



Research report

Relationship between measurement invariance and age-related differences in the prevalence of generalized anxiety disorder

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ABSTRACT

Background: Generalized anxiety disorder (GAD) peaks in prevalence in middle age and declines in prevalence into old age. Some commentators have suggested that this is not a meaningful epidemiological trend rather a methodological artifact. This study tested this hypothesis by matching respondents of different ages based on their severity and examining whether age influences the probability of endorsing GAD criteria and the prevalence of GAD.

Methods: Self-reported worriers from a nationally representative survey of non-institutionalized adults were selected for investigation ($n=1738$). All respondents were interviewed using the World Mental Health version of the Composite International Diagnostic Interview. Age-related differences in the prevalence and invariance of the GAD criteria were examined between 16 and 29 years, 30 and 44 years, 45 and 59 years and 60 years+ age groups. Effect sizes were used to assess the impact of statistically significant criterion level non-invariance on the prevalence of GAD.

Results: Respondents aged 60 years or more were less likely than younger adults to endorse most of the GAD criteria. Significant non-invariance was identified in each of the age group analyses. Nonetheless these differences had no impact on the prevalence of GAD in three group comparisons. In the other three group comparisons, the impact was minimal ($d \leq 0.3$).

Limitations: Our results support age-related differences in the prevalence of GAD but we are limited to the extent to which we can say why these differences occur.

Conclusions: Age-related prevalence differences in GAD are meaningful epidemiological trends.

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1. Introduction

Generalized anxiety disorder (GAD) is characterized by chronic, excessive and difficult to control apprehensive anxiety and worry that is associated with somatic symptoms (American Psychiatric Association, 2013; Andrews et al., 2010; Barlow et al., 1986; Brown et al., 1994). GAD can begin early in life (Merikangas et al., 2010) but peaks in prevalence during middle age and declines in prevalence thereafter (Grant et al., 2005; Hunt et al., 2002; Kessler et al., 2005). Although a sizeable number of older adults experience affective and anxiety disorders (Kessler et al., 2005), GAD is not the only mental disorder that decreases in prevalence after middle age. Analyses of large epidemiological surveys from the US (Kessler et al., 2005, 2010a), Europe (Kessler et al., 2007, 2010b) and Australasia (Trollor et al., 2007a, 2007b; Wells et al., 2006) all suggest that there is a decreased likelihood of experiencing affective and anxiety disorders

in old age compared to in early and middle adulthood. The reasons for the decreased prevalence of affective and anxiety disorders in old age are not entirely clear. Longitudinal surveys do however suggest that older cohorts are less likely than younger cohorts to experience affective and anxiety disorders irrespective of stage of life and that changes in biological, psychological and social factors across the lifespan reduce the likelihood that affective and anxiety disorders are experienced in old age in all cohorts (Brault and Meuleman, 2012; Yang, 2007).

Despite the large scale cross-sectional and longitudinal data that suggest that there is a decreased likelihood of experiencing affective and anxiety disorders in old age, there continues to be discussion around whether the age-related differences in disorder prevalence are methodological artifacts. For instance, O'Connor (2006) posited that the exclusion of elderly respondents who are living in residential facilities from national surveys and the structure of the Composite International Diagnostic Interview, which is the preferred diagnostic instrument for national surveys of mental disorders in the community could have produced lower prevalence estimates of affective and anxiety disorders in old age.

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Proponents of this interpretation of the decreased prevalence of mental disorders in old age suggest that elderly respondents who are or who have experienced the same degree of psychopathology as younger respondents are less likely to endorse diagnostic criteria because of survey designs. This hypothesis can be tested explicitly by examining the measurement invariance of mental disorders across age groups. If disorders are found to be invariant across age groups there is cause to conclude that the identified age-related prevalence differences reflect true group differences. However, if measurement invariance is not present, prevalence estimates have been biased by measurement non-invariance (Meredith, 1993; Meredith and Teresi, 2006).

Despite the utility of latent variable modeling to refine clinical phenotypes (Goodyer, 2012), little research has examined the invariance of GAD across age groups. In the only other study on this topic, Kubarych et al. (2008) sampled female respondents of the US National Comorbidity Survey and the Virginia Adult Twin Study of Psychiatric and Substance Use Disorders and found that fatigue was more able to distinguish between respondents with similar diagnostic severity with increasing age whereas irritability was less able to distinguish between people with similar diagnostic severity with increasing age (Kubarych et al., 2008). Kubarych et al. (2008) also examined the effect of measurement non-invariance on meeting criterion C of the DSM-IV classification. It was shown that approximately 5% of respondents are misclassified as a result of measurement non-invariance. No study has investigated the invariance of the cognitive symptoms of GAD across the lifespan or whether the statistically significant sources of bias associated with the cognitive and somatic criteria influence the diagnostic prevalence of GAD.

This study used latent variable models to examine the invariance of GAD between early, middle and late adulthood and old age. It was hypothesized that because of the sensitivity of latent variable models to statistical differences (Meade, 2010) and the findings of DIF by Kubarych et al. (2008), some of the GAD criteria would exhibit non-invariance, which is also referred to as differential item functioning (DIF). The DIF (if any) that is associated with the GAD criteria may or may not influence the prevalence of GAD across age groups. Based on other studies that have found that significant criterion level DIF can have little impact on the prevalence of disorders (Mewton et al., 2011), our second hypothesis was that any statistically significant DIF would have small or no influence on the prevalence of GAD. If the second hypothesis was supported, the age-related differences in the prevalence of GAD can be interpreted as meaningful differences in the prevalence of GAD across the lifespan.

2. Methods

2.1. Sample

This study is based on secondary analyses of the 2007 National Survey of Mental Health and Well Being (2007 NSMHWB), which is a nationally representative survey of the occurrence and correlates of mental disorders and chronic disease in the Australian community (Slade et al., 2009). The Australian Bureau of Statistics, the federal statutory authority that conducted the survey, identified private households using a stratified, multistage area probability design. Among the 8841 fully responding households (60% response rate), one household member provided details about the household and then a household member aged between 16 and 85 years was randomly selected to complete the survey interview (Slade et al., 2009). All respondents gave their informed consent to participate in the survey and received no compensation.

Table 1

Sociodemographic characteristics of the sample of self-reported worriers from the 2007 National Survey of Mental Health and Well Being ($n = 1738$).

	<i>n</i>	wtd%(SE)	OR(95%CI)
Sex			
Female	1104	59.6(1.8)	1.6(1.3–1.9)
Male	634	40.5(1.8)	1.0
$\chi^2(1) = 24.4, p < 0.01$			
Education			
Postgraduate	123	5.0(0.6)	0.9(0.6–1.2)
Bachelors	278	14.9(1.2)	1.1(0.8–1.3)
Certificate or diploma	582	34.5(1.6)	1.0(0.9–1.2)
No post school education	755	45.6(1.8)	1.0
$\chi^2(3) = 1.8, p = 0.6$			
Employment status			
Employed	1087	64.2(1.6)	0.9(0.8–1.1)
Unemployed	53	2.5(0.5)	0.9(0.5–1.6)
Not in labor force	598	33.4(1.5)	1.0
$\chi^2(2) = 0.64, p = 0.7$			
Marital status			
Never married	592	34.5(0.6)	1.3(1.1–1.6)
Widowed	116	4.3(0.6)	1.2(0.8–1.6)
Divorced	272	11.7(1.2)	2.2(1.7–2.8)
Separated	110	4.2(0.5)	2.4(1.6–3.5)
Married	648	45.3(2.0)	1.0
$\chi^2(4) = 42.5, p < 0.01$			

Self-reported worriers (described below) from the survey were selected for this study ($n = 1738$). The sociodemographic characteristics of these worriers are presented in Table 1. Worriers were mostly female and were more likely to have never been married or to be separated or divorced rather than be currently married. Worriers did not differ with respect to their post high school level of education or their employment status compared to respondents who do not consider themselves to be worriers.

2.2. Age groups

The invariance of GAD was examined between four age groups. These age groups were: (i) 16–29 years ($n = 349$); (ii) 30–44 years ($n = 542$); (iii) 45–59 years ($n = 455$); and (iv) 60 years or older ($n = 392$). These age groups approximate early, middle and late adulthood and old age (Peterson, 2004). Although the specific age brackets arbitrarily define the phases of the adult lifespan, these age brackets correspond to those used in the studies that have identified the age-related differences in GAD prevalence (Kessler et al., 2005). These analyses therefore test whether the reported age-related differences in prevalence reflect meaningful group differences or have been influenced by measurement non-invariance.

2.3. Diagnostic instrument

All respondents of the 2007 NSMHWB completed the World Mental Health version of the Composite International Diagnostic Interview (WMH-CIDI) in English (Kessler and Üstun, 2004). This interview was administered by lay trained interviewers employed by the Australian Bureau of Statistics using a computerized assisted survey instrument. The WMH-CIDI uses a stem-probe interview format to reduce respondent burden and survey costs. All respondents of the 2007 NSMHWB were asked “Did you ever have a time in your life when you were a “worrier” – that is, when you worried a lot more about things than other people with the same problems as you? Did you ever have a time in your life when you were much more nervous or anxious than most other people with the same problems as you?” Respondents who endorsed at

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