Cognitive-attentional syndrome – The psychometric properties of the CAS-1 and multi-measure CAS-based clinical diagnosis

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ABSTRACT

The Cognitive-attentional Syndrome Questionnaire (CAS-1) is a short self-descriptive measure developed to provide information regarding the severity of cognitive-attentional syndrome, a key construct in metacognitive therapy. The three presented studies explore the psychometric properties of the CAS-1. Study 1 was based on a community sample ($N = 1225$) and explored the factor structure of the CAS-1, its relations with measures of rumination and metacognitive beliefs, and its demographic structure. Study 2, performed on an internet-based sample ($N = 602$), explored relations of the CAS-1 with measures of rumination, psychopathology, and quality of life. This study also dealt with the validity of the CAS-1. Study 3 was conducted on participants selected from study 1 ($n = 98$), based on the results of the CAS-1 and other measures. It explored the predictive validity of the questionnaire's diagnosis through ascertaining clinical diagnoses. All three studies confirm the reliability of the CAS-1. Its validity was confirmed by significant associations with measures of rumination, metacognitive beliefs, psychopathology, and quality of life. Two-factor and four-factor structures of the CAS-1 were confirmed, with the two-factor model better fitting the data. The results obtained show that the CAS-1 has good psychometric properties; its current form is deemed most acceptable for clinical use and we advise use of combined measures of CAS or development of a more expanded measure of CAS for research purposes.

1. Introduction

Cognitive-attentional syndrome (CAS) is a core aspect of Wells' metacognitive approach to psychopathology and the metacognitive therapy (MCT) of emotional disorders [1–3]. It consists of three aspects: 1) repetitive negative thinking, i.e. rumination and worry; 2) focusing attention on threats (external – e.g. a person with social anxiety disorder paying attention to any display of vexation amongst peers, or internal – e.g. a person with panic disorder scanning their bodily functions in search of threatening signals like elevated heart rate); and 3) maladaptive, paradoxically inefficient behaviors and strategies used to cope with the first two aspects (e.g. thought suppression, thought and situation avoidance, or substance/alcohol use). These thinking and behavior patterns have been observed and interpreted as the cause of psychological problems in a plethora of clinical and population-based studies [e.g. 3–8]. CAS results from maladaptive positive ('worrying helps me cope') and negative ('worrying will ruin my health') metacognitive

beliefs and corresponding schemas and meta-strategies, which are reversibly solidified by elevated levels of CAS [2,9–14]. Thus metacognitive beliefs are also central to CAS. This syndrome has a central role in the self-regulatory executive function model (S-REF) developed by Wells & Matthews [1,4]. According to this model, self-regulatory executive function becomes activated when there is a discrepancy between self-relevant goals (outer circumstances and mental states) and perceived goals. In most people, periods of CAS activation – and therefore negative emotions, self-appraisal, and sense of threat – will be brief or non-existent. However, some will experience prolonged CAS activation, which is understood in the S-REF model as the cause of emotional and other psychiatric disorders or their core, common component. Therefore, CAS is seen as a basic and transdiagnostic factor of psychological disturbances, especially emotional disorders (e.g. mood and anxiety disorders), but it is also possible that other types of psychiatric symptoms are intensified by elevated levels of CAS. Prolonged CAS activation may result from its vicious-circle characteristic: for example, a person with income- and poverty-related anxiety after losing their job engages in negative repetitive thoughts on the causes (rumination) and consequences (worry) of the event, resulting from positive metacognitive beliefs (e.g. 'this thinking will help me understand and prepare'). Consequently, this person may experience loss of performance due to their attention resources being engaged by CAS or simply find that they are devoting excessive

amounts of time to worry and rumination. This observation may trigger worrying about worrying [cf. 3] due to negative metacognitive beliefs (e.g. 'I won't be able to work if I constantly worry'). Strategies like attempting to suppress thoughts about having lost a job or avoiding job-related topics will probably lead to greater preoccupation with these thoughts, meaning that CAS is likely to continue to occur.

The Cognitive-attentional Syndrome Questionnaire (CAS-1) was developed to measure aspects of CAS, with its primary goal being use in clinical practice [2] (note: cognitive-attentional syndrome – the theoretical construct – is abbreviated as CAS and the questionnaire which measures it was named the CAS-1 by Wells [2]; these abbreviations are used in this paper). It was devised as a short tool for assessing general levels of CAS without disorder-specific symptomatology. To date, there have been three studies which have used the CAS-1 [15–17]. The first study [15] was conducted on a student sample and revealed relationships between CAS and anxiety, depression, and stress as well as the moderating role of beliefs about attentional control in these relationships – beliefs about low attention control produced stronger relationships between elevated CAS and psychopathology symptoms. The second study [16] was conducted on a sample of patients with emotional disorders (primarily mood or anxiety disorders). It revealed relationships between CAS and depressive and anxiety symptoms as well as the incremental validity of the CAS-1 when controlling for psychological inflexibility. The third study [17] established a relationship between CAS, especially maladaptive strategies and negative metacognitive beliefs, and sleep disturbances.

It seems important for the diagnostic use of the CAS-1 to detail its psychometric properties in a large community sample and to analyze gender and age differences. It is hypothesized that female participants will have higher levels of CAS as they are more often afflicted with depressive [18] and anxiety [19] disorders. Emotional disorders are a primary interest in metacognitive models, however the psychological mechanisms they describe might not be universal across other disorders. For example, men are more often affected by substance/alcohol-abuse disorders [20]. It is assumed that such disorders might be related to a slightly different set of metacognitive beliefs [21,22], mostly concerning the role of alcohol/substances in emotional regulation. A large epidemiological study in a Polish sample [23] revealed similar gender differences in emotional disorders and substance/alcohol-related disturbances. In light of mixed results concerning the differing prevalence of disorders in different age groups in the Polish population [23], it is hypothesized that the null-hypothesis of no differences in CAS levels between age groups will hold. The predictive value of the CAS-1 is also important for validating the transdiagnostic status of CAS [cf. 16]. The theoretical model proposed by Wells and Matthews [2,24] implies that people with high and/or frequent CAS activation are prone to developing emotional disorders. We aim to test this implication of S-REF theory. The aforementioned studies, and others [10–12], work backwards because they explore CAS (mostly as a combination of metacognitive beliefs, rumination tendencies, or worrying) in patients with established diagnoses, especially depression and generalized anxiety disorder (GAD). A second group of studies explore levels of symptoms, but without full clinical examination [9,12,13]. To date, there have been no studies exploring various psychiatric disorders in people with high CAS levels. As mentioned above, most studies validating metacognitive models of disorders did not use the CAS-1, instead they mostly used a combination of the metacognitions questionnaire (MCQ-30) [25] and rumination or worry questionnaires for depression and anxiety models, respectively. Thus, it is of interest to measure the validity of the CAS-1 in predicting the symptoms of various psychological disorders when controlling for the results of metacognition, rumination, or worrying questionnaires [26]. The hypothesis here is that the CAS-1 could serve as a stand-alone measure of all elements of CAS, predicting a high percentage of the variance of general psychopathology and emotional disorder symptoms. Because different methods of assessing CAS were used in previous studies [9–13,15–17], testing this

hypothesis will allow the issue of various measures of CAS being used in research to be addressed. Examining the factorial structure of the CAS-1 is also of interest [16]. The CAS-1, as a comprehensible measure of CAS, should consist of four factors (worry/rumination, attention to threat, CAS-related behaviors, and metacognitive beliefs) which will load one main factor – CAS, according to Wells's metacognitive theory [2]. Repetitive negative thinking (i.e. worry/rumination) and attention to threat may be viewed as functioning strategies [24], as may the strategies and behaviors listed separately in the CAS-1, thus it is important to test a model in which these items are grouped together in such a fashion. Also, metacognitive beliefs are conceptually divided into positive and negative beliefs, which should also be reflected in factor analyses. Thus, in the present paper we examine 2-, 3-, 4-, and 5- factor models of the CAS-1 and compare them against each other.

Three studies are presented in this paper. The first study deals with the convergent validity of the CAS-1 and age and sex differences in cognitive-attentional syndrome levels in a large sample mirroring the population of a large city. The factorial structure of the CAS-1 is also explored in this study. The second study concerns the convergent validity of the CAS-1, its relationships with different types of psychopathology symptoms and quality of life, as well as the validity of this questionnaire in predicting levels of psychopathology symptoms, taking into account the rumination and metacognitive beliefs questionnaires. The third study, conducted on a pre-selected sample of people with high and low CAS scores, concerns the predictive validity of CAS as a theoretical construct through ascertaining clinical diagnoses in both groups.

2. Study 1

2.1. Procedure and sample characteristics

The study was conducted through an internet survey panel. The panel participants are offered financial and/or material rewards for participation in different survey studies. In this study, the participants were additionally motivated by the possibility of a large financial reward (about 50 EUR) for participation in the second stage of the study.

The sample was gathered for the purpose of a further fMRI study, so there were strict exclusion criteria: a history of head trauma and psychiatric and neurological disorders, substance dependence, metal objects within the body, being pregnant, having irremovable piercings, tattoos on the head area, left-handedness, claustrophobia, serious medical procedures in the past two years, and sundry medical equipment such as artificial pacemakers, bypasses, stents, etc. Participants were also required to live in Warsaw and the surrounding area to ensure their ability to participate in further stages of the study. Fig. 1 shows a consort flowchart of the recruitment of participants.

A total of 1225 participants were eligible and completed the study. The dropout rate was 36%. Participants were selected based on quotas mirroring the population of Warsaw [27,28] in terms of sex, age, and education. However, the final demographic structure of the obtained sample was slightly different to Warsaw's population: 52% females in the population vs 61% in the study sample; 27% people aged 18–29, 42% aged 30–39, and 31% aged 40–50 in the population vs 38%, 39%, and 23% respectively in the study sample; the demographic was also shifted in favor of higher education, with 53% of the population having higher education vs 64% in the study sample. The characteristics of the final sample are presented in the results section.

2.2. Method and measures

2.2.1. The Cognitive-Attentional Syndrome Questionnaire (CAS-1)

The CAS-1 [2] questionnaire consists of 16 items. The first two, assessed on a scale from 0 to 8, are questions concerning the frequency of rumination and worry as well as concentration on threats. A further six items, assessed on a scale from 0 to 8, concern maladaptive behaviors used to cope with negative emotions and/or thoughts, e.g. thought
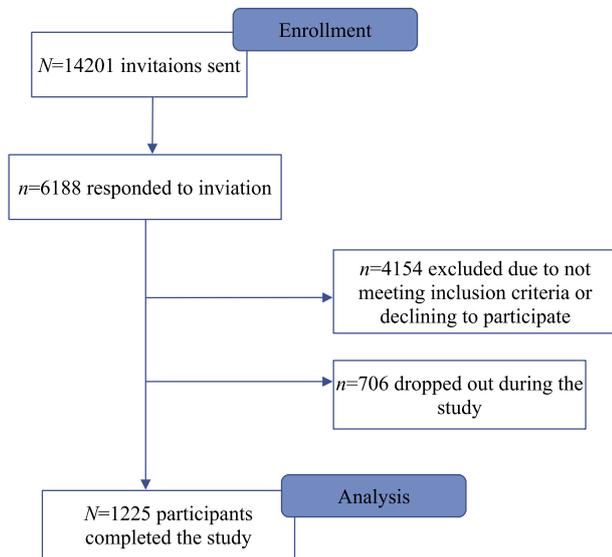
Fig. 1. Consort flow chart for recruitment for the first study.

and situation avoidance, drinking or substance abuse, and attempts to control thoughts or emotions. The last eight items, assessed on a scale from 0 to 100, concern positive and negative metacognitive beliefs core to cognitive-attentional syndrome: e.g. "worrying too much could harm me" or "worrying helps me cope". The results of the questionnaire were calculated as in the paper by Fergus et al. [15] – the last eight items were recalculated to range between 0 and 8 before being summed up. The total results can range from 0 to 128, where a higher result indicates a greater level of cognitive-attentional syndrome. The Polish version was prepared in cooperation with the author of the original scale and translated into Polish with the use of the back-translation procedure.

2.2.2. Ruminative Response Scale (RRS)

The 22-item Ruminative Response Scale was originally extracted from the 71-item Response Styles Questionnaire [29]. It focuses on one's responses to depressive mood: concentration on the self, symptoms, and the causes and consequences of depressive mood. A newer approach excludes from the scale items which are too highly correlated with depression measures and distinguishes two subscales: a "Reflection" subscale, which captures the contemplative and problem-solving nature of self-focused thinking, and a "Brooding" subscale, which is defined as moody and gloomy pondering [30]. The "Brooding" and "Reflection" subscales both consist of 5 items, with results ranging from 4 to 20, where a higher result indicates higher levels of a particular response to depressed mood. The Polish version of the RRS (revised) has generally good psychometric qualities [31]. In the current study, the RRS had excellent internal consistency of $\alpha = 0.94$ and the subscales had acceptable internal consistency: Brooding $\alpha = 0.83$ and Reflection $\alpha = 0.76$.

2.2.3. Metacognitions Questionnaire 30 (MCQ-30)

The short version of the Metacognitions Questionnaire, developed by Wells and Cartwright-Hatton [25], consists of five subscales and 30 items. It concerns metacognitive beliefs: monitoring techniques, judgments, and beliefs about one's thoughts and cognitive abilities essential in the metacognitive model of psychopathology. The "Cognitive Confidence" subscale concerns one's beliefs about insufficient cognitive abilities, e.g. "I have a poor memory". The "Positive Beliefs" subscale consists of items about the advantageous qualities of worry, e.g. "Worrying helps me cope". The "Cognitive Self-consciousness" subscale concerns one's tendency to monitor cognition, e.g. "I constantly examine my thoughts". The fourth subscale, "Uncontrollability and Danger", explores the

negative aspects of worry, e.g. "I could make myself sick with worrying". The final subscale is about the "Need to Control Thoughts", e.g. "I should be in control of my thoughts all the time". The Polish version of this questionnaire exhibits good psychometric qualities and is considered equivalent to the English version [32]. In this study, the MCQ-30 had an excellent internal consistency of $\alpha = 0.91$ and its subscales had acceptable internal consistency, with α values ranging from 0.76 to 0.88.

2.2.4. Method

This study was designed as a correlative study and was based on a large sample mirroring the population of a big city. The validity of the CAS-1 was tested with a linear regression model with demographic variables as well as RRS and MCQ-30 scores as predictors. A univariate ANOVA with two-way interaction was performed to examine age and gender differences in CAS-1 scores. These statistics were calculated with SPSS 24 software. Effect sizes were calculated with an online calculator (https://www.psychometrica.de/effect_size.html), accounting for group size differences. The factor structure of the CAS-1 was analysed with confirmatory factor analysis in AMOS 24 software with comparative fit index (CFI) and root mean square error of approximation (RMSEA) used as fit indices. The Bayesian Information Criterion (BIC) [33] was used to compare structural models against each other.

2.3. Results of study 1

The CAS-1 had an internal consistency of Cronbach's $\alpha = 0.85$. Mean results and standard deviations of the questionnaires and their subscales were as follows: CAS-1: 55.69 (18.90), RRS: 19.48 (5.77), RRS-Brooding: 10.09 (3.34), RRS-Reflection: 9.38 (3.03), MCQ-30: 58.78 (14.39), Cognitive Confidence: 11.73 (4.46), Positive Beliefs: 9.18 (3.64), Cognitive Self-consciousness: 13.15 (3.78), Uncontrollability and Danger: 13.00 (4.20), and Need to Control Thoughts: 11.74 (3.81). A univariate ANOVA revealed a significant difference in CAS-1 levels between males and females: $F(1, 1219) = 13.18$, $p > 0.001$ with a small effect size $d = 0.2$ (CI 95% = 0.09–0.32). There was no simple main effect of age with CAS-1 levels: $F(2, 1219) = 2.05$, $p = 0.13$. There were no significant results for interaction of gender and age with CAS-1 levels $F(2, 1219) = 1.57$, $p = 0.21$. A linear regression model with CAS-1 scores as response and with demographic variables and RRS and MCQ-30 subscales as predictors was created to verify the validity of the CAS-1: $F(9, 1215) = 124.24$, $p < 0.001$, $R^2 = 0.48$. Details of the model are shown in Table 1.

The confirmatory factor analyses were performed with AMOS for SPSS (version 24). We created 2-, 3-, 4-, and 5-factor models; their details (fit indices and factor loadings) are presented in Table 2. In each model, Modification Indices of M.I. ≥ 40 were deemed suitable for introducing intercorrelation between item errors to maximize the fit of the models to the data while simultaneously avoiding overfitting and ensuring that conditions for all tested models were similar. Analysis of BIC indices for different models revealed that the 2-factor and 4-factor models are characterized by the lowest values of this measure (i.e. the

Table 1
Details of linear regression analysis with CAS-1 as response variable and with demographic and questionnaire measures as predictors.

Response variable: CAS-1		β	t	p
Age		0.05	2.22	0.027
Gender		−0.04	−1.94	0.053
RRS subscales	Brooding	0.22	7.53	<0.001
	Reflection	0.17	5.39	<0.001
MCQ-30 subscales	Cognitive Confidence	−0.04	−1.47	0.14
	Positive Beliefs	0.16	6.41	<0.001
	Cognitive Self-consciousness	0.02	0.63	0.53
	Uncontrollability and Danger	0.23	7.78	<0.001
	Need to Control Thoughts	0.13	4.30	<0.001

best fit for the obtained data). Of these two models, the 2-factor model appears to be the better fit, $\Delta BIC = 8.35$.

2.4. Conclusions

These results indicate the satisfactory validity and reliability of CAS-1 measures. They also shed light on gender differences in CAS levels, with women obtaining higher scores. The analyses performed also indicate that the theory driven [2] 2-factor and 4-factor structures of the CAS-1 are acceptable and are of good fit to the obtained data, in contrast to the 3- and 5-factor models, which are also based on theory.

3. Study 2

3.1. Procedure and sample characteristics

The study was conducted via an internet tool for online surveying – LimeSurvey. Links to the study were shared across social media – especially clinical psychology and neuropsychology fan-pages and students' groups on Facebook. Invitations to the study were supplemented with requests to distribute the study to one's social contacts. Therefore the sampling technique can be characterized as a mix of convenience and snowball sampling. A total of 1080 people took part in the study, and 602 people completed all measures. The dropout rate was 44%, which was not unexpected due to the length of the study. Only completed surveys were included in the analyses.

The sample had a mean age of 31.92 (SD = 10.18) with a range from 18 to 75 years. Approximately 77% of the participants were female; 1.5% of participants did not report their gender identification. Approximately 71% of the participants reported having higher education, 25% had secondary education, and the rest reported basic or vocational education. 18.3% of participants declared living in a small town with a population of up to 20 thousand, 18.4% participants declared living in a medium-sized town with between 20 and 100 thousand inhabitants, and 63.3% of participants lived in a large city with a population above 100 thousand. The use of the services of a psychiatrist, psychologist, or psychotherapist at the time of the study was reported by 18.8% of participants. This is in-line with data from research on the prevalence

Table 2
Results of factor analyses of CAS-1.

		Models and their fit indices			
		2 factors	3 factors	4 factors	5 factors
CFI		0.92	0.91	0.92	0.91
RMSEA		0.068	0.071	0.068	0.72
χ^2		617.94	683.52	626.29	694.76
BIC		923.70	975.06	932.05	986.30
		Items and their factor loadings			
1. How much time in the last week have you found yourself dwelling on or worrying about your problems?		0.64	0.62	0.79	0.78
2. How much time in the last week have you been focusing attention on the things you find threatening (e.g., symptoms, thoughts, danger)?		0.68	0.65	0.84	0.83
How often in the last week have you done the following in order to cope with your negative feelings or thoughts?	3. Avoided situations	0.71	0.70	0.72	0.72
	4. Tried not to think about things	0.67	0.66	0.68	0.68
	5. Used alcohol/drugs	0.38	0.36	0.40	0.37
	6. Asked for reassurance	0.67	0.66	0.67	0.67
	7. Tried to control my emotions	0.53	0.53	0.53	0.53
	8. Tried to control my symptoms	0.63	0.63	0.63	0.64

Table 2 (*continued*)

Below are a number of beliefs people have. Indicate how much you believe each one by placing a number from the scale below next to each item.					
	9. Worrying too much could harm me	0.35	0.37	0.34	0.36
	10. Strong emotions are dangerous	0.43	0.43	0.42	0.42
	11. I cannot control my thoughts	0.71	0.73	0.72	0.75
	12. Some thoughts could make me lose my mind	0.70	0.71	0.70	0.70
	13. Worrying helps me cope	0.43	0.59	0.43	0.59
	14. Focusing on possible threats can keep me safe	0.34	0.76	0.34	0.76
	15. It is important to control my thoughts	0.35	0.46	0.33	0.45
	16. Analyzing my problems will help me find answers	0.14	0.40	0.14	0.40

CAS-1 – Cognitive-attention Syndrome Questionnaire, CFI – Comparative Fit Index; RMSEA – Root Mean Square Error of Approximation. Cell colors indicate belonging to certain factors.

of mental health problems in the Polish population [23] and allows the sample to be considered a community based one.

3.2. Method and measures

The study employed the assessment tools used in the previous study: the CAS-1, the RRS (in this study, the "Brooding" and "Reflection" subscales had acceptable internal consistency, $\alpha = 0.77$ and 0.73 respectively), and the MCQ-30 (which had excellent internal consistency in this study, $\alpha = 0.90$; its subscales' consistencies were acceptable, with α's ranging from 0.77 to 0.89). It also employed other measures, described in detail below.

3.2.1. The General Functioning Questionnaire (GFQ-58)

The General Functioning Questionnaire [34] is a checklist-type questionnaire concerning general functioning and different types of psychopathology symptoms. It consists of 13 subscales with a total of 58 items. Three concern general functional aspects: poor functioning in the workplace and at home, lack of entertainment, and poor social relations. Ten subscales concern various types of symptoms: cognitive impairments, addictions, positive psychotic symptoms (delusions and hallucinations), depressive symptoms, manic symptoms, anxiety symptoms, eating disorder symptoms, sleep problems, sexual disorders, and somatic symptoms. The number of items for subscales varies and can range from 2 (sexual disorders) to 8 (anxiety disorders), with most scales having 4 or 6 items. The total result can vary from 58 to 290 points, where higher results indicate greater levels of psychopathology symptoms. In the present study, the questionnaire had good internal consistency ($\alpha = 0.89$), the internal consistencies of separate subscales are presented elsewhere [34]. Only results concerning symptom subscales (without functioning subscales) are presented in this study.

3.2.2. The WHO Quality of Life Questionnaire - short version (WHOQOL-BREF)

WHOQOL-BREF is a 26-item questionnaire developed for measuring quality of life in four domains: physical health, social relationships, and psychological and environmental dimensions [35]. The total score on this questionnaire ranges from 26 to 130, where higher scores indicate greater quality of life. The Polish version of this questionnaire has acceptable psychometric properties [36]. In the present study, this questionnaire had good internal consistency ($\alpha = 0.89$). The psychological domain, the only subscale presented here, also had good internal consistency: $\alpha = 0.87$.

3.2.3. Method

This study was designed as a correlative study. The convergent validity of the CAS-1 was tested with a linear regression model with demographic variables, and CAS-1, RRS, and MCQ-30 scores as predictors of various psychopathology symptoms and quality of life. These statistics were calculated with SPSS 24 software.

3.3. Results of study 2

The mean values of the measures used were as follows: RRS = 45.45 (±12.47), MCQ-30 = 59.43 (±14.38), GFQ-58 = 117.00 (±83.80), CAS-1 = 55.17 (±19.70), WHOQOL-BREF = 83.80 (±15.85). In this study, the CAS-1 had internal consistency of $\alpha = 0.83$. The convergent validity of the CAS-1 was checked by creating regression models with demographic variables and CAS-1 scores as predictors of GFQ-58 symptoms subscales, the psychological domain, and total score of WHOQOL-BREF. These data are presented as Step 1 in Table 3. The second step in the regression analysis was to explore the predictive value of the CAS-1 for demographic variables and measures of rumination and

Table 3
Results of study 2; variance of different psychopathology symptoms and quality of life as explained by different CAS measures.

			Step 1			Step 2									
			sex	Age	CAS-1	Sex	Age	CAS-1	RRS-B	RRS-R	MCQ-1	MCQ-2	MCQ-3	MCQ-4	MCQ-5
WHOQOL-BREF	Total score	partial r	0.02	-0.22*	-0.57*	-0.04	-0.22*	-0.25*	-0.30*	-0.13°	-0.16*	-0.04	0.14*	-0.14*	-0.03
		R^2		0.33*				0.48*							
	Psychological domain	partial r	0.01	-0.06	-0.57*	-0.06	-0.06	-0.25*	-0.33*	-0.14*	-0.15*	-0.02	0.17*	-0.14*	-0.03
		R^2		0.32*				0.50*							
GFQ-58	Total score	partial r	-0.06	0.08	0.67*	0.00	0.07	0.33*	0.31*	0.16*	0.21*	0.01	-0.06	0.19*	0.07
		R^2		0.45*				0.61*							
	Somatic Symptoms	partial r	-0.14*	0.17*	0.45*	-0.10†	0.14*	0.20*	0.16*	0.03	0.17*	-0.03	0.04	0.11°	-0.08
		R^2		0.22*				0.29*							
	Sexual Disorders	partial r	-0.14*	0.21*	0.38*	-0.12°	0.20*	0.16*	0.09†	0.07	0.09†	0.03	-0.02	0.02	0.03
		R^2		0.17*				0.20*							
	Sleep Problems	partial r	-0.02	0.10†	0.42*	0.00	0.09†	0.16*	0.17*	0.04	0.08	-0.04	-0.01	0.06	0.06
		R^2		0.17*				0.22*							
	Eating Disorders Symptoms	partial r	-0.13*	-0.02	0.37*	-0.11°	-0.03	0.14*	0.15*	0.02	0.06	0.07	-0.05	0.06	0.01
		R^2		0.15*				0.19*							
	Anxiety Symptoms	partial r	-0.10†	0.06	0.63*	-0.04	0.04	0.28*	0.17*	0.09†	0.11°	0.05	0.01	0.28*	0.04
		R^2		0.40*				0.52*							
	Manic Disorders	partial r	0.00	-0.10†	0.47*	0.02	-0.10†	0.15*	0.14*	0.06	0.08	0.03	0.13°	0.07	0.09†
		R^2		0.23*				0.32*							
	Depressive Disorders	partial r	-0.06	0.07	0.62*	0.01	0.09†	0.30*	0.31*	0.17*	0.06	0.00	-0.08†	0.14*	0.02
		R^2		0.38*				0.51*							
	Positive Symptoms	partial r	0.10†	0.00	0.31*	0.09†	-0.01	0.07	0.06	0.00	0.10†	0.15*	0.03	-0.02	0.13*
		R^2		0.11*				0.18*							
	Addictions	partial r	0.12°	-0.13°	0.26*	0.13°	-0.12°	0.14*	0.15*	-0.02	0.07	-0.06	0.06	-0.03	-0.05
		R^2		0.11*				0.13*							
	Cognitive Impairment	partial r	-0.05	0.14*	0.50*	0.00	0.07	0.20*	0.15*	0.09†	0.49*	-0.02	-0.07	0.14*	-0.01
		R^2		0.25*				0.50*							

GFQ-58 – The General Functioning Questionnaire, WHOQOL-BREF – The WHO's Quality of Life Questionnaire - Short Version, CAS-1 – Cognitive-attentional Syndrome Questionnaire, RRS-B/R – Ruminative Response Scale, Brooding and Reflection subscales respectively, MCQ-1 – Metacognitions Questionnaire – Short Version, Cognitive Confidence subscale, MCQ-2 – Positive Beliefs subscale, MCQ-3 – Cognitive Self-consciousness subscale, MCQ-4 – Uncontrollability and Danger subscale, MCQ-5 – Need to Control Thoughts subscale, * $p \leq 0.001$, ° $p \leq 0.01$, † $p \leq 0.05$.

metacognitive beliefs. In both steps and for all models, the total scores of the GFQ-58 and WHOQOL-BREF as well as their subscales were significant (all p's < 0.001), the percent variance predicted by each model is presented in the R^2 columns in Table 3.

3.4. Conclusions

The results obtained indicate the satisfactory validity and reliability of the CAS-1. They also show that CAS symptoms are connected with various kinds of psychopathology symptoms and that these associations still hold when controlling for other measures of elements of CAS (rumination and metacognitive beliefs), which indicates that the CAS-1 has some unique properties. Regression models (created to show the ability of the CAS-1 to explain the variance of general psychopathology, various psychopathology symptoms, and quality of life when controlling for rumination and metacognitive beliefs) indicate that the CAS-1 is partially correlated with other measures of CAS and also possesses a unique ability to predict a significant amount of the variance of psychopathology and quality of life. It is worth noting that one of the most important popular tools for explaining CAS symptoms, apart from the CAS-1, is the RRS "Brooding" subscale. Also, different sets of metacognitive beliefs seem to play roles in explaining the variability of different types of symptoms. Therefore it may be concluded that assessment of CAS levels could be enhanced by combining different CAS measuring tools which would ensure that a larger percentage of the variance would be explained, thus ensuring the smallest measurement error possible.

4. Study 3

4.1. Procedure and sample characteristics

This study was conducted before an fMRI study in the Laboratory of Brain Imaging of the Institute of Experimental Biology of the Polish Academy of Sciences. Participants who took part in both parts of the study (diagnosis + fMRI) were given about 50 EUR in return. From participants of Study 1 ($N = 1225$), two extreme groups were selected, each with 134 participants. As the results of Study 2 suggest that combining tools which measure aspects of CAS predicts a greater amount of variance in psychopathology symptoms, a combination of measures was used in forming the two groups. The criteria for inclusion were obtaining scores above the 66th percentile or below the 33rd percentile on all of the following measures: the CAS-1, the "Brooding" subscale of the RRS (as this aspect of rumination is most prominently connected to emotional disorder) [cf. 37], and the "Need for Control" and "Uncontrollability and Danger" subscales from the MCQ-30, as these aspects of metacognitive beliefs are most prominently connected to levels of anxiety and depression [cf. 25,32,38,39]. Participants were invited to the study in random order and affiliation to groups was blinded. In the end, 98 participants took part in the present study: 44 from the High-CAS (HCAS) group and 54 from the Low-CAS (LCAS) group. Participants were first interviewed with SCID-I and were then asked to fill-in questionnaires. The study took about 2 h to complete.

4.2. Measures

In this study, the following measures presented in previous sections were used: the CAS-1, the RSS ($\alpha = 0.96$), and the MCQ-30 ($\alpha = 0.93$). Other measures were also used, which are described in detail below.

4.2.1. Structured clinical interview for DSM-IV-TR (SCID-I)

The SCID-I is a tool for the assessment of past and current psychiatric diagnoses but is limited to Axis I disorders – psychological disorders and mental illnesses, but not personality and developmental disorders [40]. It is based on DSM-IV-TR criteria [41]. This interview was administered by a trained clinical psychologist and psychotherapist (MD) with the

use of the B/C module, as any psychotic symptoms were an exclusion criterion. The Polish adaptation of SCID-I (research version) was used [42].

4.2.2. Symptom checklist 27 plus (SCL-27-plus)

This is a checklist-type questionnaire that measures depressive, vegetative, agoraphobic, social phobia, and pain symptoms [43], and allows the calculation of a general symptoms index (GSI). The results on each scale can range from 0 to 20, where higher scores indicate higher levels of a given symptom. In this study, the Polish adaptation of the questionnaire was used [44], and it had an excellent internal consistency of $\alpha = 0.93$.

4.3. Results of study 3

In this study, the CAS-1 had an internal consistency of $\alpha = 0.91$. In general, the groups did not differ in demographic measures, except that the HCAS group had more females ($\chi^2 = 7.81$, $p = 0.005$; Cramér's $phi = 0.29$). There were significant differences between HCAS and LCAS groups in symptoms reported on the CAS-1 ($U = 73.5$, $p < 0.001$; Cohen's $d = 2.7$, d CI 95% = 2.15–3.25), RRS Brooding ($U = 117$, $p < 0.001$; Cohen's $d = 2.35$, d CI 95% = 1.84–2.87), MCQ-30 Uncontrollability and Danger ($U = 105.5$, $p < 0.001$; Cohen's $d = 2.41$, d CI 95% = 1.89–2.93), MCQ-30 Need to Control Thoughts ($U = 161$, $p < 0.001$; Cohen's $d = 2.20$, d CI 95% = 1.70–2.70), as well as SCL-27-plus GSI ($U = 148$, $p < 0.001$; Cohen's $d = 2.14$, d CI 95% = 1.65–2.64). Thus, the HCAS group scored significantly higher, on average, on all measures than did the LCAS group.

Analyses of SCID-I results revealed that Axis I disorders occurred significantly more often in the HCAS group. A lifetime diagnosis was established in 31 (70%) participants in the HCAS group in comparison to 6 (11%) in the LCAS group ($\chi^2 = 36.33$, $df = 1$, $p < 0.001$, Cramér's $V = 0.61$). A current diagnosis was established in 18 (41%) HCAS participants in comparison to 3 (6%) LCAS participants ($\chi^2 = 18.00$, $df = 1$, $p < 0.001$, Cramér's $V = 0.43$). Relative risk for lifetime diagnosis in the HCAS group was RR = 6.34 (CI 95% = 2.91–13.80) and for current diagnosis was RR = 7.36 (CI 95% = 2.32–23.39).

Current diagnoses in the HCAS group were as follows: 9 (50% of the sample) had anxiety disorders (i.e. GAD, social phobia, specific phobia), 4 (22%) had mood disorders (i.e. MDD, dysthymic disorder), 3 (17%) had PTSD comorbid with another Axis I disorder, and 2 (11%) had other disorders. Current diagnoses in the LCAS group were: 1 had PTSD, 1 had an anxiety disorder NOS, and 1 alcohol abuse disorder. Lifetime diagnoses in the HCAS group were as follows: 8 (26%) had anxiety disorders, 4 (13%) had mood disorders, 7 (23%) had comorbid anxiety and mood disorders, 5 (16%) had PTSD and anxiety and/or mood disorders, and the remaining 6 (19%) fulfilled criteria for other disorders. Lifetime diagnoses in the LCAS group were: 2 (33%) anxiety disorder NOS, and 4 other: 1 MDD comorbid with another Axis I disorder, 1 PTSD, 1 minor depressive disorder, and 1 alcohol abuse disorder.

Inclusion in the HCAS and LCAS groups on the basis of questionnaire results in the context of the presence of a lifetime diagnosis had sensitivity of 70% (CI 95% = 55%–83%) and specificity of 89% (CI 95% = 77%–96%). The positive predictive value was 84% (CI 95% = 70%–92%), the negative predictive value was 79% (CI 95% = 70%–85%), while the overall accuracy (sum of true positives and negatives divided by all results) of selection based on questionnaires was 81% (CI 95% = 71%–88%).

4.4. Conclusions

The results obtained indicate satisfactory reliability of the CAS-1 and satisfactory validity of a combination of the CAS-1, the "Brooding" subscale from the RRS, and two subscales from the MCQ-30. These measuring tools have satisfactory overall accuracy in detecting psychological disorders in a sample of people not currently undergoing psychiatric treatment. High levels of CAS are mostly connected to mood and anxiety

disorders and PTSD diagnoses. High levels of CAS symptoms are also connected to greater levels of psychopathology and pain symptoms.

5. General discussion

The aim of the presented studies was to explore the psychometric qualities of the CAS-1. The first study explored the validity and reliability of the CAS-1, its factor structure, and age and gender differences across a large community sample. The validity of the CAS-1 was explored through its relationships with metacognition and rumination questionnaires. The second study explored the validity of the CAS-1 through its relationships with a general functioning and psychopathology questionnaire and a quality of life questionnaire. The reliability of the CAS-1 was also explored. This study also allowed the identification of what amount of variance of psychopathology symptoms is explained by the CAS-1 when controlling for measures of metacognitive beliefs and rumination. The third study aimed to explore the predictive validity of CAS as a theoretical construct by ascertaining diagnoses in people with high and low levels of CAS. In light of results from the second study, the authors decided to broaden the questionnaire-based selection to other measures of elements of CAS: rumination and metacognitive beliefs. Subgroups based on the results of the CAS-1, the RRS's "Brooding" subscale, and the MCQ-30's "Need to Control Thoughts" and "Uncontrollability and Danger" subscales were diagnosed with a SCID-I structured interview and participants' levels of psychopathology symptoms were measured with the SCL-27-plus questionnaire.

There were gender differences in the CAS-1 results. This may result from gender differences in perceived levels of stress – women tend to obtain higher results on such measures [45–47], which may indicate that women are more prone to CAS because of higher levels of stressful events or a greater tendency to perceive events as stressful. Women also use emotional and avoidance styles to cope with stress more often [47]. It is noteworthy that these styles may be identified as elements of CAS – rumination [18] or thought suppression [6]. In particular, studies show that women are more likely than men to use rumination [48]. Likely because of this tendency, random selection in study 3 yielded a greater number of women in the HCAS group.

Four different theory driven factorial models of the CAS-1 were tested. All models had acceptable fit indices but χ^2 and BIC values indicate that the 2- and 4- factor models are a better fit to the data than the others and that the 2-factor model is superior to the 4-factor model. This may be understood as an indication that CAS-1 items can be easily divided into measures of cognitive and behavioral strategies on one hand and metacognitive beliefs on the other hand. But it should also be taken into account that the CAS-1 has only two items regarding basic CAS cognitive activities: repetitive negative thinking and threat monitoring. It may be hypothesized that the 4-factor structure proposed by Wells [2] would be preferable in a measuring tool with a more comprehensive assessment of those aspects, if such tool were to be devised.

The correlation analyses in studies 1 and 2 are in line with Wells' theory [2] and previous research which used the CAS-1 [15–17]. CAS-1 results have a medium-strength relationship with the measures of metacognitive beliefs and rumination. This indicates the construct validity of the CAS-1. CAS-1 results are also correlated with medium strength with levels of psychopathology symptoms (partial $r = 0.67$), and quality of life (partial $r = -0.57$) and its psychological domain (partial $r = -0.57$). This serves as a concurrent validity indicator. CAS-1 results are associated with different types of symptoms, not just depressive (partial $r = 0.62$) and anxiety symptoms (partial $r = 0.63$), which are known to be primarily linked to CAS levels [15,16]. They are also linked with other types of psychopathology such as cognitive deficits (partial $r = 0.50$), manic symptoms (partial $r = 0.47$), psychotic symptoms (partial $r = 0.31$), sexual disorder symptoms (partial $r = 0.38$), sleep disturbances (partial $r = 0.42$) [cf. 17], and somatic disorders (partial $r = 0.45$). This indicates the transdiagnostic

character of CAS. However, it is important to note that the strongest relationships between CAS scores and disorder symptoms are with symptoms of depression and anxiety. This leads to the hypothesis that CAS is not only a key factor in the development of emotional disorders, which is in line with Wells' theory [2], but that it also may be a moderating factor in relationships between levels of psychopathology and subjective distress related to symptoms. It also may be hypothesized that levels of CAS are a moderating factor for relationships of mechanisms or risk factors of mental illnesses with subjectively rated levels of psychopathology symptoms. This would be associated with the high levels of comorbidity of various mental disorders, especially when anxiety or mood disorders are part of a diagnosis [49]. These hypotheses remain to be tested in further studies.

Most of these associations (apart from the Positive Symptoms subscale) remain with diminished strength after introducing other CAS variables (RRS and MCQ-30 subscales) to the regression models. More complex models explain a greater percentage of the variance of psychopathology symptoms and quality of life; the role of the CAS-1 in these models is smaller but CAS-1 scores are still significant predictors of the response variables, even when taking RRS and MCQ-30 scores into account. This may indicate some unique component of the CAS-1 in relation to these two measuring tools, which have been previously used to assess levels of CAS [10,12,13]. However, the creator of the CAS-1 [2] states that this measure is mostly for clinical use and for rare cases when it is not known which tool for the assessment of disorder-specific CAS symptoms is of use. This may indicate that devising a thorough CAS measure for use in scientific and clinical studies is appropriate. Such a measure should take into account all CAS components – worry, rumination, threat-sensitivity (internal and external), and, most strongly connected to emotional disorders metacognitive beliefs. Such a measure was simulated in the third study with the use of a combination of CAS-related measures.

The overall accuracy of the questionnaire-based diagnosis had an acceptable value of 71%–88%. There is medium probability of being diagnosed with a psychological disorder when in the HCAS group, and high probability of not receiving such a diagnosis when in the LCAS group. It should be noted that these values are considered acceptable because of the highly pre-selected sample. Potential participants who were undergoing any kind of psychiatric treatment or were generally unfit for participation in an fMRI were not included in studies 1 and 3. Bearing in mind that the sample explored in study 3 consisted of individuals who were by their own declaration "fit for the study", the obtained accuracy may be considered acceptable and serve as proof of the validity of a CAS diagnosis based on questionnaires and of the questionnaires' ability to distinguish between people with current and past psychological disorders as well as those who do not have a disorder.

As with all research, these studies have limitations. Concerning the samples: the sample in study 1 was supposed to mirror the population of Warsaw, instead it contained slightly more women and was better educated than the population. Study 2 was also not balanced in terms of gender and education – the participants were mostly women and people with higher education. Study 3, which consisted of subsamples from study 1, was pre-selected in terms of excluding participants who were undergoing psychiatric treatment and unsuitable for an fMRI study. These exclusion criteria do not allow this sample to be considered a community one and diminishes the ecological validity of the study. It may be hypothesized that in a group of high-CAS individuals there would be a higher percent of people with psychiatric disorders and illnesses who were unable to participate in this study due to undergoing some kind of treatment. It may also be hypothesized that the group of people with severe levels of CAS greatly overlapped with the group of people with severe psychological disorders who are thus unable or unwilling to participate in any kind of scientific study. For example, people with agoraphobia would not want to travel to an unknown location, people with claustrophobia would not want to partake in an fMRI study, etc. On the other hand, it could perhaps be suggested that people with some notion of their psychological disturbances were more prone

to participate in the study with the motivation of "checking themselves" and obtaining a psychological diagnosis free of charge.

6. Conclusions

The main conclusions of the studies discussed are as follows:

1. The CAS-1 has satisfactory reliability and validity.

2. Two and four factor structures of the CAS-1 were confirmed. The two-factor model had the best fit to the data in the large sample examined and in comparison to other proposed factor structures.

3. CAS may be perceived as a vulnerability factor for the development and continuance of various psychopathological symptoms.

4. High levels of CAS are connected with the occurrence of mood and anxiety disorders and PTSD.

5. The CAS-1 was devised for clinical purposes and, thanks to its brevity, may be useful in such a setting. For research purposes it would be helpful to devise a more extensive measure of CAS.

6. A combination of items from the worry, rumination, and metacognitive beliefs questionnaires with items concerning behavioral aspects of CAS could serve as such a measure.

Acknowledgments

References

[1] Wells A. Emotional disorders and metacognition: innovative cognitive therapy. John Wiley & Sons; 2002.

[2] Wells A. Metacognitive therapy for anxiety and depression. New York: Guilford press; 2009.

[3] Wells A. Cognitive therapy of anxiety disorders: A practice manual and conceptual guide. John Wiley & Sons; 2013.

[4] Wells A, Matthews G. Modelling cognition in emotional disorder: the S-REF model. Behav Res Ther 1996;34(11):881–8.

[5] Borkovec TD, Shadick RN, Hopkins M. The nature of normal and pathological worry. In: Rapee RM, Barlow DH, editors. Chronic anxiety: generalized anxiety disorder and mixed anxiety-depression. New York: Guilford Press; 1991.

[6] Wegner DM, Zanakos S. Chronic thought suppression. J Pers 1994;62(4):615–40.

[7] Nolen-Hoeksema S. The role of rumination in depressive disorders and mixed anxiety/depressive symptoms. J Abnorm Psychol 2000;109(3):504.

[8] Borkovec TD, Alcaine O, Behar E. Avoidance theory of worry and generalized anxiety disorder. In: Heimberg RG, Turk CL, Mennin DS, editors. Generalized anxiety disorder: advances in research and practice. New York: Guilford Press; 2004.

[9] Wells A, Carter K. Preliminary tests of a cognitive model of generalized anxiety disorder. Behav Res Ther 1999;37(6):585–94.

[10] Wells A, Carter K. Further tests of a cognitive model of generalized anxiety disorder: metacognitions and worry in GAD, panic disorder, social phobia, depression, and nonpatients. Behav Ther 2001;32(1):85–102.

[11] Papageorgiou C, Wells A. Metacognitive beliefs about rumination in recurrent major depression. Cogn Behav Pract 2001;8(2):160–4.

[12] Papageorgiou C, Wells A. An empirical test of a clinical metacognitive model of rumination and depression. Cogn Ther Res 2003;27(3):261–73.

[13] Papageorgiou C, Wells A. A prospective test of the clinical metacognitive model of rumination and depression. Int J Cogn Ther 2009;2(2):123–31.

[14] Sica C, Steketee G, Ghisi M, Chiri LR, Franceschini S. Metacognitive beliefs and strategies predict worry, obsessive–compulsive symptoms and coping styles: a preliminary prospective study on an Italian non-clinical sample. Clin Psychol Psychother 2007;14(4):258–68.

[15] Fergus TA, Bardeen JR, Orcutt HK. Attentional control moderates the relationship between activation of the cognitive attentional syndrome and symptoms of psychopathology. Personal Individ Differ 2012;53(3):213–7.

[16] Fergus TA, Valentiner DP, McGrath PB, Gier-Lonsway S, Jencius S. The cognitive attentional syndrome: examining relations with mood and anxiety symptoms and distinctiveness from psychological inflexibility in a clinical sample. Psychiatry Res 2013;210(1):215–9.

[17] Fergus TA, Scullin MK. The cognitive attentional syndrome is associated with sleep difficulties in a community sample. Behav Sleep Med 2017;15(5):410–20.

[18] Nolen-Hoeksema S. Gender differences in depression. Curr Dir Psychol Sci 2001;10(5):173–6.

[19] McLean CP, Asnaani A, Litz BT, Hofmann SG. Gender differences in anxiety disorders: prevalence, course of illness, comorbidity and burden of illness. J Psychiatr Res 2011;45(8):1027–35.

[20] Kessler RC, McGonagle KA, Zhao S, Nelson CB, Hughes M, Eshleman S, et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. Arch Gen Psychiatr 1994;51(1):8–19.

[21] Spada MM, Wells A. Metacognitions about alcohol use in problem drinkers. Clin Psychol Psychother 2006;13(2):138–43.

[22] Spada MM, Wells A. Metacognitive beliefs about alcohol use: development and validation of two self-report scales. Addict Behav 2008;33(4):515–27.

[23] Kiejna A, Piotrowski P, Adamowski T, Moskalewicz J, Wciórka J, Stokwiszewski J, et al. The prevalence of common mental disorders in the population of adult poles by sex and age structure – an EZOP Poland study. Psychiatr Pol 2015;49(1).

[24] Wells A, Matthews G. Attention and emotion: A clinical perspective. Hove. UK: Lawrence Erlbaum; 1994.

[25] Wells A, Cartwright-Hatton S. A short form of the metacognitions questionnaire: properties of the MCQ-30. Behav Res Ther 2004;42(4):385–96.

[26] Hunsley J. Introduction to the special section on incremental validity and utility in clinical assessment. Psychol Asses 2003;15(4):443.

[27] Central Statistical Office. Demographic yearbook of Poland. http://stat.gov.pl/obszary-tematyczne/roczniki-statystyczne/roczniki-statystyczne/rocznik-demograficzny-2014,3,8.html; 2014. [accessed 11.07.2017].

[28] Central Statistical Office. Population in Poland. Size and structure by territorial division. http://stat.gov.pl/obszary-tematyczne/ludnosc/ludnosc/ludnosc-stan-i-struktura-oraz-ruch-naturalny-w-przekroju-terytorialnym-stanu-w-dniu-30-06-2016-r-,6,20.html; 2016. [accessed 11.07.2017].

[29] Nolen-Hoeksema S, Morrow J. A prospective study of depression and posttraumatic stress symptoms after a natural disaster: the 1989 Loma Prieta earthquake. J Pers Soc Psychol 1991;61(1):115.

[30] Treynor W, Gonzalez R, Nolen-Hoeksema S. Rumination reconsidered: a psychometric analysis. Cogn Ther Res 2003;27(3):247–59.

[31] Kornacka M, Buczny J, Layton RL. Assessing repetitive negative thinking using categorical and transdiagnostic approaches: a comparison and validation of three polish language adaptations of self-report questionnaires. Front Psychol 2016;7:322.

[32] Dragan M, Dragan WŁ. Psychometric properties of the Polish version of the metacognitions questionnaire-30. Psychiatr Pol 2011;45(4):545–53.

[33] Kass RE, Raftery AE. Bayes factors. J Am Stat Assoc 1995;90(430):773–95.

[34] Styła R, Kowalski J. Psychometric properties of the General Functioning Questionnaire (GFQ-58) used for screening for symptoms of psychopathology and overall level of functioning. Psychiatr Pol 2019 (in press).

[35] WHOQOL Group. Development of the World Health Organization WHOQOL-BREF quality of life assessment. Psychol Med 1998;28(3):551–8.

[36] Jaracz K, Kalfoss M, Górna K, Bączyk G. Quality of life in polish respondents: psychometric properties of the Polish WHOQOL–Bref. Scand J Caring Sci 2006;20(3):251–60.

[37] Olatunji BO, Naragon-Gainey K, Wolitzky-Taylor KB. Specificity of rumination in anxiety and depression: a multimodal meta-analysis. Clin Psychol Sci Pract 2013;20(3):225–57.

[38] Spada MM, Mohiyeddini C, Wells A. Measuring metacognitions associated with emotional distress: factor structure and predictive validity of the metacognitions questionnaire 30. Pers Individ Differ 2008;45(3):238–42.

[39] Sarisoy G, Pazvantoğlu O, Özturan DD, Ay ND, Yilman T, Mor S, et al. Metacognitive beliefs in unipolar and bipolar depression: a comparative study. Nord J Psychiatry 2014;68(4):275–81.

[40] First MB, Gibbon M, Spitzer RL, Williams JBW. SCID-I-TR: structured clinical interview for DSM-IV-TR disorders. New York: Biometrics Research; 2001.

[41] American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed., Text Revision; 2000 (Washington, DC).

[42] Popiel, A., Pragłowska, E., Zawadzki, B. (Polish version editors), 2014. Ustrukturalizowany wywiad kliniczny do badania zaburzeń z osi I DSM-IV-TR. Warszawa: Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego.

[43] Hardt J. The symptom checklist-27-plus (SCL-27-plus): a modern conceptualization of a traditional screening instrument. GMS Psycho-Social-Medicine 2008;5.

[44] Kuncewicz D, Dragan M, Hardt J. Validation of the polish version of the symptom checklist-27-plus questionnaire. Psychiatr Pol 2014;48(2):345–58.

[45] Turner RJ, Wheaton B, Lloyd DA. The epidemiology of social stress. Am Sociol Rev 1995:104–25.

[46] Almeida DM, Kessler RC. Everyday stressors and gender differences in daily distress. J Pers Soc Psychol 1998;75(3):670.

[47] Matud MP. Gender differences in stress and coping styles. Personal Individ Differ 2004;37(7):1401–15.

[48] Kwon H, Yoon KL, Joormann J, Kwon JH. Cultural and gender differences in emotion regulation: relation to depression. Cogn Emot 2013;27(5):769–82.

[49] Hasin DS, Grant BF. The national epidemiologic survey on alcohol and related conditions (NESARC) waves 1 and 2: review and summary of findings. Soc Psychiatry Psychiatr Epidemiol 2015;50(11):1609–40.