

Forum

Future-Oriented Thought Patterns Associated With Anxiety and Depression in Later Life: The Intriguing Prospects of Prospec tion

Beyon Miloyan, PhD,^{*1} Nancy A. Pachana, PhD,² and Thomas Suddendorf²

¹Department of Mental Health, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland. ²School of Psychology, The University of Queensland, Brisbane, Australia.

*Address correspondence to Beyon Miloyan, PhD, Center on Aging and Health, 2024 E. Monument Street, Suite 2-700, Baltimore, MD 21205-2223.
E-mail: beyon@jhu.edu

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Abstract

Anxiety and mood disorders in later life are the focus of an increasing amount of intervention research, however basic mechanisms and paradigms explaining etiology and maintenance warrant further exploration. Research on future-oriented thought patterns associated with anxiety and depression in this age group may prove useful, as these disorders are both characterized by a tendency to generate and fixate on threat-related future scenarios that may or may not materialize. Additionally, depression is associated with a reduced expectancy of positive future events. In this paper, we review the literature relevant to future thinking in anxiety and depression in older adults. We focus on the mental construction and anticipation of negative future events, and their underlying neurocognitive mechanisms. We then consider clinical and research implications of anxious and depressive future-oriented thought patterns for older adults. We believe that more research investigating future-oriented thought patterns associated with emotional disorders in later life could improve conceptualization, measurement, and perhaps potential treatments for late-life anxiety and depression.

Key words: Late life, Anxiety, Depression, Older adults, Episodic foresight, Cognitive, Prospec tion

Anxiety and mood disorders are among the most prevalent mental health conditions in older adults (Reynolds, Pietrzak, El-Gabalawy, Mackenzie, & Sareen, 2015). These disorders are associated with considerable service use and economic burden (de Beurs *et al.*, 1999; Smit *et al.*, 2006; Vasiliadis *et al.*, 2013). Despite their high prevalence and impact, research on fundamental mechanisms underlying late-life emotional disorders has lagged behind research on other mental health conditions of comparable public health significance (e.g., Alzheimer's disease; see Mayeux & Stern, 2012), even while intervention studies are on the rise (Cuijpers, van Straten, & Smit, 2006; Wolitzky-Taylor, Castriotta, Lenze, Stanley, & Craske, 2010). Indeed, recent treatment studies for late-life anxiety, while reporting some

positive outcomes, also cite disappointing treatment effects (Gonçalves & Byrne, 2012; Thorp *et al.*, 2009).

Aided by the increasing availability of epidemiological data, the number of studies focused on late-life emotional disorders is steadily increasing. Previous studies indicate that late-life anxiety and depression are associated with cognitive impairment, and that treatment of emotional symptoms is associated with improved cognitive function (Beaudreau & O'Hara, 2008; Butters *et al.*, 2011; Green, Fairchild, Kinoshita, Noda, & Yesavage, 2015; Mantella *et al.*, 2007; Zahodne, Devanand, & Stern, 2013). Nonetheless, our understanding of cognitive function in the context of late-life anxiety and depression remains limited, and gaining such knowledge may have important implications for understanding etiological

and maintaining factors (Bryant *et al.*, 2013; Butters *et al.*, 2008; Mohlman, 2013). Here, we suggest that altered future-oriented cognition represents a key feature of late-life emotional disorders that warrants further research. We review studies relevant to future-oriented thinking in anxiety and depression, and in older adults, and suggest how an improved understanding of future-oriented thought patterns in the context of late-life anxiety and depression may lead to improvements in conceptualizing and measuring these disorders.

Future-Oriented Thought Patterns

Episodic foresight refers to the mental construction of potential future events and the ability to flexibly organize current action in light of such anticipations (Suddendorf, 2010; Suddendorf & Moore, 2011). It is the future-oriented part of the purported uniquely human capacity to travel mentally in time (Suddendorf & Corballis, 1997, 2007). Episodic foresight enables us to prudently prepare for threats, opportunities, and eventualities and to plan and control important aspects of the future. However, a price paid for this powerful capacity is that it may lead to excessive rumination about potential future events that cause anxiety and depression (Miloyan, Bulley, & Suddendorf, 2015; Roepke & Seligman, 2015). Since the proposal of Beck's cognitive content specificity hypothesis nearly 40 years ago (Beck, 1976), in which anxiety was conceptualized as being focused on future harms and depression on loss and hopelessness about the resolution of problems, future-oriented thinking has been considered a central feature of anxiety and depression. Empirical studies in younger adults have consistently demonstrated that anxiety and depression are associated with distinct affective and future-oriented thought patterns (MacLeod, Byrne, & Valentine, 1996). Although anxious and depressed individuals mentally construct and anticipate a greater number of personally relevant threat-related events, and more frequently expect negative outcomes to occur, depressed individuals distinctly generate and anticipate fewer positive events (MacLeod & Byrne, 1996; Miranda & Mennin, 2007). These findings interface with two factors of the tripartite model, which suggests that negative affect (NA) is shared by both disorders, reduced positive affect (PA) is distinctly associated with depression, and increased hyperarousal distinctly with anxiety (Clark & Watson, 1991). Specifically, the frequency of negative future-oriented thoughts is associated with NA, whereas the frequency of positive future thinking is inversely associated with PA (Beck *et al.*, 2001; MacLeod *et al.*, 1996; Sherratt & MacLeod, 2013). Thus, depression and anxiety can be distinguished with respect to affective and future-oriented cognitive profiles.

The Mental Construction of Negative Future Events

Episodic memory and foresight are closely linked at cognitive and neural levels: contents of memory represent the ingredients with which individuals construct future scenarios, hippocampal

amnesia is associated with impairments in mental time travel, that is impairments in both episodic memory and episodic foresight, and similar activation patterns as measured by functional neuroimaging are observed for the (re)construction of past and future events (Addis & Schacter, 2011; Andelman, Hoofien, Goldberg, Aizenstein, & Neufeld, 2010; Hassabis, Kumaran, Vann, & Maguire, 2007; Kurczek *et al.*, 2015; Kwan, Carson, Addis, & Rosenbaum, 2010; Schacter, Addis, & Buckner, 2007; Suddendorf & Corballis, 1997, 2007). Increasing age is associated with reductions in hippocampal volume, particularly among individuals with cognitive impairment (Jack *et al.*, 1998). Furthermore, stress and depression are associated with lower hippocampal volume and poorer memory (Sapolsky, 2000; Videbeck & Ravnkilde, 2004), particularly among older persons (Brown, Hughes *et al.*, 2014). In anxiety, there are strong links between episodic memory and foresight, such that individuals retrieve relatively few concrete details, and tend to remember and imagine threat-related events in a generalized way (Brown *et al.*, 2013, Brown, Addis *et al.*, 2014; MacLeod, Tata, Kentish, & Jacobsen, 1997). Given that episodic foresight represents one of the central cognitive features of emotional disorders, it is surprising that there has been so little research focused on the intersection of age-related neural changes, symptoms of anxiety and depression, and future thinking.

The tendency to construct negative future scenarios in anxiety and depression may largely be based on retrieval biases that are attributable to affective state (Miloyan, Pachana, & Suddendorf, 2014). Affective state can bias the acquisition, storage, and retrieval of information into and from memory (Buchanan, 2007; Holland & Kensinger, 2010; Mather & Sutherland, 2011; Teasdale & Fogarty, 1979), which frequently results in the construction of emotionally significant future-oriented thoughts (Barsics, Van der Linden, & D'Argembeau, 2015; D'Argembeau, Renaud, & Van der Linden, 2011; Gilbert & Wilson, 2007; Miloyan & Suddendorf, 2015). The persistent imagination of negative future events may also be attributable to affectively induced attentional biases that (a) drive vigilance toward threat-related or negative cues (Bishop, 2007; Mogg, Bradley, & Williams, 1995), (b) trigger repetitive thinking about negative future scenarios (Mogg *et al.*, 1995; Watkins, 2008), and thereby (c) lead to heightened expectations for their occurrence (Szpunar & Schacter, 2013). There do not appear to be substantial age-related differences in the manifestation of affectively induced attentional biases (Fox & Knight, 2005; Poon & Knight, 2009, but see Mohlman, Price, & Vietri, 2013), suggesting that anxiety and depression may similarly influence these attentional processes, irrespective of age. However, whether and to what extent anxious and depressed older adults may exhibit attentional biases toward threat-related and negative future thoughts has as yet not been investigated.

The Anticipation of Negative Future Events

In contrast to the construction of negative future events, which rely critically on novel combinations of retrieved knowledge, the tendency to anticipate the occurrence of negative events does not necessarily depend on the mental

construction of future scenarios (Miloyan *et al.*, 2014). Neurological patient studies have revealed that damage to the ventromedial prefrontal cortex (vmPFC) results in a lack of anxiety toward potential or impending threats (Bechara, Damasio, Tranel, & Damasio, 1997; Motzkin, Philippi, Wolf, Baskaya, & Koenigs, 2014). Relatedly, the vmPFC has been found to play an important role in facilitating the emotional experience of future event simulations (Benoit, Szpunar, & Schacter, 2014; D'Argembeau, Xue, Lu, Van der Linden, & Bechara, 2008). Age-related neurological changes in vmPFC may explain why some otherwise high functioning older adults tend to make poor financial decisions, due to a lack of emotional signals that indicate potential threats based on relevant cues (Denburg, Recknor, Bechara, & Tranel, 2006; Denburg *et al.*, 2007; Raz *et al.*, 1997, 2005; Weller, Levin, & Denburg, 2011).

In contrast to individuals with vmPFC atrophy, clinical anxiety is associated with increased frequency of, and neural and physiological responses towards, the anticipation of negative future events (Miranda & Mennin, 2007; Nitschke *et al.*, 2009), which may lead to risk avoidant decision-making patterns (Mueller, Nguyen, Ray, & Borkovec, 2010). Clinical depression is also associated with increased anticipation of negative life events, and fewer positive events (Korn, Sharot, Walter, Heekeren, & Dolan, 2014; Miranda & Mennin, 2007). Studies investigating the relationship between anxiety, depression, the anticipation of future events, and age-related neurological changes may shed light on the etiology and maintenance of these disorders.

Research Implications of Future-Oriented Thought Patterns Associated With Anxiety and Depression in Later Life

We do not know of any studies to date that have investigated patterns of episodic foresight in anxious or depressed older adults. We hypothesize that anxious older adults tend to generate emotionally charged and overgeneralized threat-related future events, consistent with previous findings in anxious younger adults and asymptomatic older adults (Brown *et al.*, 2013; Brown, Addis *et al.*, 2014; Kleim, Graham, Fihosy, Stott, & Ehlers, 2014; Schacter, Gaesser, & Addis, 2013). More work is needed to verify and extend these findings. We suggest several potential fruitful avenues of future research on late-life anxiety and depression, using future orientation models of cognition:

1. Anxious and depressive future-oriented thought patterns are based largely on retrieval biases (Miloyan *et al.*, 2014). In the context of older adulthood, impairments in remembering the past and imagining the future start to occur more frequently (Schacter *et al.*, 2013). Such deficits also contribute to poor decision-making and problem-solving capacities (Gupta *et al.*, 2009; Lyons, Henry, Rendell, Corballis, & Suddendorf, 2014). *However, the direct influence of future event simulation on decision making and problem solving in late-life anxiety and depression remains unexplored.*
2. The generalized nature of older adults' future simulations, usually characterized by sparse episodic details, may lead to difficulties in expressing worries and key symptoms when queried about anxiety, irrespective of subjective anxious feelings. In fact, older adults report worrying less frequently and concretely relative to younger adults, and older adults with Generalized Anxiety Disorder (GAD) report fewer worries than younger adults with GAD despite similar degrees of impairment (Basevitz, Pushkar, Chaikelson, Conway, & Dalton, 2008; Gonçalves & Byrne, 2012; Gould & Edelstein, 2010). Thus, when assessing anxiety, contrary to recent suggestions (e.g., Bryant *et al.*, 2013), it may not be useful to query older adults about whether their own worries are more excessive than those of others. Older adults worry less than younger adults—however, relatively few worries may still bear a considerable impact on feelings. *Instead of exploring the excessiveness or avoidance associated with worry, it may be more effective to explore the affective and functional impact that worries about the future have on the individual.*
3. Anxiety and depression frequently co-occur in later life, which poses a challenge to detection and subsequent treatment (Wolitzky-Taylor *et al.*, 2010). Patterns of future-oriented cognition distinguish anxious from depressed younger adults (Miloyan *et al.*, 2014), and among younger and older adults alike, parasuicide is associated with reduced expectancy and generativity of positive events (Conaghan & Davidson, 2002; MacLeod, Pankhania *et al.*, 1997). *Assessment of episodic foresight may aid with measurement of late-life emotional disorders and help distinguish anxiety from depression.*
4. In addition to retrieval biases, heightened anticipation—in terms of frequency, and neural and physiological responses—of threat-related future events can also be invoked to explain the observed future-oriented thought patterns in anxiety and depression. Importantly, attentional capture for threat-related information in anxiety may be due to changes in the attribution and weighting of risk or uncertainty estimates (Grupe & Nitschke, 2013; Miloyan *et al.*, 2014). This may help explain current mixed results regarding the efficacy of attentional modification programs for treating anxiety (e.g., Boettcher, Berger, & Renneberg, 2012; Boettcher, Hasselrot, Sund, Andersson, & Carlbring, 2014; Heeren, Mogoşe, Philippot, & McNally, 2015). Despite suggestions to implement attentional training paradigms in older adults (Mohlman *et al.*, 2013; Price, Siegle, & Mohlman, 2012), such programs may only have limited efficacy. This is because risk and uncertainty estimates influencing expectations of threat can influence attention to and processing of stimuli via mPFC influence on visual cortex (Anderson, Laurent, & Yantis, 2011; Kastner & Pinsk, 2004; Peelen & Kastner,

2011; Wang, Yu, & Zhou, 2013). Therefore, attentional retraining programs might be more efficacious if combined with cognitive training programs aimed at altering risk attribution.

Conclusion

There remain significant gaps in our understanding of neurocognitive and behavioral correlates of late-life anxiety and mood disorders, which pose challenges for detection and treatment (Hall & Reynolds-Iii, 2014; Lenze & Wetherell, 2009). Here, we have explained some characteristic features of anxiety and depression relevant to later life that have heretofore been missing from discussions of these disorders, and we have considered some directions for future research investigations of these disorders. Future studies investigating future-oriented cognition in the context of emotional symptoms, and their expression across the lifespan, can play an important role in improving understanding of anxiety and depression in later life.

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