

# Introducing the brief version of the Dysfunctional Attitude Scale (DAS-14) based on a large clinical sample

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(Received: 1 October 2020, accepted: 15 June 2021)

*Theoretical background:* The Dysfunctional Attitude Scale (DAS) is a measurement tool that is commonly used to detect dysfunctional beliefs contributing to the emergence and onset of depressive symptoms. Although it has been primarily used for testing clinical populations, and various forms of the scale have been created, only a small body of literature has proved its psychometric adequacy on a clinical sample. *Goals:* Therefore, the current study aims to construct an updated, reliable and brief version of the DAS. *Methods:* For this purpose, besides the normal samples of adolescents ( $n = 195$ ) and adults ( $n = 270$ ), a heterogeneous clinical sample ( $n = 1077$ ) was involved in cross-sectional research. *Results:* The overall results of parallel analysis and exploratory factor analysis suggested a bifactor structure with a general factor and three extracted subfactors (Dependence, Perfectionism and Entitlement), comprising 14 items altogether ( $\chi^2 = 157.26$ ,  $DF = 63$ ,  $p < 0.001$ ,  $CFI = 0.970$ ,  $TLI = 0.957$ ,  $RMSEA = 0.036$ ,  $RMSEA CI_{90} = 0.029-0.044$ ). Convergent validity was tested by correlations with Beck Depression Inventory ( $r = 0.36$ ,  $p < 0.001$ ). *Conclusion:* Our study was based on the largest clinical sample in the field of psychometric analysis of the DAS so far. The findings suggest that DAS14 as a brief version of the original DAS has good psychometric properties, and it can be widely used as a measurement tool in the assessment of mood disorders.

**Keywords:** Dysfunctional Attitude Scale, DAS14, brief version, large clinical sample, bifactor analysis, validity

## 1. Introduction

Attitudes are one of the core structures of the human cognitive system which help to categorise and interpret experiences in the mind (Beck, 1967). They develop in interaction with the social environment while adjusting to individual needs, and are activated during frustration (Epstein, 1998).

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As generally present cognitive constructions in humans, attitudes influence thoughts, emotions and behavior. They may become dysfunctional while maladaptive patterns of reactions occur and perpetuate when encountering environmental stimuli, resulting in incapability to mobilise resources in order to maintain optimal functioning. Dysfunctional attitudes are overgeneralised, inconsistent, unrealistic beliefs organized into a continuum regarding the individual's self, the world and the future (Beck, Rush, Shaw, & Emery, 1979). Appearing in mentally healthy individuals as well as in people with diagnosed mental disorders (i.e. depression and anxiety disorders), they develop during adapting to stressful life events. Extensive research investigating depression found that dysfunctional attitudes are not only maintaining/covarying factors of depressive symptoms, but also predictors of depressive relapse and predictors of depressive episode frequency (Brouwer, Williams, Forand, DeRubeis, & Bockting, 2019; Ingram, Miranda, & Segal, 1998; Scher, Ingram, & Segal, 2005; Scotte, 1995; Thase & Simons, 1992; Theasdal & Dent, 1987). Therefore, measuring dysfunctional attitudes is also a clinically relevant question.

In contrast with the majority of questionnaires assessing dysfunctional attitudes and beliefs that target specific problems – such as sleep (Dysfunctional Attitudes and Beliefs about Sleep; Morin, Vallières, & Ivers, 2007) or sexuality (Sexual Dysfunctional Beliefs Questionnaire; Nobre, Gouveia, & Gomes, 2003) –, dysfunctional attitudes are measured in a wider sense by the Dysfunctional Attitude Scale (DAS). The 40-item DAS, as a widely accepted and applied questionnaire, was developed by Arlene Nancy Weissman (1979) and was completed by graduates and undergraduates. An initial, item-pool version of the DAS contained a hundred, 7-point Likert scale items in order to create two parallel forms that measure the distinctive characteristics of depressive cognitions. Applying principal component analysis with varimax rotation to form the structure of the questionnaire, Weissman found ten factors but used only one global dimension, as the aim of the study was to identify a general vulnerability factor to depression. As a result of empirical decisions, the DAS-A and the DAS-B comprising of 40 items and one general factor each, seemed psychometrically relevant, of which DAS form A remained the most widely applied version in clinical practice and depression research (e.g. Fuhr, Reitenbach, Kraemer, Hautzinger, & Meyer 2017; Senormanci et al., 2014). Since the DAS-A has become a common measurement tool to monitor cognitive therapeutic processes, a considerable amount of research has been carried out in several countries that proved the validity and reliability of the DAS in other languages (e.g. Ohrt & Thorell, 1998; Power et al., 1994; Sahin & Sahin, 1992).

Although the 100-item DAS was developed to assess pathogenic features of mental disorders, Weissman's assessments were performed on a

normative sample. Therefore, the factor structure of the DAS was revised by Beck, Brown, Steer and Weissman (1991) recruiting a large community of 2023 psychiatric outpatients. As a result, 9 factors were unfolded including 66 items. These factors were Vulnerability, Need for Approval, Success-Perfectionism, Need to Please Others, Imperatives, Need to Impress, Avoidance of Appearing Weak, Control Over Emotions, Disapproval-Dependence, which vary from the unidimensional conception of Weissman (1979).

Synthesizing previous research and practice, Kopp (1994) introduced a 35-item version of the questionnaire developed by Burns (1980). Burns (1980) transposed the original functional items into dysfunctional statements, resulting in 35 items collected from the DAS displaying dysfunctional beliefs, whereas Weissman and Beck (1978) also used reversely coded items (e.g. in the 35-items DAS item 6: 'I cannot find happiness without being loved by another person.' is composed in DAS-A in item 40: 'I can find happiness without being loved by another person.'). Based on Burns's theoretical model, compared to the DAS-A, no sum score is calculated; in contrast, seven subscales represent seven dysfunctional attitudes (Need for Approval, Love, Achievement, Perfectionism, Entitlement, Omnipotence, Autonomy) with total scores ranging from -10 to 10.

Contributing to the reduction of items, a growing differentiation of psychometric methodology, patient fitting problems and redundancy of items resulted in attempts to shorten the questionnaire.

### 1.1. Shortened forms of the DAS

In the last decades, several studies were published about shortened versions of the DAS-A in order to increase patient compliance, reduce assessment and administration time. Explorative and confirmative factor-analyses of the questionnaire brought about heterogeneous results. Studies mainly have found a one factor solution (Beevers, Strong, Meyer, Pilkonis, & Miller 2007; Ebrahimi, Samouei, Mousavii, & Bornamanesh, 2012; Moore, Fresco, Segal, & Brown, 2014). Other studies identified two (Batmaz & Ozdel, 2016; de Graaf, Roelofs, & Huibers, 2009; Mukhtar & Oei, 2010; Ruiz et al., 2015a,b), three (Power et al., 1994; Tajima et al., 2007) or four factors of the DAS (Chioqueta & Stiles, 2004). Further psychometric analyses, removed items from the original 100-item DAS or the 40-item DAS-A, resulted in 9-, 26- and 24-item forms of the questionnaire (Beevers et al. 2007; Ebrahimi et al., 2012; Power et al., 1994). Finally, a 17-item form of the DAS-R with two subscales (Perfectionism and Dependency) and a general factor became the most widespread version (de Graaf et al., 2009; Ruiz et al., 2015a,b) (See *Table 1*).

These mixed results may presumably depend on the features of the obtained population due to cultural diversity (as is the case in the abbreviated versions from Norway, the Netherlands, Iran, Spain, Turkey, Malaysia), sample size and the examination of healthy or clinical samples, the different forms of the questionnaire and the different number of items. Additionally, the use of exploratory and confirmatory factor analyses might have led to different structures of the questionnaire. While exploratory factor analysis gives the possibility for researchers to decide the number of extracted factors, confirmatory factor analysis fit indices are more accurate, but at the same time they rely on a priori findings that limit the number of examined factors. Despite the heterogeneity of the obtained results, Perfectionism, Dependency and DAS total score seemed to remain constant factors, independent of the above mentioned influences.

Psychometric studies of DAS have yielded results of reliability and various forms of validity. Internal consistency of the 40-item general DAS and its subscales were at a range of 0.60–0.92 not only in the original English version but also in other languages (e.g. Ohrt & Thorell, 1998; Power et al., 1994; Weissman, 1979). Test-retest reliability of the 24-item Japanese DAS with intraclass correlation (ICC) was relatively high (0.79, CI 95% = 0.63–0.88) and the *concurrent validity* was also in the acceptable range with the Irrational Belief Test ( $r = 0.76, p < 0.001$ ; Tajima et al., 2007). One study tested the *predictive validity* of the 40-item DAS-A using posttreatment Beck Depression Inventory (BDI) score. Beevers and his coworkers (2007) have found that the predictive value of the test is relatively small regarding depressive symptoms after cognitive therapy ( $\beta = 0.18, p = 0.02$ ) (with the control of pretreatment BDI). According to convergent validity studies, the relationship between depressive symptoms and dysfunctional attitudes remains unassured. Medium level correlation has been found between different forms of the DAS and the BDI: DAS-A and BDI ( $r = 0.47, p < 0.001$ ; Chioqueta & Stiles, 2004); DAS-R and BDI ( $r = 0.37, p < 0.001$ ; Batmaz & Ozdel, 2016). Strong correlation has been obtained between BDI-II and DAS-24 (non-clinical sample:  $r = 0.44, p < 0.001$ ; clinical sample:  $r = 0.63, p < 0.001$ ; Tajima et al., 2007), the Malay revised form of the DAS and BDI on a heterogeneous clinical and non-clinical sample ( $r = 0.68, p < 0.001$ ; Muhktar & Oei, 2010).

*Convergent validity* of different forms of the DAS confirmed strong relationship with the Automatic Thoughts Questionnaire ( $r = 0.51, p < 0.001$ ; Muhktar & Oei, 2010), the General Health Questionnaire ( $r = 0.56, p < 0.001$ ; Ebrahimi et al., 2012) and the Beck Hopelessness Scale ( $r = 0.51, p < 0.001$ ; Batmaz & Özdel, 2016), which reflect that dysfunctional attitudes are also in close relationship with the general cognitive system.

To conclude, based on correlational studies, the factor structure of the DAS does not show a consistent picture. In this context, the present study aims to (1) develop a brief and psychometrically reliable version of the DAS and (2) analyze its convergent and construct validity.

Table 1. Factor-analytic studies of the DAS

| Authors                   | Number of factors and items | Language  | Sample   | Method (CFA/EFA, extraction method, rotation) | Results   |
|---------------------------|-----------------------------|-----------|--|---|---|
| Power et al. (1994)       | 3 factors<br>24 items       | English   | 294 (students, recovered depressed and their relatives)                                      | 1. PCA, Varimax rotation<br>2. CFA            | The 3 factor explained the 34.1% of the total variance in DAS-A and 33.9% in DAS-B.   |
| Chioqueta & Stiles (2006) | 4 factors<br>32 items       | Norwegian | 318 soldiers   | PCA, Promax rotation                          | Explained variance of the 4 factors: 24%.   |
| Beevers et al. (2007)     | 1 factor<br>9 items         | English   | 367 depressed patients   | PFA (ML)                                      | Explained variance of general dimension: 33%.   |
| Tajima et al. (2007)      | 3 factors<br>24 items       | Japanese  | 1120 healthy<br>59 depressed patients  | EFA (ML), Promax rotation                     | No information about explained variance.  |
| de Graaf et al. (2009)    | 2 factors<br>17 items       | Dutch     | 8960 healthy   | CFA (ML)                                      | Two factor model: RMSEA = 0.065 (0.063-0.066), ECVI = 0.52 (0.49-0.54), NNFI = 0.98, CFI = 0.98, and GFI = 0.94.                |
| Mukhtar & Oei (2010)      | 2 factors<br>19 items       | Malay     | 315 undergraduates<br>459 general population<br>167 medical patients<br>113 major depression | EFA, CFA                                      | CFI = 0.90, GFI = 0.90, RMR = 0.15, RMSEA = 0.05  |
| Ebrahimi et al. (2012)    | 4 factors<br>26 items       | Persian   | 160 healthy<br>160 psychiatric patients  | PCA, CFA, Oblimin rotation                    | The 4 factor explained 33.27% of the total variance.  |
| Ruiz et al. (2015a,b)     | 2 factors<br>17 items       | Spanish   | 762 students   | CFA, Schmid-Leiman orthogonal rotation        | Two factor model with general factor:<br>RMSEA = 0.045, 90%<br>CFI = 0.99, NNFI = 0.99<br>GFI = 0.99<br>ECVI = 0.54[0.47;0.62]. |
| Batmaz & Ozdel (2016)     | 2 factors<br>13 items       | Turkish   | 885 outpatients  | EFA, CFA                                      | NFI = 0.92, TLI = 0.92, GFI = 0.97, CFI = 0.94, RMSEA = 0.06.   |

Note: PCA = Principal Component Analysis, MLE = Maximum Likelihood Estimation, PFA = Principal Factor Analysis, EFA = Exploratory Factor Analysis, CFA = Confirmatory Factor Analysis, RMSEA = Root Mean Square Error of Approximation, CFI = Comparative Fit Index, GFI = Goodness of Fit, ECVI = Expected Cross-Validation Index, NNFI = Non-normed Fit Index, TLI = Tucker-Lewis Index.

## 2. Methods

### 2.1. Participants and procedures

One clinical, one non-clinical and an adolescent group participated in the research, 1542 subjects altogether. The first group consisted of 1077 adult outpatients (69.5% female,  $M = 34.2$  years,  $SD = 11.8$  years) who were referred for treatment to the mental health center of Semmelweis University Department of Clinical Psychology. Inclusion criteria were 18–65 years of age and at least one of the following mental disorders: major depression, different types of anxiety disorder, personality disorder, obsessive compulsive disorder, eating disorder, sleeping disorder and sexual dysfunction (Table 2). Exclusion criteria were acute psychosis, acute alcohol or drug use, mental retardation and dementia. Patients took part in a pretreatment diagnostic assessments conducted by a clinical psychologist or intern clinical psychologist. Diagnoses based on the ICD-10 (WHO, 2004) were established by a clinical interview, SCID-I, SCID-II and self-report questionnaires.

The subjects of the non-clinical group were recruited via internet from the general population ( $n = 270$ , 77.4% female,  $M = 29.0$  years,  $SD = 9.5$  years). The adolescent sample comprised of 195 secondary school students (84.1% female,  $M = 15.1$  years,  $SD = 0.90$  years), from a secondary school in Pest and Veszprém county.

Data of the clinical sample were collected at the mental health center; subjects from the non-clinical group were assessed via internet, while the adolescents completed the questionnaires during classes after parental consent. The study protocol was approved and reviewed by the regional and institutional ethics board of the collaborating institutions (ethical approval numbers of the study are: SE 194/2012; KRE: 53/2019/P/ET).

Prior to questionnaire completion, informed consent was given by participants providing voluntary and anonymous participation. No monetary reimbursement was given for the assessment (Table 2).

Table 2. Sociodemographic data of clinical and non-clinical samples

| Variables  | Clinical sample<br>( <i>n</i> = 1077) | Non-clinical sample<br>( <i>n</i> = 270) |
|--|---------------------------------------|--|
| Marital status                                     |                                       |  |
| Single   | 434 (40%)                             | 82 (30%)                                 |
| In relationship                                    | 312 (29%)                             | 138 (51%)                                |
| Married  | 232 (22%)                             | 43 (16%)                                 |
| Divorced   | 64 (5.9%)                             | 5 (1.8%)                                 |
| Widow  | 13 (1.2%)                             | 2 (0.7%)                                 |
| Socioeconomic status                               |                                       |  |
| Student  | 247 (23%)                             | 83 (31%)                                 |
| Employed   | 623 (58%)                             | 151 (56%)                                |
| Unemployed/occupational disability                 | 186 (17%)                             | 36 (13%)                                 |
| Level of education                                 |                                       |  |
| Elementary school                                  | 93 (8.6%)                             | 2 (0.7%)                                 |
| High school/vocational school                      | 527 (49%)                             | 84 (31%)                                 |
| University/college                                 | 443 (41%)                             | 184 (68%)                                |
| Diagnoses (DSM-5)                                  |                                       |  |
| Depressive disorders                               | 255 (24%)                             |  |
| Anxiety disorders                                  | 418 (39%)                             |  |
| Bipolar and related disorders                      | 14 (1%)                               |  |
| Obsessive-Compulsive and Related Disorders         | 31 (3%)                               |  |
| Trauma- and stressor-related disorders             | 185 (17%)                             |  |
| Personality disorders                              | 80 (7%)                               |  |
| Somatic symptoms and related disorders             | 49 (5%)                               |  |
| Sleep-wake disorders                               | 6 (0.6%)                              |  |
| Feeding and eating disorders                       | 18 (2%)                               |  |
| Substance-related and addictive disorders          | 9 (0.8%)                              |  |
| Sexual dysfunctions                                | 3 (0.2%)                              |  |
| Schizophrenia spectrum and other related disorders | 9 (0.8%)                              |  |

## 2.2. Measurements

*Sociodemographic data.* As for the clinical sample, age, sex, socioeconomic status, highest level of education and marital status were assessed during the first clinical interview. Questions regarding sociodemographic data of the non-clinical sample were administered via internet. Sociodemographic data of the adolescent sample was collected by paper-and-pencil assessment.

*Dysfunctional Attitude Scale (DAS).* In the current study, the 35-item version of the DAS was administered in all samples (Kopp, 1994; Weissman & Beck, 1978). Items were scored on a 5-point Likert scale ( $-2 = Absolutely\ agree$  to  $2 = Absolutely\ disagree$ ) resulting in a total score between  $-70$  and  $70$ . Seven subscales are assumed to exist, with 5 items in each subscale (Need for Approval, Seeking Love, Performance Evaluation, Perfectionism, Entitlement, Omnipotence, Autonomy), with results ranging from  $-10$  to  $10$  each. A higher total score represents more frequent activation of the dysfunctional attitudes. Internal consistency of the subscales ranged from  $0.57$  to  $0.79$  in previous studies (Mészáros et al., 2014).

*Beck Depression Inventory (BDI).* The Beck Depression Inventory (BDI, Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Kopp & Fóris, 1993) contains 21 items measuring the severity of emotional, motivational, cognitive and somatic symptoms of depression. Each item consists of four statements with varying severity of one particular symptom. Total scores range from  $0$  to  $63$  with higher scores reflecting more severe depression. In the present study, Cronbach's  $\alpha$  of the BDI confirmed previously assessed excellent reliability ( $0.90$ ) by Mészáros et al. (2014).

## 2.3. Statistical analysis

To evaluate the factor structure of the DAS-R, an exploratory factor analysis (EFA) was first performed to explore the factor structure on the clinical sample. Prior to conducting the EFA, the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity were used to check for the factorability of the data. We decided on the number of factors using parallel analysis based on a polychoric correlation matrix when performing the EFA (Timmerman & Lorenzo-Seva, 2011). The CFA was applied to confirm the factor structure we extracted in the EFA with maximum likelihood estimation with the clinical, non-clinical and adolescent samples. The following indices were used to evaluate how well the data fit the model: Chi-Square value, degrees of freedom (DF), root mean square error of approximation (RMSEA  $< 0.08$ ), comparative fit index (CFI  $< 0.90$ ), and Tucker-Lewis index (TLI  $> 0.90$ ) (Bentler, 1990).



We also calculated the percent of Explained Common Variance (ECV; Reise, Moore, & Haviland, 2010), an index of unidimensionality, attributable to the general factor and each of the three group factors. When Percent of Uncontaminated Correlations (PUC) values are higher than 0.80, general ECV values are less important in predicting bias; when PUC values are lower than 0.80, general ECV values greater than 0.60 and Coefficient Omega Hierarchical values greater than 0.70 suggest that the presence of multidimensionality is not severe enough to disqualify the interpretation of the instrument as primarily unidimensional (Reise, Scheines, Widaman, & Haviland 2013). In turn, group factor ECVs establish the uniqueness of each factor, with a low group ECV indicating little unique variability due to that subscale factor.

We also tested convergent validity with Beck Depression Inventory. Pearson correlation was used to test the convergence.

We used Amos, SPSS 27.0 and FACTOR 10.10.03. for statistical analyses.

### 3. Results

#### 3.1. Exploratory factor analyses (EFA) with clinical sample

The EFA was first used to analyze the data and identify the underlying factors of all 35 items for clinical sample. The KMO value was 0.92, which was higher than the recommended value of 0.60. The Bartlett's test of sphericity ( $\chi^2 = 9623.41$ ,  $p < 0.001$ ) was adequate, which implied that the data of the clinical sample were suitable for factor analysis. Parallel analysis confirmed a three-factor model of DAS-R. The EFA with varimax rotation extracted a three-factor solution that accounted for 32.3% of the total variance. Several items did not load onto any of the extracted factors, and few of them demonstrated high cross-loading for another factor (Table 3). Factors 1, 2, and 3 (F1, F2 and F3) were named *Performance Evaluation and Perfectionism*, *Entitlement*, and *Seeking Love*, respectively.

Table 3. Factor loadings, communalities ( $h^2$ ), percentage of extracted variance accounted for by each factor based on Exploratory Factor Analysis (EFA) and Varimax rotation

| Subscales and items   | F1          | F2   | F3          | $h^2$ |
|---|-------------|------|-------------|-------|
| <b>Need for Approval</b>  |             |      |             |       |
| 1. Criticism will obviously upset the person who receives the criticism.                          |             |      |             | 0.19  |
| 2. It is best to give up my own interests in order to please other people.                        | 0.44        |      |             | 0.29  |
| 3. I need other people's approval in order to be happy.   | 0.33        |      | 0.57        | 0.43  |
| 4. If someone important to me expects me to do something, then I really should do it.             |             |      |             | 0.07  |
| 5. My value as a person depends greatly on what others think of me.                               | 0.45        |      | 0.48        | 0.47  |
| <b>Seeking Love</b>   |             |      |             |       |
| 6. I cannot find happiness without being loved by another person.                                 |             |      | <b>0.69</b> | 0.51  |
| 7. If others dislike you, you are bound to be less happy.   |             |      | <b>0.75</b> | 0.58  |
| 8. If people whom I care about reject me it means there is something wrong with me.               |             |      | <b>0.49</b> | 0.30  |
| 9. If a person I love does not love me, it means I am unlovable.                                  | 0.56        |      | 0.38        | 0.48  |
| 10. Being isolated from others is bound to lead to unhappiness.                                   |             |      | <b>0.46</b> | 0.22  |
| <b>Performance Evaluation</b>   |             |      |             | 0.51  |
| 11. If I am to be a worthwhile person, I must be truly outstanding in at least one major respect. | 0.58        |      | 0.30        | 0.41  |
| 12. I must be a useful, productive, creative person, or life has no purpose.                      | 0.47        |      |             | 0.29  |
| 13. People who have good ideas are more worthy than those who do not.                             | <b>0.65</b> |      |             | 0.43  |
| 14. If I do not do as well as other people, it means I am inferior.                               | <b>0.73</b> |      |             | 0.58  |
| 15. If I fail at my work, then I am a failure as a person.  | <b>0.68</b> |      |             | 0.51  |
| <b>Perfectionism</b>  |             |      |             |       |
| 16. If you cannot do something well, there is little point in doing it at all.                    | <b>0.57</b> |      |             | 0.32  |
| 17. It is shameful for a person to display his weaknesses.  | 0.58        |      |             | 0.35  |
| 18. A person should try to be the best at everything he undertakes.                               | 0.38        | 0.31 |             | 0.28  |
| 19. I should be upset if I make a mistake.  | 0.34        |      | 0.33        | 0.22  |
| 20. If I don't set the highest standards for myself, I am likely to end up a second rate person.  | <b>0.69</b> |      |             | 0.48  |

Table 3. (Continued)

| Subscales and items  | F1    | F2   | F3   | $h^2$ |
|--|-------|------|------|-------|
| <b>Entitlement</b>   |       |      |      |       |
| 21. If I strongly believe I deserve something, I have a reason to expect that I should get it.   |       | 0.48 |      | 0.23  |
| 22. It is necessary to become frustrated if you find obstacles to getting what you want.   |       | 0.48 |      | 0.26  |
| 23. If I put other people's needs before my own, they should help me when I need something from them.  |       | 0.64 |      | 0.43  |
| 24. If I am a good husband (or wife), then my spouse is bound to love me.  |       | 0.67 |      | 0.45  |
| 25. If I do nice things for someone, I can anticipate that they will respect me and treat me just as well as I treat them.   |       | 0.61 |      | 0.35  |
| <b>Omnipotence</b>   |       |      |      |       |
| 26. I should assume responsibility for how people feel and behave if they are close to me.   |       |      |      | 0.08  |
| 27. If I criticize the way someone does something and they become angry or depressed, this means I have upset them.  | 0.34  |      |      | 0.22  |
| 28. To be a good, worthwhile, virtuous person, I must try to help everyone who needs it.   |       | 0.39 |      | 0.23  |
| 29. If a child is having emotional or behavioral difficulties, this shows that the child's parents have failed in some important respect.                                    | 0.31  |      |      | 0.11  |
| 30. I should be able to please everybody.  | 0.53  | 0.39 |      | 0.44  |
| <b>Autonomy</b>  |       |      |      |       |
| 31. I cannot expect to control how I feel when something bad happens.  |       |      | 0.35 | 0.21  |
| 32. There is no point in trying to change upsetting emotions because they are a valid and inevitable part of daily life.   |       |      |      | 0.12  |
| 33. My moods are primarily created by factors that are largely beyond my control, such as the past, or body chemistry, or hormone cycles, or biorhythms, or chance, or fate. | 0.34  | 0.32 |      | 0.24  |
| 34. My happiness largely depends on what happens to me.  |       | 0.45 |      | 0.28  |
| 35. People who have the marks of success (good looks, social status, wealth or fame) are bound to be happier than those who do not.  | 0.42  |      |      | 0.26  |
| Percentage of the variance   | 22.08 | 5.51 | 4.74 | -     |

Note: clinical sample ( $n = 1077$ ). Factor 1 = Performance Evaluation and Perfectionism, Factor 2 = Entitlement, Factor 3 = Seeking Love.

### 3.2. Confirmatory factor analyses (CFA) with clinical, non-clinical and adolescent samples

The internal structure of the 35-item DAS and DAS-14 was tested via a series of CFAs (with MLR method, and oblique rotation) specifically. For the 35-item original version, the one- and seven-factor second order versions were tested, respectively. The abbreviated 14-item version was tested in a one-factor form, and also the three-factor, and bifactor form based on previous exploratory factor analysis.

Regarding the DAS-14, both the bifactor and the three-factor solutions demonstrated adequate model fit for every sample (Table 4). The original DAS-R unidimensional and seven-factor solutions had inadequate model fit.

Table 4. Goodness of fit statistics for all tested measurement models

| Model   | $\chi^2$ | DF  | $p$    | RMSEA<br>(CI <sub>90</sub> ) | CFI   | TLI   |
|---|----------|-----|--------|------------------------------|-------|-------|
| <b>Clinical sample (<math>n = 1077</math>)</b>    |          |     |        |                              |       |       |
| Unidimensional (DAS-35)                           | 3166.22  | 560 | <0.001 | 0.064<br>(0.061–0.066)       | 0.720 | 0.703 |
| Seven-factor second order (DAS-35)                | 1822.74  | 539 | <0.001 | 0.046<br>(0.044–0.048)       | 0.859 | 0.845 |
| Unidimensional (DAS-14)                           | 1072.59  | 77  | <0.001 | 0.107<br>(0.101–0.113)       | 0.686 | 0.628 |
| Three-factor second order (DAS-14)                | 208.61   | 74  | <0.001 | 0.040<br>(0.034–0.047)       | 0.957 | 0.948 |
| Three-factor bifactor (DAS-14)                    | 157.26   | 63  | <0.001 | 0.036<br>(0.029–0.044)       | 0.970 | 0.957 |
| <b>Non-clinical sample (<math>n = 270</math>)</b> |          |     |        |                              |       |       |
| Unidimensional (DAS-35)                           | 1356.76  | 560 | <0.001 | 0.073<br>(0.068–0.078)       | 0.657 | 0.636 |
| Seven-factor second order (DAS-35)                | 1010.91  | 539 | <0.001 | 0.057<br>(0.052–0.062)       | 0.797 | 0.776 |

| Model  | $\chi^2$ | DF  | <i>p</i> | RMSEA<br>(CI <sub>90</sub> ) | CFI   | TLI   |
|--|----------|-----|----------|------------------------------|-------|-------|
| Unidimensional (DAS-14)                          | 397.78   | 77  | <0.001   | 0.124<br>(0.112–<br>0.137)   | 0.625 | 0.557 |
| Three-factor second order<br>(DAS-14)            | 142.77   | 74  | <0.001   | 0.059<br>(0.044–<br>0.073)   | 0.920 | 0.901 |
| Bifactor with three<br>specific factors (DAS-14) | 100.31   | 63  | 0.002    | 0.047<br>(0.029–<br>0.064)   | 0.956 | 0.937 |
| <b>Adolescent sample (<i>n</i> =195)</b>         |          |     |          |                              |       |       |
| Unidimensional (DAS-35)                          | 822.73   | 560 | <0.001   | 0.049<br>(0.042–<br>0.056)   | 0.560 | 0.533 |
| Seven-factor second order<br>(DAS-35)            | 709.51   | 539 | <0.001   | 0.040<br>(0.032–<br>0.048)   | 0.715 | 0.685 |
| Unidimensional (DAS-14)                          | 183.34   | 77  | <0.001   | 0.084<br>(0.069–<br>0.100)   | 0.526 | 0.440 |
| Three-factor second order<br>(DAS-14)            | 87.95    | 74  | 0.128    | 0.031<br>(0.000–<br>0.054)   | 0.938 | 0.923 |
| Bifactor with three<br>specific factors (DAS-14) | 68.21    | 63  | 0.305    | 0.021<br>(0.000–<br>0.049)   | 0.977 | 0.966 |

Note: DF = degree of freedom, RMSEA = Root Mean Square Error of Approximation, CFI = Comparative Fit Index, TLI = Tucker-Lewis Index.

### 3.3. Standardized loadings and model-based reliability estimates for the DAS-14

Table 5 summarises the factor loadings for the unidimensional and bifactor solutions for the DAS-14. Most general factor item loadings were similar to the group factor loadings and to the item loadings from the unidimensional solution. The ECV coefficients for the DAS-14 were low. Eight of the 14 items had Individual Explained Common Variance (IECV) coefficients below 0.50, which indicated that most items were better measures of the group factors than the general factor.

Coefficient Omega Hierarchical ( $\omega_H$ ; McDonald, 1999) measures the proportion of total score variance that can be attributed to a single general factor after accounting for group (i.e., subscale) factors. Coefficient Omega Subscale ( $\omega_S$ ) is a version of  $\omega_H$  that measures the proportion of subscale score variance that is uniquely due to that group (i.e., subscale) factor after controlling for the general factor. Thus,  $\omega_H = 0.60$  would indicate that the DAS-14's total score predominantly reflects a single general factor despite the presence of multidimensionality across items, which in turn would permit researchers to interpret the total score as a sufficiently reliable and appropriate measure of the general construct of dysfunctional attitudes.

Table 5. Factor loadings for the unidimensional and bifactor solutions for the DAS-14

| Subscales and items                               | Unidimensional model | Bifactor model           |      |      |      |      |
|---|----------------------|--------------------------|------|------|------|------|
|   |                      | General Factor ( $F_g$ ) | F1   | F2   | F3   | IECV |
| <b>Seeking Love</b>                               |                      |                          |      |      |      |      |
| DAS6  | 0.43                 | 0.48                     | 0.56 |      |      | 0.42 |
| DAS7  | 0.45                 | 0.50                     | 0.52 |      |      | 0.48 |
| DAS8  | 0.43                 | 0.50                     | 0.12 |      |      | 0.95 |
| DAS10   | 0.27                 | 0.31                     | 0.22 |      |      | 0.66 |
| <b>Performance Evaluation and Perfectionism</b>   |                      |                          |      |      |      |      |
| DAS13   | 0.66                 | 0.49                     |      | 0.45 |      | 0.54 |
| DAS14   | 0.78                 | 0.56                     |      | 0.65 |      | 0.42 |
| DAS15   | 0.72                 | 0.53                     |      | 0.53 |      | 0.49 |
| DAS16   | 0.46                 | 0.37                     |      | 0.26 |      | 0.66 |
| DAS20   | 0.57                 | 0.44                     |      | 0.36 |      | 0.59 |
| <b>Entitlement</b>                                |                      |                          |      |      |      |      |
| DAS21   | 0.26                 | 0.24                     |      |      | 0.37 | 0.31 |
| DAS22   | 0.24                 | 0.28                     |      |      | 0.26 | 0.53 |
| DAS23   | 0.34                 | 0.37                     |      |      | 0.55 | 0.30 |
| DAS24   | 0.31                 | 0.31                     |      |      | 0.56 | 0.24 |
| DAS25   | 0.24                 | 0.25                     |      |      | 0.49 | 0.21 |
| <i>Cronbach's <math>\alpha</math></i>             |                      | 0.83                     | 0.67 | 0.79 | 0.67 |      |
| <i>Omega Hierarchical (<math>\omega_H</math>)</i> |                      | 0.60                     | 0.26 | 0.38 | 0.47 |      |
| <i>Explained Common Variance (ECV)</i>            |                      | 0.46                     | 0.12 | 0.21 | 0.20 |      |

### 3.4. Validity of the DAS-14

To provide data on the convergent validity of the brief DAS-14, correlations between the DAS-14 scores and BDI were investigated on the clinical sample ( $n = 1077$ ). As predicted, the 3 subscales and global DAS14 score were positively correlated with the BDI total score. We have found medium positive correlation with the global DAS-14 score ( $r = 0.36, p < 0.001$ ), Performance Evaluation and Perfectionism subscale ( $r = 0.41, p < 0.001$ ), and Entitlement subscale ( $r = 0.39, p < 0.001$ ). Low correlation was found with Seeking Love subscale ( $r = 0.27, p < 0.001$ ).

## 4. Discussion

The present study aims to revise the Dysfunctional Attitude Scale (DAS) in order to clarify its factor structure. Since the rate of dysfunctionality is arranged on a continuum, the current paper aimed to create a measurement tool in order to examine dysfunctional attitudes in mentally healthy population and among mental disorders. Wide range of applicability was taken into account when choosing items. In addition, keeping clinically relevant information served the purpose of facilitating its clinical application by a shortened version. Owing to bifactor solution, total score of the measure reflects the global intensity of dysfunctionality while subscales help to identify different problem areas.

Compared to the original 7 and 9 subscale forms of the DAS, in the present study we identified three dysfunctional attitudes, namely, Seeking Love, Performance Evaluation, and Entitlement. These are consistent with Beck's vulnerability theory describing that individuals categorise and structure their experiences by perception (Beck, et al., 1979). As perceptual schemas are damaged, maladaptive, over-generalised structures may distort cognitions by letting a depressive thinking pattern become dominant in cognitive processes. Dysfunctional attitudes evolving on the basis of maladaptive schemas can be measured by the DAS. Although numerous revised versions of the scale were developed, Perfectionism and Dependence/Seeking Love were recurrently confirmed to exist as stable factors (de Graaf et al., 2009; Ruiz et al., 2015a,b).

The current study is partly in accordance with previous findings, mainly by highlighting the significance of *Perfectionism* and *Seeking Love*. The depressive cognitive self-system – a core of Beck's concept – provides a basis for negative preconceptions about not only the self but also interpersonal relationships and about the future. These ideations are dividable into well-defined schemas, of which *Unlovableness* and *Self-*

*worthlessness* are primal. Self-worthlessness is a core maladaptive schema of depressive self-experience with a drive to prove a person's value through talent and excellence; and Unlovableness operates the level of trust in people as well as the intensity of a desire to be loved (Beck et al., 1979; Tringer, 2007).

In DAS-14 the third dysfunctional attitude (the third factor) named *Entitlement* represents the expectations and frustrations toward others, such as in item #23 "If I put other people's needs before my own, they should help me when I need something from them." It is in line with the negative view of the world in Beck's negative cognitive triad of depression (e.g. Genuchi & Valdez, 2015; Kopp, Skrabski, & Szedmák, 2000; Rude, Chrisman, Burton Denmark, & Maestas, 2012).

Psychometric analyses considered not only factor content appropriateness, but also clinically relevant features of the DAS. Focusing on Beck's cognitive vulnerability concept, the present study applied three independent samples in order to maintain its theoretical qualities. Since the DAS is primarily a diagnostic measurement tool, another aim was to maintain comprehensibility, conciseness and clarity of the statements. Hence, two psychometrically weaker items #8 and #10 ("If people whom I care about reject me it means there is something wrong with me." and "Being isolated from others is bound to lead to unhappiness.") were kept in the questionnaire in order to strengthen the theoretical coherence of the scale.

The most remarkable result to emerge from the data is the fitting of the bifactor model, showing a clear advantage over balancing the psychometrical parameters and diagnostic properties including multidimensionality of the scale. The bifactor solution allows the use of a general factor in order to gain a holistic picture of the dysfunctionality level of cognitive processes. On the other hand, analyzing the three subscales of Seeking Love, Performance Evaluation and Perfectionism, and Entitlement separately may contribute to obtaining a more detailed and more specific picture about the problem areas of the patient (Brunner, Nagy, & Wilhelm, 2012; Chen, West, & Sousa, 2006).

Another noteworthy finding is the adequate construct validity of the DAS-14. Convergent validity of the brief DAS-14 was also confirmed by finding medium level correlations with the Beck Depression Inventory, supporting a previous study by Batmaz and Ozdel (2016).

A strength of the study, regarding sample size, is that this study has been carried out on the largest clinical sample in the field of psychometric analysis of the DAS so far. Sample heterogeneity and functional aspects required multiphasic analyses, thus, parallel and bifactor modelling were used.



Settings of questionnaire completion differed by subgroups. While clinical subjects went under a diagnostic process with the control of a health professional, the adolescent sample filled in the form by paper-and-pencil testing in a group setting, and healthy subjects via internet. This could cause differences between groups. However, previous research found similar features of data collecting methods when contrasting paper-and-pencil scores with online assessment (i.e. Cronly et al., 2018; Vosylis, Zukauskienė, & Malinauskienė, 2012). Moreover, the considerable gap between subgroup sizes could have influenced the obtained results. Sample size of the clinical population met factor analytic criteria. In contrast, adolescent and normal population sample sizes were not sufficient for conducting exploratory factor analysis properly. However, fitting of the bifactor model was fairly similar in all samples. Thus, our results are confined mainly to a clinical population with the supplementary role of normal and adolescent data.

On the other side, a limitation of the study is that various test batteries were given during assessments. Consequently, test priming effects also differed by subgroups. For instance, the clinical population completed depression and anxiety scales besides the DAS. Previous research supported the finding that monitoring depressive symptoms and anxiety may influence self-reported mood and negative mood priming might increase levels of dysfunctional attitudes (Fresco, Heimberg, Abramowitz, & Bertram, 2006; Mark, Sinclair, & Wellens, 1991). Consequently, an affective priming effect could cause differences in test results. Finally, since our data collecting method was cross-sectional, no test-retest reliability or predictive value was investigated. Research into solving this problem requires longitudinal design. Apart from structural validity, other types of validity should be investigated on normal population.

To summarise, our findings support that DAS-14 is an appropriate, reliable and valid questionnaire to be used in research and clinical practice. It can be used not only for diagnostic purposes but also for monitoring therapeutic effects along multidimensional scaling. In the present study, the brief DAS showed sufficient internal consistency with theoretically proven three factors, thus allowing for reduced administration time. All in all, the brief DAS-14 has several benefits compared to the original, longer forms.

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## Acknowledgements

The study was supported by the Center of Excellence in High Education program of the Ministry of Innovation and Technology in the field of Neurology at Semmelweis University (FIKP) and a grant of Károli Gáspár University of the Reformed Church (Grant nu.: 20655B800 'Personality and Health Psychology' and 20643B800 'Person- and Family-oriented Health Sciences).

## Authors contribution

Dóra Perczel-Forintos: developing idea, assuring the availability of clinical sample, critical reading of the paper. Barbara Kulig: data collection, writing the paper, literature review. Veronika Mészáros: writing the paper, literature review, interpreting results. Dóra Antal-Uram: data collection, literature review. Sándor Rózsa: statistical analyses, developing idea, interpreting results.

## Conflict of interest

The authors declare that they have no conflict of interest.

## Appendix: Diszfunkcionális Attitűd Skála (DAS-14)

Kérem, karikázzon be 1-től 5-ig egy számjegyet minden állítás mellett. 5-öt ha teljesen egyetért, 4-et ha kissé egyetért, 3-at ha bizonytalan, 2-t ha kissé nem ért egyet, 1-et ha egyáltalán nem ért egyet.

|  | Egyáltalán<br>nem értek<br>egyet | Kissé<br>nem értek<br>egyet | Bizony-<br>talan | Kissé<br>egyet-<br>értek | Teljesen<br>egyet-<br>értek |
|--|----------------------------------|-----------------------------|------------------|--------------------------|-----------------------------|
| 1. Nem lehetek boldog,<br>ha nem szeret valaki.  | 1                                | 2                           | 3                | 4                        | 5                           |
| 2. Azok az emberek,<br>akiknek jó ötleteik vannak,<br>értékesebbek, mint<br>akiknek nincs.                       | 1                                | 2                           | 3                | 4                        | 5                           |
| 3. Ha meg vagyok győződve<br>arról, hogy jár nekem<br>valami, jogosan várhatom<br>el, hogy meg is kapjam.        | 1                                | 2                           | 3                | 4                        | 5                           |
| 4. Ha mások nem szeretnek,<br>kevésbé vagyok boldog.   | 1                                | 2                           | 3                | 4                        | 5                           |
| 5. Ha nem dolgozom<br>olyan jól, mint mások,<br>kevesebbet érek.   | 1                                | 2                           | 3                | 4                        | 5                           |
| 6. Természetes, hogy<br>az ember csalódottnak<br>érzi magát, ha akadályba<br>ütközik, hogy elérje,<br>amit akar. | 1                                | 2                           | 3                | 4                        | 5                           |
| 7. Ha azok az emberek,<br>akikkel törődöm,<br>visszautasítanak, valamit<br>rosszul csinálok.                     | 1                                | 2                           | 3                | 4                        | 5                           |
| 8. Ha sikertelen vagyok<br>a munkámban, sikertelen<br>ember vagyok.  | 1                                | 2                           | 3                | 4                        | 5                           |
| 9. Ha mások igényeit<br>a magamé elé helyezem,<br>nekik is segíteniük kell.                                      | 1                                | 2                           | 3                | 4                        | 5                           |
| 10. Másoktól elkülönülten élni<br>boldogtalansághoz vezet.   | 1                                | 2                           | 3                | 4                        | 5                           |

|  | Egyáltalán<br>nem értek<br>egyed | Kissé<br>nem értek<br>egyed | Bizony-<br>talan | Kissé<br>egyed-<br>érték | Teljesen<br>egyed-<br>érték |
|--|----------------------------------|-----------------------------|------------------|--------------------------|-----------------------------|
| 11. Ha valamit nem tudok jól megcsinálni, egyáltalán nincs értelme belekezdeni.                                      | 1                                | 2                           | 3                | 4                        | 5                           |
| 12. Ha jó férj/ feleség vagyok, házastársamnak szeretnie kell engem.   | 1                                | 2                           | 3                | 4                        | 5                           |
| 13. Ha nem állítom magam elé a legmagasabb mércét, másodrendű ember leszek.  | 1                                | 2                           | 3                | 4                        | 5                           |
| 14. Ha valakinek jót teszek, remélhetem, hogy tekintettel lesz rám és éppen olyan jól fog bánni velem, mint én vele. | 1                                | 2                           | 3                | 4                        | 5                           |

### Kiértékelés:

A DAS-14 faktorstruktúrájában három alskála szerepel, de a kérdőívben elért összpontszám is értelmezhető önmagában. Nincsenek fordított tételek.

Az alskálák képzése a tételek összeadásával történik.

Szeretettséگیgény/Dependencia alskála: 1., 4., 7. és 10. tételek

Perfektionizmus/Teljesítményigény alskála: 2., 5., 8., 11. és 13. tételek

Elvárások alskála: 3., 6., 9., 12. és 14. tételek

## A Diszfunkcionális Attitűd Skála rövidített változatának (DAS14) pszichometriai jellemzőinek vizsgálata nagy klinikai mintán

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*Elméleti háttér:* A Diszfunkcionális Attitűd Skála (DAS) egy olyan pszichológiai kérdőíves eljárás, amely azon diszfunkcionális hiedelmek mérésére alkalmas, amelyek hozzájárulnak a depresszív tünetek kialakulásához és fennmaradásához. Annak ellenére, hogy már számos változata létezik és elsődleges használati területét a klinikai populáció jelenti, pszichometriai mutatóit klinikai mintán a kutatások szűk köre vizsgálta. *Cél:* Jelen tanulmány célja a DAS aktualizálása, rövidítése, megbízhatóságának és validitásának vizsgálata. *Módszer:* Keresztmetszeti kérdőíves vizsgálatunk keretében egészséges serdülő ( $n = 195$ ) és felnőtt ( $n = 270$ ) minta mellett heterogén klinikai mintát ( $n = 1077$ ) alkalmaztunk.

*Eredmények:* A paralelelemzés és a feltáró faktoranalízis eredményei a bifaktoros struktúrát igazolják. A 14 itemre egy általános és három alfaktor (Dependencia, Perfekcionizmus és Elvárások) illeszthető ( $\chi^2 = 157,26$ ,  $DF = 63$ ,  $p < 0.001$ ;  $CFI = 0,970$ ;  $TLI = 0,957$ ;  $RMSEA = 0,036$ ,  $RMSEA\ 90\% \text{ CI} = 0.029\text{--}0.044$ ). A skála konvergens validitását a Beck Depresszió Kérdőívvel való korrelációja alátámasztja ( $r = 0,36$ ;  $p < 0,001$ ). *Konklúzió:* A DAS pszichometriai vizsgálatai közül ez idáig alkalmazott legnagyobb klinikai elemszámú vizsgálatát mutatja be a tanulmány. Az eredmények alapján a DAS rövidített változata, a DAS-14 megfelelő pszichometriai tulajdonságokkal rendelkezik alkalmazható a hangulatzavarok diagnosztikájában.

**Kulcsszavak:** Diszfunkcionális Attitűd Skála, DAS-14, rövidített változat, nagy klinikai minta, bifaktoros elemzés, validitás