Grief as a process of cognitive reorientation and disruption of prospective memory

Grief and Memory Theory through Neuropsychological & Humanistic Perspectives

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Grief is usually considered an emotional reaction to a loss. Common complications associated with grief are longing for the deceased and traumatic symptoms caused by the loss. In about 10-20% of cases, there are persistent reactions that are generally referred to as complicated grief, and in the more severe chronic cases, so-called prolonged grief, occurs in 1-10% of cases.

Unexpected, sudden losses can have a profound impact on an individual's life and affect plans and expectations for the future. Therefore, grief interacts with future planning, predictive expectations, and prospective memory, which can potentially influence the grieving process. However, the role of updating prospective memories and plans in facilitating a successful grieving process is not fully understood. Grief and loss are associated with the loss of something valuable, such as the death of a close relative, the loss of a significant other (public figure), the loss of a bodily function (vision, hearing, amputation) or the loss of a planned future scenario (property, environmental and climate issues). Even a mental image can activate an association with a grief experience. Loss implies an irreversible end to something that cannot be recreated in its original state.

Grief is naturally always experienced as difficult, but 90% of people have a varied and adaptive grief process, who is affected by complicated grief, and with what risk and vulnerability factors, is the subject of ongoing research. It is when the loss and grief reactions are persistently difficult over an extended period, and when the person has obvious difficulties in returning to their previous daily life, that. Some individuals are more vulnerable for various reasons and some losses and situations are more distressing than others, which means that some are at risk of developing complicated grief, which can often be associated with strong feelings of guilt, inadequacy, anger, bitterness, somatic symptoms, or a shocking unexpected relief.

Different clinical contexts provide much of the research on grief reactions, often psychiatric research, or humanistic research (pastoral care), or in other situations such as crisis and trauma situations. But it is important to know what normal grief is. The differences between normal grief and increasingly complex grief are not black and white, or qualitatively different, but grief and complex grief should be considered as two extremes along a continuum.

In grief, the memory of previous interactions and experiences with the deceased can have a re-gelling function. These memories can be used in similar future situations to predict and prepare for emotional reactions and thus contribute to the process of adaptation. Autobiographical memories help to maintain a sense of continuity in life stories. In the case of a loss, the bereaved must reconstruct their life story to include the loss, which involves a complex interplay between remembering the past and anticipating the future without the deceased. The predictive processing model emphasises the brain's role in continuously updating its internal models of the world. In grief, this may mean that the reality of the loss is not integrated into these models, affecting how future events are predicted and planned. Autobiographical memories are therefore, in the context of grief and loss, not just passive

recollections. They actively contribute to updating and reshaping future expectations and plans, illustrating a dynamic interplay between retrospective and prospective cognitive processes.

According to the Predictive Processing Framework, the brain is constantly generating and updating predictions about the world based on past experiences. In this context, autobiographical memories are a rich source of data that the brain uses to make these predictions. During grief, an individual often returns to past experiences with the deceased. These autobiographical memories are not only retrospective; they influence the grieving person's expectations and predictions about the world without the deceased. The individual needs to adjust their mental models to cope with the loss, which is a prospective process.

The concept of the brain functioning as a "prediction machine" has been philosophically discussed in ancient times, as exemplified by Plato in his cave analogy, and in modern philosophy by David Hume, Immanuel Kant and empirically by Hermann von Helmholtz, but in more recent neurophilosophical contexts by thinkers such as Andy Clark, Anil Seth, David Chalmers and Karl Friston, who offer an intriguing perspective on the interplay between autobiographical and prospective memories, particularly in the context of grief.

In the predictive processing model, autobiographical (episodic) memories are used to update and refine future predictions. In grief, reliving memories of the deceased can lead to the realisation that future plans, expectations or beliefs need to be refined. The brain uses past experiences (autobiographical memory) to recalibrate and create new expectations for life (prospective memory) in the absence of the loved one.

One of the best-known theories of grief is Elisabeth Kübler-Ross's oft-cited DABDA model. It identifies five stages in the grieving process: denial, anger, bargaining, depression, and acceptance. Unintentionally, according to Kübler-Ross herself, the stages were never meant to be strict. She later clarified that most of us tend to jump back and forth between the steps or be at several levels at once. But doesn't that make the model less useful? Nevertheless, the step model (and others like it) has become an obligatory element in a popular view of a 'normal' crisis and grief process.

Related to the grief model are the crisis models. Different countries often have their own theoretical version of how to deal with crisis and trauma. In Sweden, from my point of view, we have Dr Johan Cullberg's well-known four-stage crisis model, which is just another model of the same kind.

But this pragmatic approach has been subject to much criticism. Not least because the empirical evidence for such stage models is rather thin. For example, George Bonanno and other empirical researchers argue that recovery and resilience are much faster, stronger, and more uneven than previously thought. Bonanno's concept of 'coping ugly' is a powerful expression of how grief is highly individual, based on the experiences and relationships we happen to have with what we have lost. Why is it not possible to experience liberation when someone has died? Can an acquired disability mean that one can suddenly avoid harsh social demands and expectations? Is it allowed to laugh in mourning? And how long does one really mourn? And with what intensity? Can grief pass in five minutes?

It turns out that it is sometimes inappropriate to "uncover" so-called denied frozen grief through repeated exposure to discomfort and traumatic memories; or to carry it out through organised debriefing; or that mourning must take place in certain ways; or truly grieving through various variations of catharsis. Preconceived notions of how grief should be experienced may in some cases exacerbate the imposition of guilt and shame. Loss of control can be quite frightening in some cases and is often perceived as life threatening. The need for social security and predictability is often acute in such situations.

Of course, there is great individual variation, highlighting that there are different ongoing neuroanatomical correlates and memories that covary - not that there is one 'correct'

model of coping with grief. Both O'Connor and Bonanno point to the fact that most of us have a high degree of 'resilience' that allows us to really cope with great personal stress without breaking down, and that most of us are back to work within a few days or weeks of a major loss.

The problem with the previous documentation is that it was done by clinicians and psychotherapists who mainly met people with complicated grief (10%), and so a confirmation bias developed with preconceived notions that a priori and naively generalised this to apply to most of us, and sometimes with anecdotal psychoanalytic case studies discussing "denial", "displacement" and step theories as if they were the truth of the day. Empirical research suggests otherwise.

Another criticism is the view of authenticity or 'genuineness' of 'inner' feelings. Essentialism is not fully discussed by either Bonanno or O'Connor, who both adopt a wait-and-see attitude, unintentionally becoming half-vitalistically romantic in the process. But are there, as Plato, Descartes, Darwin and later Paul Ekman, Tomkins, Adolphs, Solms, Panksepp and others explored in the 1900s, "basic emotions" such as sadness, joy, disgust, surprise, anger and fear? Or do we simply construct and update cognitive experience through expectations and predictions that are then continually revised and updated?

According to the latter view, discussed in research by Joseph LeDoux and Lisa Feldman Barrett, we are not victims of a blindly inherited "essential" inevitability, but rather bear conscious responsibility for the management of our higher cognitive experiences. This contrasts with immediate avoidance reactions, such as when we reflexively protect ourselves in the face of sudden, potentially life-threatening danger. The first is an executive function in which we use our reasoning and conscious impulse inhibiting control skills to manage our experiences, but also to evaluate and update memories. The second is a non-conscious, rapid survival response that lasts only a few milliseconds - and therefore does not result in any conscious emotional experience within this short time frame, conscious interpretation and experience occurring only secondarily. Moving beyond the reductionist boundaries of black-box thinking, the study of consciousness is a new and increasingly comprehensive aspect of neuropsychological research on grief.

But what is the experience of loss? What is sadness? What is the "real" experience of grief? Is grief and bereavement a basic, primary emotion that emanates from the "essential" parts of the "deepest" sense and mind? Or is grief nothing more than multiple layers of memories, different modalities of sensory images and broken expectations?

When we mourn someone or something, it is in the context of a personal relationship where the memories also symbolise future plans, hopes and dreams - which may explain why we miss celebrities with whom we have not had a direct personal relationship, but who are still part of our thoughts. This means that we do not mourn someone we have never thought about - like a stranger in a foreign country.

Dealing with grief means cognitively constructing, reconstructing, deconstructing, reorienting, predicting a new meaningful lifeline after a loss. To create new expectations and new prospective memories - that is, memories of what we think is going to happen, and plans to fulfil that expected future - which from now on do not include the dead or what we lack. In this way, mourning is also a social construction, which can be exemplified by different turns in social contexts, not least at funerals, with a defined chain order of how those present are supposed to ritualise and express their grief, such as where and how one sits, or who confirms who. A person who is outside this inner circle, for example in the case of illicit love or hate, is not allowed to express themselves in the same social community.

Some rational explanatory models of the phenomenon of grief can sometimes be perceived as having a kind of chilly stoic logic and which seem frighteningly objectifying, but which nevertheless opens up for new varying individual-centered forms, with all its proximity, relational and reinforcement mechanisms, which are integrated into different memory

modalities, neural networks and biofeedback systems: short-term memories, perceptual memories, conditioning, semantic memories, episodic memories, Procedural memories and not least: prospective memories.

The concept of "anticipatory grief" sheds light on the phenomenon we face in situations where we know something will happen in the future, or where our previous hopes will not be fulfilled. We are preparing for the coming inevitable final moment, and we are updating our dashed hopes during an ongoing life process. This is the case with disabilities such as loss of sight, hearing or body parts, or newborns with severe brain damage, cognitive impairments, or progressive diseases that may last for many years. Or a loved one with a serious addictive disorder that will ultimately destroy any social responsibility. In anticipation of the inevitable, there is an infinite line of updated daily grief.

The common grief reactions are often grouped into four main categories: a) autonomic reactions (fight, flight, freeze); b) physiological reactions such as headaches, numbness, sleep disturbances, appetite, eating; c) emotional reactions such as crying, sadness, longing, clinging, guilt, depression, fear, anxiety; and d) cognitive reactions such as attention problems, inhibition problems, memory problems, learning difficulties and rumination. But in all living things, these reactions are also based on the ability to make predictions, i.e. predictions about how to ensure survival, mate choice and reproduction, and how to avoid enemies, injury or being eaten. And how every biological system, down to the smallest amoeba, corrects itself when things go wrong by calculating "prediction errors". And the system's ability to update its memories to increase the likelihood of survival, both phylogenetically and ontogenetically. It is simply about all our expectations, ideas and dreams, and what happens emotionally and cognitively when expectations are not met according to previously learned experience and personal needs.

Research by, among others, Joseph LeDoux and colleagues, who have mapped avoidance in anxiety and fear reactions, shows that there is a huge amount of empirical evidence that episodic memories are often updated and changed as they are updated. In grief, we can therefore conclude that when a memory is actualised, there is an adjustment of the memory ("updating") when we experience that the remembered association is no longer relevant but needs to be adjusted to the difference in the actual new situation ("prediction error"). This can be compared to a neural plastic probability process, which the calculating brain processes in milliseconds and which also gives physiological feedback reactions via proprioceptive and interoceptive memory structures between the central and peripheral nervous system - and where the subjective, very private and personal experience is the phenomenon and feeling of sadness, as when predicted expectations don't come true - in milliseconds of myriads of thoughts, some of which trigger autonomic reactions such as crying and tears. This also immediately triggers social bonding and nurturing behaviours as part of a heightened survival mechanism.

In addition, the contours of the neuroanatomical correlates can be tentatively discerned, and that many describe the experience of grief as 'striated', i.e., oscillating with the ups and downs of sadness, in and out of reactions and associations, and that the frequency of this oscillation varies and habituates and gradually fades away, perhaps as a result of Donald Hebb's old neural principle. They may never disappear altogether but may reappear unexpectedly with an event or theme that at first seems completely unrelated, but which nevertheless has a strong associative bearing.

Learning is a constantly repetitive process involving the frontal lobes, the hippocampus, the perceptual systems, and the motor areas of the cortex. Memories have to be stored in different modalities and neural networks and mediated by associative areas in the parietal lobes in order to relieve the hippocampus and start again. These processes are optimised by sleep, during which a certain amount of memory consolidation appears to take place. Particularly important is deep sleep (slow-wave sleep).

The Danish researcher Maiken Nedergaard recently discovered in deep sleep what she calls the "glymphatic system", by analogy with the lymphatic system. This is the brain's cleaning system, in which astrocytes are most effective during deep sleep, opening a permeability in the brain's vascular system that allows waste products to seep out and be transported away through the veins.

During deep sleep, memories are consolidated. Exactly how these two systems are related is not known, but there seems to be a link between memory storage, deep sleep and waste elimination. In the case of exhaustion, rest and recovery have been shown to be important, but the idea of "sleeping on it" is good for memory storage, stress and ordinary fatigue, but not always when it comes to traumatic events. If you are going through something unpleasant and traumatic, it may be better for some to stay awake for another 6 hours and instead do something completely different to distract yourself so that the experience is not consolidated into new, robust memory tracks.

There is a direct psychotherapeutic component to updating memories. Research shows that when a memory is updated, there is a "reconsolidation window" in a couple of minutes, i.e., a period of approximately 6 hours after the memory has been updated and recognised, during which there is an opportunity for molecular updating of the memory. In well-designed psychotherapies, new alternative memories can be implemented and update the previous, perhaps dysfunctional experiences. This is a new neuropsychological finding that can be applied in a variety of psychotherapeutic programmes - especially in complicated grief and traumatic loss reactions.

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Some scientific and philosophical references in alphabetical order
(See relevant research articles or books by the respective authors)

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