The Mnemic Neglect Effect and Information about Dementia:

Age Differences in Recall

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Abstract (197/250 words)

As the risk of dementia increases with age, the condition represents a more immediate threat for older than for younger adults. Consequently, the strategies that younger and older people use to defend the self against the threat of dementia may vary, with the latter more likely to recruit psychological defence mechanisms such as mnemic neglect (in which information that is threatening to the self is selectively forgotten) to reduce distress. We tested the hypothesis that older (compared to younger) adults are more likely to manifest mnemic neglect for dementia-related information. Fifty-nine younger adults (aged under 50) and 44 older adults (aged over 50) recalled 24 dementia-related statements that were either high or low in negativity. Participants were randomised to recall statements that referred either to themselves or another person. High-negativity, self-referent statements had the most substantial threat potential. Older and younger participants showed different recall patterns: the recall of older (but not younger) participants for high-negativity (vs. low-negativity) dementia-related statements was impaired when these statements referred to the self rather than to another person. The results are consistent with the hypothesis that older, but not younger, adults evince mnemic neglect in response to self-threatening information about dementia.

Keywords: Alzheimer's disease; dementia; memory, short-term; amnesia, anterograde; self-concept; mnemic neglect

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Introduction

Dementia is a progressive disease that steadily erodes an individual's core abilities, eventually resulting in death. The impact of neurological impairment varies according to the specific diagnosis, but all forms of dementia progressively degrade the social, psychological, and neurological capacities that underpin identity (World Health Organisation, 1993). Although treatments exist, dementia itself is incurable. The condition, then, represents a profound psychosocial threat. Yet, the nature of that threat, and thus the strategies upon which people draw to defend the self against it, vary. In particular, as the risk of developing dementia increases exponentially with age, roughly doubling every five years (Lincoln et al., 2014; Matthews et al., 2013), the threat that dementia represents also changes with age. Consequently, we propose that the threat-reduction strategies that older people use will be different to those that younger people use. We test this proposition in the current article.

The older one becomes, the more immediate the threat of dementia feels. Thus, although people of all ages may be frightened of dementia, these fears intensify among older adults. A 2011 YouGov poll[1] of over 2,000 UK adults found that 39% of respondents aged over 55 cited Alzheimer's disease as the illness they feared most compared to just 18% of 18- to 24-year olds. For someone in their 70s, then, dementia is likely to be a more imminent threat than it is for someone in their 20s, and consequently they may draw on different psychological defences to protect the self. Thus, younger adults are more likely to frame their attitudes and beliefs about

[1] http://cdn.yougov.com/today_uk_import/yg-archives-life-cancerresearch-diseases-150811.pdf, accessed on the 22nd of May, 2018.

dementia within broader and paternalistic stereotypes about ageing (Fiske et al., 2002). Characteristically, they insulate themselves from anxiety about their own ageing by distancing themselves from their future, older selves (Greenberg et al., 2002; Martens et al., 2005; Nelson, 2005). For example, they frequently hold ageist stereotypes of older people in which they depict them as warm, but also as forgetful, incompetent, and unproductive - in essence, as being unlike their representations of their own self (Cuddy et al., 2005; North & Fiske, 2012). Further, younger individuals view older adults with dementia as less competent than older adults who are healthy or who suffer from a physical health complaint such as arthritis (O'Connor & McFadden, 2012).

Although younger people often draw on distancing strategies to regulate their anxiety both about ageing and about dementia, this strategy is likely to be less effective for older adults, as dementia represents a more immediate threat to them. Accordingly, we propose that older people draw on different forms of self-protection than younger people to regulate their dementia-related concerns.

One prominent theoretical formulation of self-protective feedback processing and recall involves the psychological mechanism of mnemic neglect. The self-protection literature suggests that individuals can diminish the negativity, or enhance the positivity, of their self-concept by selectively forgetting information that threatens their identity (Green & Sedikides, 2004; Pinter et al., 2011; Sedikides et al., 2004). At the heart of the mnemic neglect model is the mnemic neglect effect (MNE; Sedikides & Green, 2009; Sedikides et al., 2016). The MNE is defined as the selective forgetting of self-threatening feedback relative to other kinds of feedback. That is, participants poorly recall experimenter-provided feedback (in the form of statements or behaviours they are likely to enact) that is self-threatening compared to feedback

that is not so. Although participants encode both types of feedback, they process self-threatening (compared to non-self-threatening) feedback in a relatively shallow manner, which in turn inhibits its recall. Mnemic neglect, therefore, has a self-protective function: participants engage in selective forgetting in an attempt to protect the self from the psychological discomfort that self-threatening information entails. (Sedikides et al., 2016; Sedikides & Skowronski, 2020; Zengel et al., 2018). It has also been observed among older people living with dementia: their recall for negative, dementia-related information is worse when it refers to themselves than another person (Cheston et al., 2018).

Prior research has not examined age differences in the MNE, but there are reasons to expect them, as two other lines of research indicate age differences in memory. The first line pertains to an age-related positivity effect in memory: Compared to yournger adults, older adults attend to positive information more than to negative information, and are better at remembering it (Carstensen & DeLiema, 2018; Mammarella et al., 2016; Mikels et al., 2005). This positivity effect is found in the autobiographical memory of older people even when they are living with dementia. For example, Cuddy et al. (2017) asked three groups of participants (20 younger adults, 20 older adults, 20 older adults with mild to moderate Alzheimer's disease) to listen to familiar musical excerpts and describe any memories that these excertps evoked. Autobiographical memories for both groups of older adults were more vivid, more positive, and less negative than autobiographical memories for younger adults. The positive characteristics of the music evoked autobiographical memories, then, seem to reflect age-related changes in motivation that may direct behavior and cognitive processing rather than neural or cognitive decline (Carstensen & DeLiema, 2018).

The second line of research pertains to the self-reference effect: people remember new information better when they relate it to the self than another person (Rogers et al., 1977; Symons & Johnson, 1997). The self-referencing effect improves memory across the life span (Hamami et al., 2011; Leshikar et al., 2015). However, this memory improvement is accentuated among older than younger participants (Gutchess et al., 2007), potentially buffering against deficits in newly acquired memories (i.e., episodic memories; Gutchess & Kensinger, 2018). Indeed, it is possible that a shared system contributes to the improved episodic recall of both self-referential and emotional material (Gutchess & Kensinger, 2018). Arguably, linking information to the self renders the information more positive and thus more memorable and beneficial (Gregg et al., 2017; Shi et al., 2017). In all, both the age-related positivity effect and the self-reference effect demonstrate a preference among older adults for positive (than negative) information - a preference is consistent with the MNE.

Based on the above-reviewed literature, we hypothesised that as dementia represents a more immediate threat for older adults than for their younger counterparts, older adults without dementia would display the MNE for dementia-related statements — controlling for levels of depression and anxiety — whereas younger adults without dementia would not. Put otherwise, we hypothesised that, in self-protection, older (but not younger) adults would recall fewer self-threatening (than non-self-threatening) dementia-related statements.

Method

Participants

We received ethics approval[2] and secured participants' written consent to the inclusion of their anonymized data in the dissemination of the results. We recruited participants from four sources: students at the University of the West of England; UWE Bristol staff, family, and friends; volunteers on the Join Dementia Research register, who self-identified as not having a diagnosis of dementia[3]; and residents at a retirement village. We provide participant information in Table 1.

[Insert Table 1 about here]

Inclusion Criteria

In order to screen out individuals who might have dementia (but not been diagnosed), we assessed participants' levels of cognitive functioning using the Montreal Cognitive Assessment (MoCA; Nasreddine et al., 2005). We excluded them from data analyses if they scored below the suggested cut-off score for dementia of 19 (Milani et al., 2018). Similarly, as high levels of depression (Brand et al., 1992) and anxiety (Reidy & Richard, 1997) can influence recall, we screened participants for depression and anxiety. For depression, we used the 15-item Geriatric Depression Scale or GDS (Yesavage et al., 1983), a measure designed for use with older adults but which has also shown good criterion-related validity with younger and middle-aged adults (Guerin et al., 2018; Ferraro & Chelminski, 1996). Given that anxiety measures validated with a younger population may be inappropriate for older populations, we used the Geriatric Anxiety Inventory or GAI (Pachana et al., 2007) to screen for anxiety. The GAI minimizes the emphasis of somatic symptoms, which can

[2] The study received approval from University of the West of England Faculty of Health and Social Sciences ethics committee on the 14th of January 2016 (HAS/15/12/065). Amendment to allow additional recruitment of family and friends was approved on the 7th of April 2017.
[3] The Join Dementia Research Register is a UK based database that allows people to register their interest in taking part in research on dementia, and which researchers can use to contact potential participants. It is open to people both with and without a diagnosis of dementia (https://www.joindementiaresearch.nihr.ac.uk)

be confounded with physical health problems in older adults (Johnco et al., 2015). In addition, the GAI uses a simple forced-choice response format (agree/disagree) that increases clarity and decreases the risk of confusion. We excluded from data analyses participants who scored more than three standard deviations above or below the mean (12 or higher out of a maximum of 15 on the GDS and 15 or above out of 20 on the GAI).

Materials

Following previous research (Cheston et al., 2018), we asked all participants to recall 24 dementia-related statements, 12 of which had previously been rated as highly negative (i.e., as both highly diagnostic of dementia and with serious consequences for well-being) and 12 statements that had been previously rated as low on negativity. Examples of highly negative statements are: "*as the illness gets worse, so you will increasingly come to rely on others*" and "*the illness means that you may forget the names of friends or family*." Examples of low-negativity statements are: "*in the illness proteins can gradually build-up inside your brain*" and "*the illness means you will still able to learn to do new activities*." Additionally, these statements referred either to the participants (self-referent) or to a hypothetical person named Chris[4] (other-referent). We arranged the 24 statements in four blocks of six statements each, balancing the numbers of high- and low-negativity statements in each block and assessed recall after each block of six statements.

Randomisation

The third author carried out participant randomization in blocks of 10 using a random number generator, and with participants being assigned to one of two

[4] Given some evidence for gender-consistent recall (Frawley, 2008), we followed previous practice in the literature by selecting "Chris", a gender-neutral name.

conditions. We used a sealed envelope procedure to ensure that allocation to conditions was concealed from the researchers (first and second authors) until after participants had entered into the study. We did not disclose the hypothesis to participants, but simply informed them that the aim of the study was to explore how well information about dementia was retained.

Procedure

We allocated participants to one of two conditions. In each condition, we read aloud, at a constant pace and in identical order, 24 statements that differed only in wording (see Appendix 1). The order in which the statements were read was fixed and identical across conditions. Specifically, in the self-referent condition, we instructed participants to "*Imagine that these descriptions relate to you*," and worded the statements so that they applied to the participant (e.g., "*The impact of the illness depends on your emotional resilience*"). In the other-referent condition, we instructed participants to "*Imagine that the descriptions relate to a person named Chris*", and worded the statements so that they applied to another person (e.g., "*The impact of the illness depends on Chris' emotional resilience*"). In the rare event of participants being named Chris or having a close relative with this name, we used another gender-neutral name (i.e., Jo). Participants responded verbally, and with no temporal constraints.

Results

Data Analysis

We omitted data from an older participant, as errors in completing the Case Record Form prohibited us from being able to confirm that they had received proper instructions (i.e., instructions corresponding to the allocated other-referent condition). The age distribution was approximately bi-modal: of the 103 participants, 41 were

aged 25 or under, 44 were over the age of 50, and only 18 fell in the intermediate 25-50 age bracket. We therefore proceeded to divide the sample into two age groups: younger adults (aged under 50 years) and older adults (aged 50 years and over). In total, we analysed data for 44 older and 59 younger participants.

Sample Characteristics and Demographic Variables

We did not observe any condition (self vs. other) differences between older and younger adults on recruitment method, sex, age, anxiety (GAI), depression (GDS), and cognitive status (MoCA) (Table 1).

Recall

We coded the recalled statements on the basis of a predefined gist criterion, in which we counted statements as correctly recalled if the text conveyed their general meaning (Green et al., 2008; Sedikides & Green, 2000). For example, we counted the statement "*The illness can make X feel depressed*" as correct, if there was reference to being depressed or sad, grieving or upset. Two raters (the first and second authors) assisted by an intern, all blind to allocation, scored the statements. Any disagreements were resolved through discussion.

We entered the number of correctly recalled statements into a 2 (statement negativity: high, low) × 2 (referent: self, other) × 2 (age group: 50 and over, under 50) Analysis of Variance (ANOVA) with the first independent variable (statement negativity) being within-subjects, and the last two being between-subjects. The analysis yielded a Negativity × Referent interaction, $F(1, 99) = 5.55$, $p = 0.020$, $\eta^2 = 0.053$. Importantly, the interaction was qualified by the Negativity × Referent × Age interaction, $F(1, 99) = 5.77$, $p = 0.018$, $\eta^2 = 0.055$. The latter interaction remained significant after controlling for anxiety, $F(1, 98) = 5.68$, $p = 0.019$, $\eta^2 = 0.055$, and depression, $F(1, 98) = 5.96$, $p = 0.016$, $\eta^2 = 0.057$. To probe this three-way

interaction, we tested the Negativity × Referent interaction separately for each age group. We used pooled error terms and degrees of freedom for these follow-up analyses (Howell, 1987).

Older Participants. The MNE entails a Negativity × Referent interaction: recall is lower when the high-negativity (vs. low-negativity) statements refer to the self rather than other. Older adults evinced the MNE: the Negativity × Referent interaction was significant, $F(1, 99) = 9.87$, $p = 0.002$, $\eta^2 = 0.091$. We next probed the Negativity × Referent interaction with tests of simple effects. Older participants recalled high-negativity statements more poorly when the statements referred to them ($M = 5.14$, $SD = 1.61$) rather than to Chris ($M = 6.45$, $SD = 1.81$), $F(1, 99) = 5.530$, $p = 0.021$, $\eta^2 = 0.053$. However, older participants did not significantly differ in their recall of low-negativity statements referring either to them ($M = 6.09$, $SD = 2.31$) or to Chris ($M = 5.23$, $SD = 1.93$), $F(1, 99) = 1.94$, $p = 0.167$, $\eta^2 = 0.019$ (Table 2). This interaction remained significant ($p < 0.005$) when we added either anxiety or depression as co-variates.

[Insert Table 2 about here]

Younger Participants. Younger adults did not evince the MNE: the Negativity × Referent interaction was not significant, $F(1, 99) = 0.001$, $p = 0.974$, $\eta^2 = 0.001$.

Discussion

We tested whether older, but not younger, adults would show evidence of impaired recall of highly negative and self-referent dementia-related information, thereby demonstrating the MNE (Cheston et al., 2018; Sedikides et al., 2016). Results were consistent with this hypothesis. Older and younger participants evinced distinct patterns of recall: older participants manifested lower recall of high-negativity (vs. low-negativity) dementia-related statements when these referred to themselves rather

than to another person. Their recall of low-negativity statements did not differ across conditions.

These findings are consistent with the psychological literature on self-protective memory (Sedikides, 2012; Sedikides et al., 2016; Zengel et al., 2018) and suggest that older adults selectively forget highly negative information about dementia that is directed at them. Put otherwise, the mnemic neglect of highly negative, self-referent dementia-related information may serve a key self-protective function for older, but not younger, adults. Whereas research elsewhere has shown that self-referencing information aids recall (Gutchess et al., 2007; Hamami et al., 2011; Leshikar et al., 2015), in this study self-referencing statements failed to improve their memorability for older participants. At the same time, our findings of an age-related recall preference for low-negativity and relatively positive statements over more highly negative statements is consistent with an age-related positivity effect (Mather & Carstensen, 2005; Reed & Carstensen, 2012; Reed et al., 2014).

Although Socioemotional Selectivity Theory's (Carstensen, 2006) account for the positivity effect is mostly motivational, cognitive factors are also relevant. For example, older adults who are more cognitively healthy are more likely to exhibit the positivity effect. In the current study, we were unable to test directly whether cognitive factors played a role in the MNE, as participants did not vary enough on cognitive capacity. However, using the same dementia related materials, Cheston et al. (2020) showed that participants with mild to moderate levels of cognitive impairment, due to dementia, display the MNE. It is possible that the memorial neglect of highly negative self-referent information does not require a high level of cognitive abilities.

Whereas research on dementia as a threat has been relatively scarce, the construct of dementia worry (i.e., a person's fear that they may develop dementia themselves) has been discussed in the older adult stereotype-threat literature (Kessler et al., 2012, 2014; Martin et al., 2020). There is evidence that levels of dementia threat and fears about developing dementia oneself are separate but overlapping constructs. Thus, the positive relationship between dementia threat and dementia worry may be primarily driven by a significant positive correlation between levels of threat and the extent to which the person catastrophizes about the risk of having dementia themselves (Cheston et al., 2020). Contrastingly, other aspects of dementia worry, such as a person's general fears about dementia or the extent to which thinking about dementia cause them to feel anxious, are associated with the person's overall levels of anxiety rather than the extent to which the self is threatened by dementia (Cheston et al., 2020).

Research into dementia threat is also consistent with the possibility that, for older (but not younger) adults, dementia not only constitutes a threat, but also that this threat can interfere with cognitive processing. A relevant study (Mazerolle et al., 2016) manipulated the conditions under which older adults completed cognitive screening assessments: participants were allocated either to a reduced-threat condition (in which they learned that the assessments were age-fair and there were no differences between older and younger adults' performance) or a threat condition (in which they received no instructions). Participants in the threat condition performed at a lower level, with 40% scoring below the cut-off threshold for Mild Cognitive Impairment. However, only 10% of participants in the reduced threat condition scored below this cut-off threshold (see also: Desrichard & Köpetz, 2005; Kang & Chasteen, 2009). The relative performance deficit was due to threat arising from the activation

of negative stereotypes of ageing, such as beliefs that ageing inevitably causes severe cognitive decline and Alzheimer's disease (Lamont et al., 2015; O'Brien & Hummert, 2006; Weiss & Lang, 2012).

Nevertheless, there are differences between our study and studies on the effects of ageing stereotypes on memory performance. Within the latter paradigm, the threat to the self arises from the context in which individuals are tested, and is assessed through performance on cognitive tasks or assessments. The performance deficit is believed to arise from an increase in anxiety in response to the threat. In our study, the threat to the self is thought to emerge from the statements that participants are asked to recall, and is assessed through the selective forgetting of that material. Importantly, the performance deficit is purported to arise as a defence against anxiety. Despite such differences, however, both literatures refer to recall discrepancies occasioned by a threat to self.

Limitations

Our study adds to the literature on psychological defences against the threat of dementia (Martens et al., 2005; McKenzie & Brown, 2017; Nelson, 2011). However, although we propose that the function of older adults' selective forgetting of threatening self-referent dementia information is to protect the self, and thus to buffer against anxiety, further work is required. For instance, research could examine changes in levels of threat (Cheston et al., 2020) and anxiety by assessing these variables before and after the experimental procedure in order to test more rigorously the self-protective function of the MNE. Additionally, whereas our study focused on age differences in the use of MNE, other dementia-related experiences, such as caring/having cared for a person with dementia or familial prevalence of dementia, might influence self-protection.

Lastly, we acknowledge that the binary division of participants into older (those over the age of 50) and younger (those below 50) does not constitute the conventional young adult versus older adult comparisons in the gerontological literature. Despite controversy over what constitutes older adulthood, the age of 50 and above generally falls short of this (Christopher, 2013). Here, we only used 'older' as a comparator. Having said this, the respective mean ages for the younger and older groups were 26 and 64 for the self condition, and 25 and 62 for the other condition.

Conclusion

Our research points towards differences in how older and younger people remember dementia-related information that is self-threatening (i.e., highly negative and self-referent). These findings contribute to the understanding of psychological mechanisms that underlie the processing of information about dementia. We hope that our findings spark further investigations into this topic.

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