# Resilience, depression and anxiety and hazardous alcohol use behaviour among community dwelling older adults

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### ABSTRACT (300 words)

Objectives: In the present study, the goal is twofold. First, we examine the psychometric properties of the CD-RISC, including factor structure, in a large community dwelling older population. Secondly, we examine if resilience factors moderates the association between negative affect (depression and anxiety) and hazardous alcohol use.

Design: This is a retrospective cross-sectional study.

Setting: The population was recruited by a snowball sampling. Appointments for data gathering were made at their own residence. At that time, a trained research assistant explained the purpose and procedure of the study for a second time. Most older adults were able to complete the questionnaire by themselves, yet the research assistant was at all time available for help and assistance.

Participants: The sample population, enrolled from October 2013 to April 2016, consisted of 1,368 older adults living in the Flemish part of Belgium (Flanders).

Measurement: We used standardized questionnaires to collect self-reported data on alcohol use behaviour, depression and anxiety and resilience by using respectively the Alcohol Use Identification Test (AUDIT), the Brief Symptom Inventory (BSI) and the Connor-Davidson Resilience Scale (CD-RISC).

Results: Of the total sample (N 1.368), 80.1% reported using alcohol. The total sample and the drinking reported respectively a mean 65.75 (SD 15.40) and 65.79 (SD 15.90) on the CD-RISC. Exploratory factor analysis presents four factors, three with a good reliability. Moderation analyses reflects that older adults with higher levels of resilient characteristics didn't report an association between negative affect and hazardous drinking. Alternatively, low resilient older adults did report an positive and significant association between negative affect and hazardous drinking.

Conclusion: The Exploratory Factor Analysis presented three reliable factors. Resilience characteristics moderate the association between negative affect and hazardous drinking among older adults.

### Keywords

Older adults, hazardous drinking, depression, anxiety, resilience

### INTRODUCTION (5.000 words)

### Resilience

As life expectancy increases, health systems and communities are challenged to find sustainable and effective ways to promote successful ageing (Clarke, Burbank, Greene, Owens, & Riebe, 2011). As people age they often encounter challenges such as the development of chronic illness and emotional stress resulting from experiences of loss. Older adults with higher levels of resilience are able to adjust to those life adversities with less disruption to their lives (Jeste et al., 2013). Some view resilience as a personality trait that could potentially buffer the adverse effects of stressful life events (Connor & Davidson, 2003), others describe resilience as a process of adapting well in face of adversities, as 'bouncing back from difficult experiences (APA, 2020). Furthermore, resilience among older adults may be seen as the tendency to consider their life and health to be satisfactory, despite age-related illnesses and disabilities (Lamond et al., 2008). Despite the lack of consensus on the construct definition of resilience, resilience has been identified by some as an important psychosocial factor contributing to successful aging (Jeste et al., 2013; Montross et al., 2006). High levels of resilience in older adults are associated with better physical, psychological and social functioning. According to (Resnick & Inguito, 2011) being more physically active may have particularly strong associations with high resilience. On psychological level, higher resilience predicted greater happiness, lower depression and higher psychological well-being (Gooding, Hurst, Johnson, & Tarrier, 2012; Smith & Hollinger-Smith, 2015). Furthermore, on the social level, older adults with high resilience reported being more socially active and were more involved in community participations (Gooding et al., 2012; Lamond et al., 2008).

### Resilience and alcohol

Alcohol use among older adults is quiet common. (Foster & Patel, 2019) study reported a prevalence of 78% of drinkers in a community dwelling population aged 65+ in England and (Carvalho et al., 2018) presented a prevalence of 70% of drinkers and 27.3% of heavy drinkers (>4 units/day of >10 units/week) in a community dwelling sample of Irish 60+.

Several studies suggested a relationship between resilience and alcohol use in (younger) adults. (Wingo, Ressler, & Bradley, 2014) reported a negative association between resilience and alcohol related problems and even dependency. Individuals with low levels of resilience tend to use ineffective coping skills, such as alcohol, to manage stress and negative affect (Graber, Pichon, & Carabine, 2015). Alternatively, higher level resilience was linked to reduced risk of alcohol use (Wang & Chen, 2015). A prospective study suggested that the ability to adapt flexibly to environmental demands is one of the characteristics of resilience that can reduce the risk of alcohol use (Wong et al., 2006). In other words, resilience may be seen as a protective factor that seems to mediate between stressful life events and consequent behavioural responses (Clarke et al., 2011) like alcohol use and heavy drinking (Wingo et al., 2014).

### This study

### Problem with concept of resilience

One obstacle to an adequate model of resilience is the lack of well-validated measures of this construct. One of the exceptions is the Connor-Davidson Resilience Scale (CD-RISC; (Connor & Davidson, 2003). The CD-RISC is a self-reported scale intended to measure resilience. Preliminary analyses of the CD-RISC in general population, primary care and psychiatric outpatient support its internal consistency and test-retest reliability (Connor & Davidson, 2003). However, most psychometric studies focused on younger populations. Only a few studies assessed the psychometric properties of CD-RISC in older adults. (Lamond et al., 2008) examined the psychometric properties of the CD-RISC and it's factor structure in a large sample of women over age 60, living in community. They proposed a structure of four factors that somewhat differ from the one proposed by (Connor & Davidson, 2003). (Goins, Gregg, & Fiske, 2013) study aimed to assess the psychometric properties of CD-RISC in a sample of community dwelling older American Indians but couldn't confirm a meaningful factor structure. We need to take into account that resilience in older adults may reflects a somewhat different process (Lamond et al., 2008) which may lead to a different factor structure for this population. Therefore a more thorough analysis of its psychometric properties in an older population is warranted, especially given the fact that the CD-RISC is a promising measure of resilience.

### Problems in alcohol use among older adults

The percentage of the European population over age 65 has risen progressively over the past years. As a greater proportion of the post-war baby-boom generation reaches retirement, this percentage will increase significantly over the upcoming decades. The EU-population is projected to increase to a peak of 525 million older adults around 2050 (https://ec.europa.eu/eurostat/statisticsexplained/index.php/Population\_structure\_and\_ageing). Alcohol use and high risk drinking among older adults is increasing (Grant et al., 2017). The adverse consequences of alcohol use in older adults are widespread. Higher levels of alcohol use increases the odds for diseases, injuries and even death (Rehm et al., 2017), limitations in instrumental activities of daily living (León-Muñoz, Guallar-Castillón, García-Esquinas, Galán, & Rodríguez-Artalejo, 2017) and development of affective and anxiety symptoms (Carvalho et al., 2018; Muñoz et al., 2018). Several studies in (younger) adults reported resilience as a characteristic that might decrease the risk of risky and heavy alcohol use. Literature on resilience and alcohol use among community-dwelling older adults is scare.

### Aim & research questions

In the present study, the goal is twofold. First, we examine the psychometric properties of the CD-RISC, including factor structure, in a large community dwelling older population. The consistency of the factor structure of the CD-RISC derived from our sample will be compared to (Connor & Davidson, 2003) study conducted among younger adults and to (Lamond et al., 2008) study conducted among older women. Secondly, we examine if resilience factors moderates the association between negative affect (depression and anxiety) and hazardous alcohol use. We hypothesized that resilience factors will moderated the association between negative affect and hazardous drinking. We will expect that among older adults with lower levels of resilience in conjunction with higher levels of negative affect, will report higher levels of hazardous drinking, in comparison to older adults with higher levels of resilience.

# METHODE

This is a retrospective cross-sectional study exploring resilience, depression and anxiety and hazardous alcohol use in community-dwelling older adults by using an extensive quantitative survey.

### Sample

Adults aged 65 or older and living at home were invited to participated. Older adults reporting memory problems, having a neurodegenerative disease or sensory deficits were excluded. As the questionnaire was in Dutch, older adults needed to have a good comprehension of the Dutch language. If they reported difficulties understanding the questions due to language problems, they were also excluded.

The sample population, enrolled from October 2013 to April 2016, consisted of 1,368 older adults living in the Flemish part of Belgium (Flanders). This study is part of a larger research project on the drinking patterns of older adults in Belgium.

### Procedure

The population was recruited by a snowball sampling. During gatherings in community centres and local activity groups the purpose and procedure of the study were explained. Subjects were able to sign up and those who did were asked to make an appointment. The appointments were made at their own residence. At that time, a trained research assistant explained the purpose and procedure

of the study for a second time. Most older adults were able to complete the questionnaire by themselves, yet the research assistant was at all time available for help and assistance. When both spouses were questioned, they were placed in different rooms of the residence to reduce potential influences. After the assessment, participants were asked if they had acquaintances that would volunteer to fill in the questionnaire. When contacting these acquaintances, only a small number of eligible participants refused to participate, mostly due to the length of the questionnaire.

### Statement of Ethics

The research protocol was approved by the Ethical Committee of Middelheim Hospital in Antwerp. Anonymity and confidentiality were emphasized by the interviewer. A written informed consent was obtained before starting the survey: no names were registered and all the obtained data were processed by the research team.

### Measurements

Socio-demographics: The following variables were included: age, gender, educational level (lower then primary school, lower secondary, high secondary, higher education bachelor degree or higher) and living arrangement (widowhood, living alone, living together). The population was categorized into three age groups: the 'younger older adults' from 65 to 74 years of age, the 'older adults' from 75 to 84 years of age and the 'older older adults'  $\geq$  85 years of age.

Negative affect: Participants completed the Brief Symptom Inventory (BSI) as a self-report measurement for mental health (Derogatis & Melisaratos, 1983). The instrument includes 53 items and assesses nine symptom dimensions across three global indexes. Each item of the BSI is rated on a 5-point scale of distress, ranging from 'not-at-all' to 'extremely'. The rankings characterize the intensity of distress during the past seven days. From the nine symptoms dimensions, we use Depression and Anxiety to define our negative affect factors. Depression reflects a broad range of symptoms of clinical depressive syndromes. Symptoms of dysphoric affect and mood, withdrawal of interest of life activities, loss of vital energy, feelings of hopelessness and futility are reflected in this dimension. The Anxiety dimension subsumes a set of symptoms usually associated with clinically high levels of anxiety. Restlessness, nervousness, tension, experiences reflecting free-floating anxiety and panic are all indicatives of anxiety (Derogatis & Melisaratos, 1983). Cronbach's alpha for the dimension Depression and Anxiety in our sample was respectively .81 and .75. Using the guideline of ≥.70 makes this value acceptable for internal consistency (Bland & Altman, 1997).

Resilience: The Connor-Davidson Resilience scale (CD-RISC) (Connor & Davidson, 2003) is a measure of stress-coping ability including 25 items each rated on a five-point scale (0 = not true at all, 1 =

rarely true, 2 = sometimes true, 3 = often true, 4 = true nearly all of the time). Higher ratings indicates greater resilience. The total score range is from 0-100. Beside the total score, five factors were described by (Connor & Davidson, 2003): Factor 1 corresponds to the notion of personal competence, high standards and tenacity, Factor 2 reflects trust in one's instincts, tolerance of negative affect and strengthening effects of stress, Factor 3 relates to the positive acceptance of change and secure relationships, Factor 4 reflects control and Factor 5 spiritual influences. The CD-RISC has demonstrated strong internal consistency and test–retest reliability ( $\alpha$ = 0.89) in a general population (Connor & Davidson, 2003). In the current sample the CD-RISC demonstrated good internal consistency (Cronbach's alpha= .93).

Hazardous alcohol use: The Alcohol Use Disorder Identification Test (AUDIT) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) was used to assess the level of potential problematic alcohol use. It contains ten questions: three regarding quantity and frequency of alcohol use, three regarding alcohol dependence, and four regarding problems caused by alcohol misuse. Each item receives a score of 0 to 4, which implies a range of 0-40. Cronbach's alpha for the full scale (AUDIT) in our sample was .70. Using the guideline of  $\geq$ .70 makes this value at the limit of acceptable for internal consistency (Bland & Altman, 1997).

### Statistical analyses

# Aim 1: to establish a factor structure of the CD-RISC

Using the total sample (n= 1.368), we calculated the Pearson correlation coefficients between individual items and the total score on the CD-RISC, as well as the internal consistency of the instrument (Cronbach's alpha). To replicate the exploratory factor analysis conducted in the CD-RISC development study (Connor & Davidson, 2003), we performed an exploratory principal component analysis (PCA) and an exploratory factor analysis (EFA) with promax rotation. The purpose of the PCA is generating a pool of items that are purposed to tap the target construct of resilience. For the next step we used the EFA to determine the number of factors underlying the variation in and correlations among the items and to identify the items that load onto particular factors. In both analysis we used the oblique rotation promax method because of the assumption that the factors will in some extent relate to each other (Matsunaga, 2010).

# Aim 2: to examine the moderation effect of resilience factors on the relationship between negative affect (depression and anxiety) on hazardous alcohol use

We conducted series of moderation analysis to investigate whether resilience factors moderated the association between negative affect (depression and anxiety) and hazardous drinking, using the

drinking sample (n= 1.095). We added interaction terms as a predictors. These interaction terms were the independent variables (depression and anxiety) multiplied by the moderator (resilience factors). We visualized the interactions in simple slope plots showing the predicted association between negative affect (depression and anxiety) and hazardous drinking at low and high levels of resilience factors (a low level referred to one SD below the mean and high level referred to one SD above the mean). To test the models of moderation the PROCESS Procedure for SPSS Version 3.2 was used (www.guilford.com/p/hayes). Covariates gender, age and smoking were included in all models. Furthermore, in all models with depression as predictor, we added anxiety as covariate and vice versa.

The statistical analyses were conducted using SPSS (IBM Corp. Released in 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.).

# RESULTS

### Sample

Women composed 55.8% of the total sample, 60.8% was 65 to 74 years old, 76% lived with a partner and 35.1% reported having a higher secondary education. Furthermore, 9.6% reported smoking. Of the total sample, 80.1% reported drinking alcoholic beverages. Of the drinking sample, 52.7% were women, 62.9% were aged 65-74 years, 76% lived with a partner and 10.6% were smokers. Regarding the educational level, all categories were equally represented (Table 1).

Table 1: Characteristics of the total sample (n= 1.368), the drinking sample (n= 1.095) and sample with AUDIT>4

	TO TAL POP	TOTAL POPULATION		OPULATION
	n	%	n	%
DEMOGRAPHICS	1368		1095	80.1
GENDER				
women	761	55,8	576	52.7
men	605	44,2	518	47.3
AGE				
young older adults (65-74)	831	60,8	688	62.9
older adults (75-84)	459	33,6	353	32.3
older old adults (85+)	77	5,6	53	4.8
LIVING SITUATION				
livingalone	92	8,4	92	8.4
with partner	829	76,0	829	76
widowhood	170	15,6	170	15.6
EDUC LEVEL				
primary school or lower	27	2,0	16	1.5
lower secondary	441	32,3	329	30.1
higher secondary	479	35,1	376	34.4
higher education	417	30.6	373	34.1
SMOKING				
no	1236	90.4	979	89.4
yes	132	9.6	116	10.6

### CPA an EFA

The total mean score on the CD-RISC in our total sample was 65.75 (SD 15.40) and in our drinking sample was 65.79 (SD 15.09) (not represented). Using the total sample (n=1.368), the CD-RISC items were submit to a CPA and EFA with maximum-likelihood estimation and PROMAX rotation.

The CPA analysis retained four components with an eigenvalue >1. Two items (items 12 and 20) didn't meet the cutoff of .40 (Matsunaga, 2010) and were excluded from the EFA. The Kaiser-Meyer-Olkin measure verified the sample adequacy for the analysis, KMO= .945 which is categorized as 'marvellous', Hutcheson & Sofroniou (1999) in (Field, 2009).

The EFA was run with the remaining 23 items to obtain eigenvalues for each factor in the data. The four factors had eigenvalues over Kaiser's criterion of 1 and in combination explained 57.37% of the variance. Table 2 shows means, standard deviation of individual items of the CD-RISC, correlations between item and total score and factor loadings after rotation. The items remaining were retained because they met the cutoff of .40 (Matsunaga, 2010).

	Summary of exploratory factor analysis results for the SPSS Connord-Davidson Resilience	Quesionr	aire					
		Mean	SD	Item total correlation	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
15.	I prefer to take the lead in problem-solving	3.01	.953	.618*	.791			
17.	I think of myself as a strong person when dealing with life's challenges and difficulties	2.74	.973	.726*	.772			
16.	I am not easily discouraged by failure	2.83	.951	. 689*	. 768			
22.	I feel like I am in control	2.87	.950	. 686*	.744			
24.	I work to attain goals	2.69	.963	. 709*	.701			
14.	Under pressure, I stay focused and think clearly	2.83	.877	.712*	. 629			
23.	I like challenges	2.26	1.131	. 659*	. 567			
18.	I make unpopular or difficult decisions.	2.40	1.084	. 597*	. 558			
19.	I am able to handle unpleasant or painful feelings like sadness, fear, and anger	2.56	.964	.685*	. 526			
25.	I take pride in my achievements	2.88	.884	.618*	. 520			
7.	Having to cope with stress can make me stronger	2.42	1.057	.667*		.673		
5.	Past successes give me confidence	2.57	1.013	.671*		.658		
6.	I try to see the humorous side of things when I am faced with problems	2.46	1.074	.647*		.644		
4.	I can deal with whatever comes my way	2.85	. 889	.653*		.638		
1.	I am able to adapt when changes occur	2.94	.942	.564*		.439		
8.	I tend to bounce back after illness, injury or other hardships	2.90	.928	.645*		.409		
21.	I have a strong sense of purpose in life	2.37	1.230	.503*			.742	
9.	I believe most things happen for a reason	2.03	1.285	. 432*			. 666	
3.	Sometimes fate or God helps me	1.39	1.369	.354*			. 544	
13.	In times of stress, I know where to find help	2.92	1.028	.517*				.674
2.	I have one close and secure relationship	2.67	1.282	. 407*				.555
	Eigenvalues				9.053	1.818	1.315	1.008
	initial eigenvalues % of Variance				39.36%	7.91%	5.72%	4.38%
	Cronbach Alpha				. 890	.831	. 707	.385
	Extraction Method: Principal Axis Factoring.							
	Rotation Method: Promax with Kaiser Normalization.							
	* correlation is significant at the .01 level							

Table 2: Exploratory Factor Analysis (EFA) of the 25-item CD-RISC in total sample

Internal consistency of the four factors was evaluated by calculating Cronbach's alpha. The alpha values are: Factor 1  $\alpha$ = .890, Factor 2  $\alpha$ = .831, Factor 3  $\alpha$ = .707 and Factor 4  $\alpha$ = .385. Using the guideline of  $\geq$ .70 (Bland & Altman, 1997) makes the values of Factor 1, Factor 2 and Factor 3

acceptable for internal consistency. Factor 4 does not met the criteria for a good reliability and was therefore excluded from the moderation analysis.

# MODERATION ANALYSIS

A multiple regression model was tested to examine whether the association between negative affect (depression and anxiety) and hazardous drinking depends on the level of resilience factors (Table 3).

Results indicates that all three factors were negative significant associated with AUDIT (Factor 1:  $\beta$ = -.037, 95% CI: [-.037 – -.010], t= -2.740, p= .006; Factor 2:  $\beta$ = -.064, 95% CI: [-.109 – -.019], t= -2.784, p= .005; Factor 3:  $\beta$ = -.108, 95% CI: [-.172 – -.044], t= -3.312, p= .001). Furthermore, Depression was positive significant associated with AUDIT ( $\beta$ = 1.556, 95% CI: [.995 – 2.118], t= 5.438, p< .001) and Anxiety was non-significant associated with AUDIT ( $\beta$ = .347, 95% CI: [-.176 – .870], t= 1.301, p= .194).

Table 3: Results of the multiple linear regression models of the relationship between mental health (Depression and anxiety), resilience (Factor 1, Factor 2 and Factor 3) and hazardous alcohol use (AUDIT)

		OUTCOME: total score AUDIT						
						95% Cl		
		Unstandarized B	SE	t	p	LLCI	ULCI	R <sup>2</sup>
MAIN EFFECTS*	FACTOR 1	(037)	.013	-2.740	.006	(063)	(010)	.119
MAIN EFFECTS*	FACTOR 2	(064)	.023	-2.784	.005	(109)	(019)	.124
	FACTOR 3	(108)	.033	-3.312	.001	(172)	(044)	.123
	Depression	1 156	206	E 420	< 001	005	2 110	160
	Depression DEPus A CTOP1	( 100)	.200	5.456	< 001	.995	2.110	.100
IN TERACTION EFFECTS*E	DEPXFACIORI	(108)	.023	(-4.657)	<.001	(154)	(063)	.186
INTERACTION EFFECTS*£	DEPxFACTOR2	(148)	.045	(-3.326)	.001	(235)	(061)	.180
INTERACTION EFFECTS*£	DEPxFACTOR3	(245)	.073	(-3.361)	.001	(389)	(102)	.183
MAIN EFFECTS*¥	Anxiety	.347	.267	1.301	.194	(176)	.870	.168
INTERACTION EFFECTS*¥	ANXxFACTOR1	(065)	.022	(-2.963)	.003	(108)	(022)	.177
INTERACTION EFFECTS*¥	ANXxFACTOR2	(058)	.043	(-1.366)	.172	(142)	.026	.173
INTERACTION EFFECTS*¥	AN XxFACTOR3	(167)	.065	(-2.592)	.010	(294)	(041)	.180
¥ Controlled for covariates	aender, age and smoking, BSI DEPRESSIC	)N						
f Controlled for covariates	gender, age and smoking, BSI ANXIFTY							
* Main effect by linear rear	ession analyse controlled for covariates a	ender, age and sn	nokina					
** Moderation analyses by	PROCESS Procedure by Hayes		.5					

# Moderation analysis with Factor 1 as moderator

The interactions between Depression and Factor 1 ( $\beta$ = -.108, 95% CI: [-.154 – .063], t= -4.657, p= <.001) as well as Anxiety and Factor 1 ( $\beta$ = -.065, 95% CI: [-.108 – -.022], t= -2.963, p= .003) were significant suggesting that the effect of Depression on AUDIT and the effect of Anxiety on AUDIT depended on the level of Factor 1 (Table 3).

Simple slopes for the association between Depression and AUDIT were tested for low and high levels of Factor 1 (Table 4). When Factor 1 was low, Depression was significant positive associated with AUDIT ( $\beta$ = 1.940, 95% CI: [1.349 – 2.532], t= 6.435, p= <.001). However, when Factor 1 was high, there was a non-significant association between Depression and AUDIT ( $\beta$ = .211, 95% CI: [-.608 – 1.030], t= .506, p= .613). Figure 1 plots the simples slopes for the interaction.

Simple slopes for the association between Anxiety and AUDIT were tested for low and high levels of Factor 1 (Table 4). When Factor 1 was low, Anxiety was significant positive associated with AUDIT ( $\beta$ = .703, 95% CI: [.127 – 1.278], t= 2.395, p= .017). Additionally, when Factor 1 was high, there was a non-significant association between Anxiety and AUDIT ( $\beta$ = -.333, 95% CI: [-1.045 – .380], t= -.916, p= .360). Figure 2 plots the simples slopes for the interaction.

Moderation analysis with Factor 2 as moderator

The interactions between Depression and Factor 2 ( $\beta$ = -.148, 95% CI: [-.235 – .061], t= -3.326, p= .001) was significant suggesting that the effect of Depression on AUDIT depended on the level of Factor 2. On the other hand, the interaction term between Anxiety and Factor 2 was not significant ( $\beta$ = -.058, 95% CI: [-.142 – .026], t= -1.366, p= .172) (Table 3).

Simple slopes for the association between Depression and AUDIT were tested for low and high levels of Factor 2 (Table 4). When Factor 2 was low, Depression was significant positive associated with AUDIT ( $\beta$ = 1.792, 95% CI: [1.202 – 2.382], t= 5.958, p= <.001). However, when Factor 2 was high, there was a non-significant positive association between Depression and AUDIT ( $\beta$ = .609, 95% CI: [-.169 – 1.386], t= 1.536, p= .124). Figure 3 plots the simples slopes for the interaction.

Moderation analysis with Factor 3 as moderator

The interactions between Depression and Factor 3 ( $\beta$ = -.245, 95% CI: [-.389 – .102], t= -3.361, p= .001) as well as Anxiety and Factor 3 ( $\beta$ = -.167, 95% CI: [-.294 – -.041], t= -2.592, p= .010) were significant suggesting that the effect of Depression on AUDIT and the effect of Anxiety on AUDIT depended on the level of Factor 3 (Table 3).

Simple slopes for the association between Depression and AUDIT were tested for low and high levels of Factor 1 (Table 4). When Factor 3 was low, Depression was significant positive associated with AUDIT ( $\beta$ = 2.071, 95% CI: [1.385 – 2.753], t= 5.962, p= <.001). However, when Factor 3 was high, there was a non-significant association between Depression and AUDIT ( $\beta$ = .354, 95% CI: [-.491 – 1.198], t= .822, p= .411). Figure 4 plots the simples slopes for the interaction.

Simple slopes for the association between Anxiety and AUDIT were tested for low and high levels of Factor 3 (Table 4). When Factor 3 was low, Anxiety was significant positive associated with AUDIT ( $\beta$ = 1.144, 95% CI: [.402 – 1.887], t= 3.024, p= .003). When Factor 3 was high, there was a non-significant association between Anxiety and AUDIT ( $\beta$ = -.027, 95% CI: [-.675 – .621], t= -.081, p= .935). Figure 5 plots the simples slopes for the interaction.

Table 4: Conditional effects of the predictors (Depression and Anxiety) at low and high values of the moderators (Factor 1, Factor 2 and Factor 3) on AUDIT

CONDITIONAL	EFFECT OF THE PREDIC	TOR AT LOW AND H	IIGH VALU	IES OF THE I	MODERAT	OR (FACTO	R 1) ON AU	JDIT
predictor	moderator value	Effect (b value)	SE	t	р	LLCI	ULCI	
DEPRESSION	22	1.940	.302	6.435	<.001	1.349	2.532	
	38	.211	.417	.506	.613	(608)	1.030	
ANXIETY	22	.703	.293	2.395	.017	.127	1.278	
	38	(333)	.363	(916)	.360	(-1.045)	.380	
CONDITIONAL	EFFECT OF THE PREDIC	TOR AT LOW AND H	lIGH VALU	IES OF THE I	MODERAT	OR (FACTO	R 2) ON AU	JDIT
predictor	moderator value	Effect (b value)	SE	t	p	LLCI	ULCI	
DEPRESSION	12	1.792	.301	5.958	<.001	1.202	2.382	
	20	.609	.396	1.536	.124	(169)	1.386	
ANXIETY*								
CONDITIONAL	EFFECT OF THE PREDIC	TOR AT LOW AND H	lIGH VALU	IES OF THE I	MODERAT	OR (FACTO	R 3) ON AU	JDIT
predictor	moderator value	Effect (b value)	SE	t	р	LLCI	ULCI	
DEPRESSION	2	2.071	.347	5.962	<.001	1.389	2.753	
	9	.354	.430	.822	.411	(491)	1.198	
ANXIETY	2	1.144	.378	3.024	.003	.402	1.887	
	9	(027)	.330	(081)	.935	(675)	.621	
* No results Inte	eraction Term was no	a sianificant						



Figure 1: Simple slopes for the significant positive association between Depression and AUDIT for low and high levels of Factor 1.



Figure 2: Simple slopes for the significant positive association between Anxiety and AUDIT for low and high levels of Factor 1.



Figure 3: Simple slopes for the significant positive association between Depression and AUDIT for low and high levels of Factor 2.



Figure 4: Simple slopes for the significant positive association between Depression and AUDIT for low and high levels of Factor 3.



Figure 5: Simple slopes for the significant positive association between Anxiety and AUDIT for low and high levels of Factor 3.

### DISCUSSION

To address gaps in research on resilience and alcohol use behaviour among older adults we conducted this study.

### Alcohol use an resilience

In our sample, eight out of ten older adults reported using alcohol. In recent European studies on the alcohol use in older population, alcohol use was ranged between 67% and 90% (García-Esquinas et al., 2018; Muñoz et al., 2018). In our culture it is quite common to drink alcohol and therefore our high prevalence was not surprising. The level of resilience as measured by the CD-RISC in our total sample as well as in our drinking sample was lower than seen in other studies. The score of the general sample in Connor & Davidson (2003) was higher (80.4 vs 65.8) but considering the age of the sample (mean age 42) the comparison with our sample of community-dwelling older adults is difficult. Lamond et al. (2009) used a population with only women. Women appear to be generally more resilient than men (Hahn, Cichy, Almeida, & Haley, 2011) which can explain the higher scores in Lamond et al. (2009) population in comparison to ours (75.7 vs 65.8). More research on gender differences are necessary to understand the underlying mechanisms of resilience and gender differences.

### Principal Component Analysis & Exploratory Factor Analysis

The current study applied principal component and an exploratory factor analysis to the CD-RISC. The analysis extracted four factors. Three factors had good reliabilities. The original factor structure of the CD-RISC reported by (Connor & Davidson, 2003) yielded five factors. We found one similar factor, the spirituality factor. But apart from that, there is little agreement between that study and our in terms of factors. Differences in results of exploratory factor analysis could arise from multiple elements like sample characteristics. The scale was originally piloted with samples of a general population of adults, primary care and psychiatric outpatients. As our study was conducted among community-dwelling older adults, comparison is difficult. One study focused on community dwelling older women from a Clinical Centre in San Diego (Lamond et al., 2008). Our results are partly in line with their factor structure. Their first factor is a set of items assessing personal competence and our factor is guiet similar and therefore we will name our Factor 1 'personal competence'. Their second factor, as well as ours, appeared to correspond to the tolerance of negative affect and adaptability. Our Factor 2 consisted of items covering the ability to adapt and therefore we will name it 'adaptability'. This factor may be seen as something typical for older adults in comparison to their younger peers. Resilience in older adults may reflects a somewhat different process, perhaps one that involves contributions from acceptance and toleration of negative affect versus problem- or task focused active coping (Lamond et al., 2008). Our third factor, spirituality is consistent with their fourth factor and therefore we will name our Factor 3 as 'spirituality'. One of the missing factor in comparison to Connor & Davidson (2003) is the one focussing on social support. Older adults may not be focused as focused as younger people to reach out to others. It has been reported that people with higher levels of resilience often have a good social support (Wingo et al., 2014). In our sample, older adults are more keen to try to solve their problems by themselves. This is a culture aspect of Flanders where autonomy and independence are highly valued. Maybe resilience in older adults reflects more personal characteristics and less external factors like social support. More research on this topic is necessary to examine if this can be validated or not.

### Moderation analysis

We tested whether older adults with high levels of depression or anxiety and high scores on our resilience factors would display significant lower levels of alcohol use compared to older adults with high levels of depression or anxiety and low scores on our resilience factors. Our result describe the interaction effect of depression and resilience Factor 1, 2 and 3 on hazardous drinking. More precisely, the association between depression and hazardous drinking depended on the level of resilience Factor 1, 2 and 3. Among older adults with lower levels of resilience Factor 1, 2 or 3, in conjunction with higher levels of depression were more likely to report higher levels of hazardous drinking. On the other hand, older adults with higher levels of resilience Factor 1, 2 or 3 in conjunction with higher levels of depression weren't likely to report higher levels of hazardous drinking. These results may confirm the assumption that resilience characteristics influence the risks of risky and heavy drinking in individuals through effective emotional regulation or tolerance of negative affect (Wingo et al., 2014). Personal competence (our Factor 1), adaptability (our Factor 2) an spirituality (our Factor 3) are, according to our results, characteristics of resilience that may reduce the risk for hazardous drinking in community-dwelling older adults.

### Therapeutic implications

Recent findings on resilience in older adults suggested that resilience is often viewed as a process rather than a trait and is as such something that can be developed and improved in later life (MacLeod, Musich, Hawkins, Alsgaard, & Wicker, 2016). Older adults with higher levels of resilience tend to report a lower overall healthcare utilization as well as improvements in self-rated health (Ezeamama et al., 2016). Resilience may be an important attribute in recovery from illness or other potential insults and, hence, in maintaining high functional status and quality of life in old age (Hardy, Concato, & Gill, 2002) and greater health (Phillips, Auais, Belanger, Alvarado, & Zunzunegui, 2016). Senior centres are appropriate settings for resilience interventions as they are able to develop initiatives for this population. Furthermore, they are likely well positioned to implement resilience interventions for groups of seniors but are often faced with barriers of lack of staffing to deliver programs and effective recruitment strategies for seniors who may benefit most from planned activities (MacLeod et al., 2016). Personalized resilience interventions, rather than using a one-sizefits-all approach, would have the best potential for older adults (Mancini & Bonanno, 2006). According to our findings, therapeutic interventions should focus on three characteristics of resilience. The first is the aspect of personal competence which can be easily targeted among people. It could be argued that individuals need to have a sense of control in their lives to enable them to set and pursue goals in a purposeful and meaningful way, and hence achieve high psychological wellbeing. One possibility, based on Taylor and colleagues' cognitive adaptation theory (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000), is that optimism and perceived control are largely independent personal resources which have protective psychological effects and hence contribute to well-being, particularly under conditions of stress (Ferguson & Goodwin, 2010). The second characteristic is adaptability. A prospective study suggested that the ability to adapt flexibly to environmental demands is one of the characteristics of resilience that can reduce the risk of alcohol use (Wong et al., 2006). This is what might make resilience among older so particular. Older adults are more likely to encounter more challenging life events with chronic disabilities and unconformable events like personal loss. Therefore they might be more temped to accept and tolerate the negative consequences of those life events in comparison to their younger peers who may be more active problem-solving orientated (Lamond et al., 2008).

More studies are needed to elucidate the psychological mechanisms underlying protective effects of resilience characteristics on hazardous drinking among older adults.

### Strengths and limitations

There are some limitations in this study. Individuals who suffer from severe depression of anxiety associated with alcohol use were unlikely to participate in this study. It was however not our purpose to concentrate on older adults with psychiatric disorders like alcohol use disorder or mood disorders. These results cannot be generalized for older adults in sheltered homes as they might have different characteristics than community dwelling older adults. Furthermore, although the privacy of the sealed envelope method may support more honest self-reporting of alcohol use and psychological distress, the methodology might have led to social desirable answers. It might be possible to assume that hazardous alcohol use and levels of negative affect are likely to be underreported. However, literature suggested that self-reported methods are a reliable and valid approach to measuring alcohol use behaviour (Blow, 1998; Del Boca & Darkes, 2003). Another concern is the snowball

sampling as it may limit the representativeness of the sample of the population of older adults in Belgium. However, when a study involves items that one can consider as private, such as alcohol use might be for older adults, snowball sampling might be particularly beneficial (Sadler, Lee, Lim, & Fullerton, 2010). Finally, the cross-sectional design does not allow us to draw conclusions on the direction of the associations. For example we found an association between negative affect (depression and anxiety) and resilience factors, but there is the distinct possibility that the causal order is the opposite of our hypothesis.

### Conclusion

Because of the risks of alcohol use in older adults, it is important to understand factors that may influence alcohol use behaviour and problems in this population (Sacco, Bucholz, & Harrington, 2014). This study emphasise the important of resilience as dynamic factor that can be associated with hazardous alcohol use among older adults. Programs should target resilience and more specifically characteristics like 'personal competence', adaptability' and 'spirituality' which was significantly associated with a lower likelihood of hazardous alcohol use. Personalized resilience interventions, rather than using a one-size-fits-all approach, has the best potential for older adults (Mancini & Bonanno, 2006).

Conflict of interest declaration:

None

Description of authors' roles

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Figure/Table legends:

Tables

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