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Review

Reasons to remember: A functionalist view on the relation between memory and psychopathology

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Abstract

Memory is under investigation as one of the core mechanisms of psychopathology. The traditional cognitive view of memory as a stable structure with a range of set characteristics can be complemented with a perspective that considers remembering as a behaviour that varies fluidly across contexts. Remembering may serve adaptation to the environment by fulfilling a directive function, a self-function and a social function. A failure to fulfil these functions may be a risk factor for psychopathology. Implications of the discussed functionalist perspective include the importance of reinforcing adaptive ways of remembering during early development, the possibility of treating maladaptive ways of remembering through contextual interventions and the added ecological validity of using ambulatory assessment methods.

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Memory, Mnemonic behaviour, ABC analysis, Psychopathology.

Introduction

Throughout history, different views on what determines behaviour have arisen, such as the position of the stars, the power of the Gods or the willpower of a free self [14]. In other words, the way in which human behaviour and, by extension, maladaptive behaviour such as psychopathology is studied is anchored within a certain philosophy of science that is peculiar to the spirit of the times. In the cognitive framework, which is dominant in current times, cognitive structures such as (autobiographical) memory are presumed to explain some forms of (mal)adaptive behaviour. Within this cognitive perspective, there is a focus on identifying characteristics of cognitive structures (e.g. specificity, coherence, detail, valence), in the assumption that certain characteristics are reflective or predictive of psychopathological behaviour [49,74]. For instance, the specificity and coherence of the autobiographical memory are studied in their relation to psychological suffering and well-being (or maladaptive and adaptive behaviour [6,56,61]). It has been found that individuals who have higher levels of memory specificity and memory coherence report less depressive behaviour (e.g. rumination) and higher levels of psychological well-being (e.g. positive social relationships) [37,83–85]; Waters & Fivush, 2015 [92].

In the cognitive framework, we conceptualize characteristics of cognitive structures as if these structures are a crystallized reality or a stable force within the individual [21]. Indeed, we speak of these structures and their characteristics in the same way as we speak of physical objects (e.g. diamonds) and their characteristics (e.g. fragility [31]). Nonetheless, covert cognitive structures such as memory are always studied through overt behaviour, which varies fluidly or flexibly based on its context and is in that sense unstable. Simply put, every one of us, even the most seasoned cognitive psychologist, is 'condemned' to the study of observable behaviour in context [24]. For instance, in studies on memory coherence and specificity, participants are asked to write narratives about autobiographical events [6,61,85]. Depending on the experimental context (e.g. solitary or in the presence of others), the extent to which these narratives are specific or coherent can vary [3,46,50]. Importantly, researchers only have access to the context and the narrative behaviour, whereas the presumed memory system remains inaccessible. Similarly, in studies on fear reduction techniques such as memory reconsolidation interference, we induce variation in the context (e.g. presentation of instructions and

stimuli, administration of a pharmacological agent) and assess their effect on fear responding [22]. Although removal of fear is sometimes equated with the destruction of memory traces, this necessarily remains hypothetical; after all, multiple cognitive explanations are compatible with any finite set of observable data [15,32,34,41].

Behaviour in context

As said, all psychologists are 'condemned' to the study of observable behaviour that varies in accordance with environmental events, even when interested in the supposed underlying mental events/cognitive structures [24]. When moving to the behavioural level, taking the context (i.e. antecedents and consequences) into account is necessary to understand the meaning or function of (atypical) behaviour. In other words, to answer [5] the famous question 'But what the hell is it for?', we need to consider the context. For instance, consider the behaviour of 'moving your arm'. We can describe the topography or phenomenology of that behaviour (moving your arm intensely during 3 s from left to right over a distance of 10 cm and so on). However, without studying the contextual antecedents and consequences according to which the behaviour varies (e.g. hearing your name being called by a friend on the other side of the street as an antecedent, that friend coming over to you as a consequence), we cannot come to understand that behaviour as 'waving'. In other words, it makes little sense to study the behaviour of moving one's arm without studying the context. Thus, analysing determinants of behaviour (i.e. antecedents and consequences) is ultimately necessary to understand the function or meaning of the behaviour.

Analysing the behaviour in terms of its antecedents and consequences is referred to as an ABC analysis, in which A stands for antecedents, B stands for behaviour and C stands for consequences. The ABC analysis is a common tool that is highly valued in the clinical practice of behaviour therapists [38] and is closely linked to the kind of behaviourism that has been advocated by Skinner[1] and his successors [77]. Making an ABC analysis overrides the mere phenomenological description of constructs and provides the opportunity to move from the descriptive to the explanatory level because the investigation of A's and C's allows us to make a causal analysis of the behaviour. Although ABC analyses typically do not invoke mediating mechanisms, one can indeed still speak of causation if a change in A's and/or C's would result in a change in B (for a detailed discussion of mechanistic versus functional causation, see the study by Chiesa [95]). From this perspective, the ABC analysis can be considered as a counterfactual explanation [63]: 'If A or C had not occurred in this form, then B would not have occurred in this form'.

Mnemonic behaviour in context

This view can be extended to behaviour that involves the use of our 'memory', referred to as 'mnemonic behaviour' (i.e. an umbrella term that captures different forms of remembering, such as internally thinking about or retrieving a memory, as well as externally sharing or narrating a memory), namely, we can use the context to understand mnemonic behaviour in the same way as how we can use context to make sense of the behaviour of moving one's arm.

First, mnemonic behaviour can vary based on its contextual antecedents. For example, during an argument with your partner (antecedent), you might recall significantly more arguments/negative moments you have had together, whereas while having a good time together (antecedent), you might recall more positive moments. This is a form of similarity-based generalization in the sense that the present situation (antecedent) evokes the mnemonic behaviour that has been emitted in similar situations (see work on context-dependent memory [33] and mood-congruent recall [76]). Another example of antecedent control over mnemonic behaviour is that cues that have been paired with aversive events can make participants think back of those aversive events (cf. intrusions [91,94]). This is clinically important, for instance, in the context of post-traumatic stress disorder; the confrontation with certain antecedents that remind the person of the trauma (which can become generalized over time) can evoke certain types of maladaptive behaviour (e.g. avoidance of certain emotional memories through remembering in an overgeneral manner [47,66,68]). This overgeneral mnemonic behaviour can keep the anxious responses intact because it prevents proper exposure to and desensitization of the emotionally charged antecedents [64].

Second, the consequences of mnemonic behaviour also determine the way in which we will remember in the future. For instance, in a laboratory study of Debeer et al [20], participants remembered their past experiences in a significantly more specific manner when they were punished for retrieving nonspecific memories. These results illustrate the idea that the way in which we remember autobiographical events can be under the control of consequences. Also *in vivo*, the consequences of remembering are of great importance. For instance, it has been shown that when a person narrates in an incoherent and/or nonspecific manner, listeners will react more negatively (i.e. with less willingness to interact, less social support), as opposed to when a speaker narrates coherently and/or specifically [7,80,81]. The negative social consequences may reduce the

[1] It is a common misconception that Skinner's behaviourism did not take into account covert behaviour such as thinking and remembering [67,71]. Skinner [69,70,72] did theorize on such covert behaviour and referred to it as 'private events' because they are only directly observable to the organism himself/herself.

frequency of the incoherent and/or nonspecific mnemonic behaviour (i.e. punishment), whereas the positive social feedback may cause the next instances of remembering more likely to be coherent and/or specific [9,84]. The idea of training people by bringing the ways of remembering under operant control has also been translated to clinical practice, which we will elaborate in the following section.

Mnemonic adaptation

The fact that our behaviour can change based on the environmental antecedents and consequences allows us to adapt to that environment. Adaptation can be considered at the level of individual organisms during their lifetime (i.e. ontogenetic adaptation or learning, more proximal consequences) and at the level of the species (i.e. phylogenetic adaptation, more distal consequences [19,22]). In fact, certain adaptive values at the ontogenetic and at the phylogenetic level can be seen as parts of a hierarchical relation because adaptation at the ontogenetic level can, in some instances, be at the service of the adaptivity of the species (e.g. coherent remembering may lead to positive social relationships, which in turn may increase chances of survival and reproduction).

Although research on adaptation is quite sparse in the cognitive literature, one of the exceptions can be found in the literature on the functions of remembering autobiographical events. In that literature, it is generally agreed upon that mnemonic behaviour may serve adaptation in at least three ways or, in other words, result in three categories of consequences or functions that are adaptive for our well-being and survival [11,13,12,35,53,90]. These three main functions can be described as a directive function, a self-function and a social function, and all three are considered to be pivotal for maintaining psychological well-being [88,89]. In other words, obtaining these directive, self-related or social consequences by performing adaptive forms of mnemonic behaviour is regarded as function fulfilment. A failure to fulfil these functions may be a risk factor for psychopathology.[2]

The directive function

The directive function entails that we remember our past to guide and direct our present and future behaviour [54]. For example, when you are looking for the exit in a supermarket that you have never visited before (antecedent), you are likely going to remember (behaviour) previous times you went to similar kinds of supermarkets to help find your way out (consequence). As such, remembering can be conceptualized as behaviour that serves the directive function. If our mnemonic behaviour would fail to fulfil this function, our problem-solving skills would suffer, and we would feel overwhelmed by the unknown aspects of every situation. Research has indeed shown that when remembering is nonspecific and remains at an overgeneral level, this can have a pervasive (negative) impact on individuals' problem-solving skills, which in turn may add to a sense of helplessness and other depressive behaviours [25,55].

The self-function

The self-function, sometimes also referred to as the identity function, refers to the fact that remembering our past allows us to create a continuous sense of self (i.e. a sense of identity; McAdams, 2001, [45]). For example, when someone asks you to join them on a holiday for single people (antecedent), you are likely to join (behaviour) if you previously enjoyed (consequence) such events. Accurately remembering those previous events can support a sense of 'identity' by allowing one to (realize that one) behave(s) 'identically' — or at least similarly — in situations that are alike. Thus, in the example given here, one can develop an 'identity' as 'somebody who typically opts to join events for single people'. Research has shown hat how we recall our autobiographical experiences (e.g. in a nonspecific or incoherent manner) relates to the extent to which we are able to fulfil the self-function of remembering (i.e. constructing an identity) and is accordingly associated with psychological difficulties such as questioning oneself and rumination, which are important maintaining factors in depression and anxiety [57,86,93]. Furthermore, maladaptive (e.g. incoherent) forms of remembering that fail to fulfil the self-function have been associated with types of psychopathology in which healthy identity functioning is compromised, such as personality disorders (e.g. borderline [2,87]), autism spectrum disorder [23], schizophrenia [42,43] and eating disorders (e.g. anorexia nervosa [75]). In severe cases, when we would not be able to recall anything, it is almost impossible to imagine what life would look like. We would have no clue about the world or ourselves and wander through life as a void body. Possibly, forms of dementia such as Alzheimer disease could resemble this kind of experience [1,73].

The social function

Last but not least, the social function entails that we narrate about our past personal experiences to other people to create, maintain and enhance social relationships [3,4]. For instance, when you are meeting a friend (antecedent), you might share memories with him/her to create a sense of belongingness (behaviour that serves the social function [9,62]). Furthermore, research has

[2] While previous research has predominantly been investigating the 'use' (function) of remembering, the focus in this manuscript is on 'adaptive use' or 'adaptation' (the extent to which the functions are also adequately fulfilled and the intended social, self-related or directive consequences are obtained [40,51]). In other words, the term adaptation here means that a behaviour is adaptive in serving an outcome, a goal or some preferred end state, such as good mental health ([17]; see also the study by Alea & Bluck [3]). In the literature, the respective difference between use and adaptation is often illustrated by the distinction between goals and goal achievement [16].

shown that the more coherent and specific we share those memories, the more positive the social reaction of the listener is (consequence); thus, the better the social function becomes fulfilled, the more coherent or specific you will narrate the next time [7,80,81]. If the social function of remembering would remain unfulfilled, this could form one possible pathway to increased feelings of loneliness [18]. For instance, incoherent remembering has been associated with forms of psychopathology in which the development of social relationships can be a hurdle, such as social anxiety [82]. Furthermore, a failure to build and retain a supportive social network through maladaptive remembering (i.e. nonspecific, incoherent) is suggested to be a general risk factor for psychopathological problems, such as depression and anxiety [7,18,36,48,83,84].

Implications

Conceptualizing memory as a behaviour that can serve a threefold function (consequences that are of directive, self-related or social nature) carries implications for the assessment and the treatment of psychopathology. First, this conceptualization brings to attention how the (learning) history of the individual can shape ways of remembering. Second, it implies that there is great therapeutic potential in changing maladaptive forms of remembering to more adaptive forms that do adequately fulfil the functions of remembering. Third, ambulatory assessment methods can be used to understand fluctuations in behaviour due to analysis of its causal relations with contextual antecedents and consequences. We discuss these three implications in the following paragraphs.

With respect to the first implication, a large body of work by Fivush [26–28], Fivush et al. [29] and Reese and Fivush [,27,28,29,59,60] has illustrated the importance of modelling and reinforcement of adaptive mnemonic behaviour during the development of children. The extent to which the primary caregiver encourages the child for communicating about his/her personal experiences has been shown to predict whether the child will become able to verbally construe structured/coherent narratives about his/her life experiences and will develop adequate understanding (self-function), regulation (directive function) and sharing of his/her emotions (social function). Specifically, research has shown that mothers who provide more explanations, emotional expressions and resolutions (characteristics of coherent remembering) when reminiscing about highly stressful events with their children have children whose mnemonic behaviour adaptively serves its functions and thereby show higher levels of coping skills and lower levels of depression and anxiety [30,65]. Thus, characteristics of upbringing and particularly the autobiographical reminiscing style of the primary caregiver can predict the extent to which the learned mnemonic behaviour of the child fulfils adaptive functions and can consequently predict his/her well-being even into adulthood. Nonetheless, caution is warranted in causal interpretations of the findings because this concerns correlational research.

With respect to the second implication, the conceptualization of memory as a behaviour that can be brought under operant control has inspired the development of interventions such as Memory Specificity Training [58]. This treatment has proven to make people more specific in practice [8]. That way, people can be trained in remembering more specifically, which can better fulfil the directive, self-related and social functions of remembering and consequently enhance our well-being. In other words, we can change behaviour that is not adaptive for the individual (e.g. overgeneral remembering as a maintaining factor of depression and post-traumatic stress disorder), by bringing adaptive behaviour (e.g. specific remembering) under operant control, and hence protect individuals against the development or maintenance of psychopathology.

Third, an implication for our research methods can also be noted. Using ambulatory assessment methods, we would be better able to see how characteristics of mnemonic behaviour fluctuate over time and are dependent on various contextual factors [78,79]. Instead of assessing characteristics, such as the coherence or specificity of someone's memory in a single test, ambulatory assessment could improve the validity of our research methods by taking into account antecedents and consequences of behaviour and hence providing starting points to cause changes in behaviour [78,79]. This assessment method could thus help us to grasp why in certain situations (antecedents) particular ways of remembering (behaviour) are adept or inept at evoking useful directive, self-related or social consequences and could consequently help us to improve the specific form of the mnemonic behaviour to make it the most adaptive in serving our well-being.

Conclusion

Memory is discussed frequently, not only in everyday conversation but also in the scientific literature, and is under investigation as one of the core mechanisms of psychopathology. The traditional cognitive view of memory as a stable structure with a range of set characteristics can be complemented with a perspective that considers remembering as a behaviour that varies fluidly across contexts and time. We discussed how certain ways

of remembering (e.g. specific, coherent) can be adaptive for our well-being by serving a directive function, a self-function and a social function. The ABC analysis is a practical tool to study the conditions under which mnemonic behaviour is either adept or inept at evoking these adaptive directive, self-related and social consequences. Furthermore, the functionalist conceptualization shows us how we can treat maladaptive mnemonic behaviours, namely, by training people in performing mnemonic behaviour that serves more adaptive consequences. In sum, adopting a functionalist perspective can improve our understanding of the essential role that mnemonic behaviour plays in the development, maintenance and treatment of psychopathology.

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Conflict of interest statement

Nothing declared.

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