2019).

Overall, the present findings provide greater support to the position that episodic memories could act as independent representations and could potentially direct behaviors and outcomes, independently of the conceptual self. This could imply that some episodic memories are not fully integrated in AK and have unique effects of their own, without being bound by the conceptual self. Much more research will be needed to examine in further detail this understudied perspective.

#### CRedit author statement

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