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ABSTRACT

The Mood and Anxiety Symptoms Questionnaire (MASQ) was developed to measure the symptom-dimensions of the tripartite model of anxiety and depression. A 30-item short adaptation of the MASQ (MASQ-D30) was previously developed and validated in adult psychiatric outpatients. The aim of the present study was to evaluate the validity and reliability of the MASQ-D30 in a sample of adolescents and young adults. Help-seeking adolescents from Australia ($N=147$; mean age: 17.7 years; 58.8% female) completed the original, 90-item MASQ. Confirmatory Factor Analysis (CFA) was used to evaluate the construct validity (a 3-factor structure) of the original MASQ and the MASQ-D30. Internal consistencies and correlations with other instruments were calculated and compared between versions. CFA showed that the intended 3-factor structure fit adequately to the MASQ-D30 data (CFI=0.95; RMSEA=0.08). Internal consistencies ranged from 0.85 to 0.92 across the scales and patterns of correlations with the Center for Epidemiological Studies-Depression (CES-D) indicated adequate convergent/divergent properties. Importantly, the observed psychometric characteristics were comparable with the original MASQ and alternative short-forms. Results indicated that the MASQ-D30 is a valid and reliable instrument in young people, allowing for quick assessment of the tripartite dimensions of depression and anxiety.

1. Introduction

Depression and anxiety have traditionally been treated as two separate clinical categories, discernible from a healthy state. This view has been challenged for several reasons. First, the high comorbidity of depression and anxiety implies common clinical and etiological factors, which suggest that their separation in diagnostic systems such as the DSM and ICD is unjustified [e.g. (Mineka et al., 1998)]. Second, the distribution of depressive and anxiety symptoms in the general population is not dichotomous, but continuously distributed, with many individuals lying between the healthy and severely pathological ends of the continuum (Kendell, 1989; Kendell and Jablensky, 2003). Third, the use of a syndrome-approach leads to heterogeneous disease-categories, which are unhelpful for treatment or our understanding of underlying etiology [e.g. (Clark and Watson, 1991; Widiger and Samuel, 2005].

Dimensional approaches to psychopathology are an alternative. These assume that symptomatology can be described by patterns of distinct dimensional scores, with each dimension used to rate the severity of a specific symptom-domain along the full continuum from healthy to pathological (Goldberg, 2000). One advantage of these dimensions is that they are symptom-specific and circumvent the problem of comorbidity. In addition, they are more representative of the natural distribution of psychopathology in the general population and offer more statistical power in research (MacCallum et al., 2002; Altman and Royston, 2006).

Models describing the structure of co-existing dimensions have been popular in depression and anxiety research (Shankman and Klein, 2003). Of these, the 'tripartite model' (Clark and Watson, 1991) is one of the most extensively studied. This model assumes that symptomatology of depression and anxiety can be described with three dimensions. 'General Distress' encompasses general symptoms of psychological distress, which are evident in both depression and anxiety and account for their high comorbidity. 'Anhedonic Depression' describes the lack of positive affect and

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loss of energy, a specific feature of depression. 'Anxious Arousal' describes the symptoms of somatic hyperarousal, a specific feature of anxiety, especially of panic disorder. The model and its structure has been validated in a number of populations (Chorpita et al., 2000; Joiner and Lonigan, 2000; Keogh and Reidy, 2000; De Beurs et al., 2007).

The Mood and Anxiety Symptoms Questionnaire (MASQ) was introduced to measure the tripartite dimensions (Watson et al., 1995a, 1995b). The MASQ has been shown to have adequate psychometric properties (Reidy and Keogh, 1997; Keogh and Reidy, 2000; De Beurs et al., 2007), although some studies have found that MASQ data does not represent a pure 3-factor structure (Burns and Eidelson, 1998; Boschen and Oei, 2006; Buckby et al., 2008). This is likely due to redundant items, which are correlated with more than one or none of the tripartite dimensions (Bedford, 1997; Keogh and Reidy, 2000; De Beurs, et al., 2007). This, together with the fact that the lengthy 90-item questionnaire may be unsuitable for administration in large studies, suggested the need for a shorter version of the measure. The 30-item adaptation of the MASQ (the MASQ-D30) was developed by selection of the 10 best fitting items for each of the three dimensions (for more details on the construction of the MASQ-D30, see Wardenaar et al., 2010). Psychometric analyses have shown adequate internal consistency, convergent validity and construct validity of the MASQ-D30 scales in both clinical and healthy samples (Wardenaar et al., 2010). Although other short forms of the MASQ have been developed (Casillas and Clark, 2000; Osman et al., 2011), we have chosen here to focus primarily on the validation of the MASQ-D30 because these scales have been externally validated with biological factors, such as metabolic factors (Luppino et al., 2011), cortisol levels (Wardenaar, et al., 2011), sets of Single Nucleotide Polymorphisms (van Veen et al., 2012) and clinical factors, such as long term outcome of psychopathology (Wardenaar et al., 2012).

Previous research has shown that the tripartite dimensions can be effectively used to describe the variations in affect and hyperarousal in younger populations (Chorpita, et al., 2000; Daleiden et al., 2000; Joiner and Lonigan, 2000; Laurent and Ettelson, 2001; De Bolle et al., 2010). Different scales have been used to do this, often combining scales and/or items from different inventories. Such approaches being rather cumbersome and with the full MASQ being too long and containing many redundant items, a short form such as the MASQ-D30 could be especially suitable to measure the tripartite dimensions in younger populations. To date, no short-form of the MASQ has been validated in adolescent or young adult patient samples. This is unfortunately given the potential of a MASQ short form to limit the burden of questionnaire administration to patients. Therefore, the current study was aimed to evaluate whether the MASQ-D30 short form would be useful and psychometrically feasible in our target population. Analyses of validity and reliability of responses to the MASQ-D30 were conducted, using data collected with original 90-item MASQ data in a young help-seeking sample ($n=147$; age=15–24 years). Construct validity was evaluated with Confirmatory Factor Analyses (CFA), correlations with other scales were assessed to evaluate convergent/divergent validity, discriminative ability was evaluated by comparison of mean GD, AD and AA scores between different diagnostic groups, and internal consistency was evaluated with different methods. To better understand the potential usefulness of the MASQ-D30 in this sample, we directly compared the MASQ-D30 and MASQ-90 scale characteristics to evaluate the trade-off between shortening the scale and psychometric quality. Finally, to prevent an overly exclusive focus on the MASQ-D30, supplementary analyses were conducted with all other short-forms of the MASQ, enabling a full and thorough evaluation of the feasibility of a MASQ short form in our target population

2. Method

2.1. Participants and procedure

Orygen Youth Health (OYH) is a public mental health program for young people between 15 and 24 years old in north and west metropolitan Melbourne, Australia. The service provided at OYH has three components: Early Psychosis Prevention and Intervention Center (EPPIC; Edwards et al., 2002), which is a service for people with first-episode psychotic disorder, Personal Assessment and Crisis Evaluation (PACE); Yung et al., 2007), which targets individuals at ultra-high risk for psychosis, and Youthscope, a service for individuals with non-psychotic disorders.

The current sample comprised individuals who were referred, but not necessarily accepted, into Youthspace. Assessment was conducted as close as possible to the time of referral. A full description of the psychiatric diagnoses of this cohort, assessed with the Structured Clinical Interview for DSM-IV (SCID; (First et al., 1997), is described by Godfrey et al. (2005). Briefly, 69 participants met criteria for a current mood disorder, 61 for a current anxiety disorder, 31 for current substance use disorder, 23 for conduct or oppositional defiance disorders, and 18 met criteria for other non-psychotic disorders. There was substantial comorbidity.

Exclusion criteria were: known organic cause for presentation, known intellectual disability (IQ < 70), and inability to speak English. The study was approved by Melbourne Health Human Research and Ethics Committee. Of the total included patients, 151 (74.0% of patients invited to participate) completed one or more questionnaires. Of these, 147 subjects (97.4%) provided MASQ data during the research period. The sample consisted of 86 females (58.5%) and the mean age was 17.7 years (S.D.=2.6). The sample consisted of 115 adolescents (age 20–24 years) and 35 young adults (age 15–19). The CES-D (administered at the same time as the MASQ) was available for 131 of the included subjects (89.1%).

2.2. Instruments

The original 90-item MASQ was administered to participants (Watson et al. 1995a, 1995b). This self-report measure is used to assess anxiety and depression symptoms on a 5-point scale (1=not at all, 5=extremely). The MASQ-D30 scales and analyses were based on the assessed 90-item version. The Center for Epidemiologic Studies Depression Scale (CES-D) (20 self-report items) was used to assess depressive symptomatology in the past week (Radloff, 1977). This measure rates frequency of symptoms on a four-point scale. We computed the subscales for the CES-D as presented by Radloff (1991) for adolescents and young adults: 'Depressive affect', 'Lack of happiness', 'Somatic & Rumination', 'Interpersonal'. All compound (sub)scales were used as continuous severity indicators.

2.3. Analyses

Analyses were conducted with IBM SPSS (version 20.0), Mplus version 5.0 (Muthén and Muthén, 1998–2008) and EQS (Bentler, 2006). CFA's were used to investigate the fit of the hypothesized a three-factor model to the collected MASQ item responses. For CFA, Weighted least squares (WLSMV) and polychoric correlation matrices were used for model-estimation because model indicators were categorical. Several fit indices were used to evaluate model fit. For good model fit, chi-square (χ^2) should be low; Root Mean Square Error of Approximation (RMSEA) should be close to zero and the Comparative Fit Index (CFI) higher than 0.90 or 0.95 for respectively acceptable or good model fit (Brown, 2006). Fit was compared between the hypothesized 3-factor model and alternative models (1-factor). In addition, our data enabled comparison of model-fit factor (co)variances and item-loadings between the MASQ-D30 and the original MASQ. In addition to the CFA models, the WLSMV estimated models were parameterized as item response theory (IRT) models and the information function curves were plotted for each scale to gain some insight in the scale reliability as a function of underlying severity.

To evaluate the psychometric properties of the MASQ-D30, several statistical analyses were performed. Cronbach's α coefficient was used to evaluate the internal consistency for each subscale of the MASQ-D30. Because α automatically increases with scale length, we used the Spearman-Brown formula (see (1)) to estimate the hypothetical α's for the short-form scales if they had the same length as the original MASQ-scales (Nunnally and Bernstein, 1994).

To enable calculation of accurate average inter-item-correlations and corresponding 95% confidence intervals (95% CI), a Fisher's Z-transformation was applied first to the correlation matrix to correct for the skewed distribution of correlation coefficients (Fisher, 1921). Back-transformed mean correlations (r) and 95% CI's are reported. In addition to α and inter-item correlations, the Greatest Lower Bound (GLB) reliability was computed with EQS. The GLB represents the lower bound of the range within which the true reliability (ρ) of a scale lies ($GLB < \rho < 1$). Using a factor model framework, computation of the GLB separates measurement error from the actual common item variance, yielding a reliability estimate that is much less prone to underestimate internal consistency than coefficient α (Sijtsma, 2009).

To investigate the convergence with other measurements (convergent validity), Spearman's correlations (ρ) were computed between the MASQ-D30 subscales and

the CES-D subscales. The discriminative ability of the specific MASQ-D30 scales was assessed by comparison of mean scale-scores between different diagnosis groups.

For completeness, we repeated analyses on the two other MASQ short-forms, namely the Mini-MASQ (Casillas and Clark, 2000) and the Anxiety Depression Distress Inventory-27 (ADDI-27; Osman et al., 2011), to compare the usefulness of the tools. These analyses are presented as supplementary data.

$$\alpha_{long} = \frac{N\alpha_{short}}{1+(N-1)\alpha_{short}} \quad (1)$$

α_{long} represents the estimated α if item-number was increased; α_{short} represents the Cronbach's α of the short-form scale; N represents the scale-elongation factor (e.g. $N=2$ if item-number is doubled).

3. Results

3.1. Confirmatory factor analyses

Results of the CFA are shown in Table 1. In comparison to a 1-factor model, the hypothesized 3-factor model showed adequate fit (CFI=0.95; RMSEA=0.08) to the data. In this factor-model, all items loaded significantly ($p<0.05$) onto their respective factors and factor (co)variances were significant. The factor correlations were moderate-high ($r=0.50$–0.77). A 3-factor bifactor-model showed even better fit, suggesting existence of one overall severity factor (potentially explaining the substantial correlations, reported above) and 3 subscale-specific factors. This indicates that the underlying structure of the MASQ-D30 data is best described by a combination of general and specific constructs.

We also fitted a 3-factor model to the full MASQ-data to enable comparison between the short and original forms (see Table 1). Here again, a bifactor model (CFI=0.93; RMSEA=0.09) showed better fit than a regular 3-factor model. Although these results have limited precision due to our relatively small n, they point towards comparable underlying structures for the short- and original forms.

3.2. Item response theory characteristics

The WLSMV-based 3-factor model was re-parameterized as an IRT model and the information functions were provided for each of the three separate scales (see Fig. 1). The information curves showed that each of the scales provided most information around the means of their respective IRT scores (θ) and were of comparable width. When compared more specifically between scales, GD was slightly more informative below its mean level and GD above its mean level. These results indicate that the MASQ-D30 scales provide good information at the mean levels of severity in our target population.

3.3. Internal consistency and reliability

Cronbach's α coefficients for the MASQ-D30 and original MASQ are shown on the diagonals of Table 2. For the MASQ-D30, alphas ranged from 0.85 to 0.91 and GLB's ranged from 0.91 to 0.96. The mean inter-item correlation was 0.53 (95%CI: 0.34–0.64) for GD, 0.56 (95%CI: 0.43–0.66) for AD, and 0.37 (95%CI: 0.22–0.50) for AA. The mean inter-item correlations were significantly larger than the often used cutoff of 0.3 for AD and GD. For AA, the mean was larger than 0.3, but the cutoff lay within the 95% CI.

For the original MASQ, coefficients were slightly higher: alphas ranged from 0.91 to 0.95 and GLB's ranged from 0.96 to 0.98, which was likely because of the longer scale lengths. The equivalency of internal consistency across the MASQ-D30 and the full-length scale was supported by subsequent calculations using the Spearman-Brown formula. If the MASQ-D30 scales would be extended to the length of their original MASQ counterparts, alphas would be 0.95 for GD, 0.97 for AD and 0.91 for AA, which are very similar to the full scale alpha's. The average inter-item correlations for the original MASQ were 0.52 (95%CI: 0.39–0.63) for GD, 0.47 (95%CI: 0.32–0.60) for AD, and 0.38 (95%CI: 0.23–0.52) for AA. Here again, only GD and AD had mean inter-item correlations that were significantly larger than 0.3 and the cut-off lay within the 95% CI for AA.

Taken together the similar patterns of alpha's and inter-item correlations indicated that the internal consistencies of the MASQ-D30 scales were adequate and comparable to those of the original MASQ.

3.4. Scale intercorrelations

The intercorrelations (Spearman's ρ) for the MASQ-D30 and the original MASQ are presented in Table 2. In line with the tripartite

Table 1
Confirmatory factor analyses.

	Model	χ^2	d.f.	CFI	RMSEA
MASQ-D30	1-factor	383.7	55	0.72	0.20
	3-factor	127.7	64	0.95	0.08
	bifactor[a]	116.6	66	0.96	0.07
Original MASQ	3-factor[b]	193.5	83	0.92	0.10
	bifactor[c]	184.9	82	0.93	0.09

All results based on WLSMV estimation and polychoric correlation matrices. CFI=Comparative Fit Index; RMSEA=Root Mean Square Error of Approximation.

[a] Each item loading on its specific scale factor and an overall severity factor.

[b] The 3-factor model was constructed analog to the tripartite model as presented by de Beurs et al. (2007).

[c] Each item loading on its specific scale factor (following de Beurs et al. (2007)) and an overall severity factor.

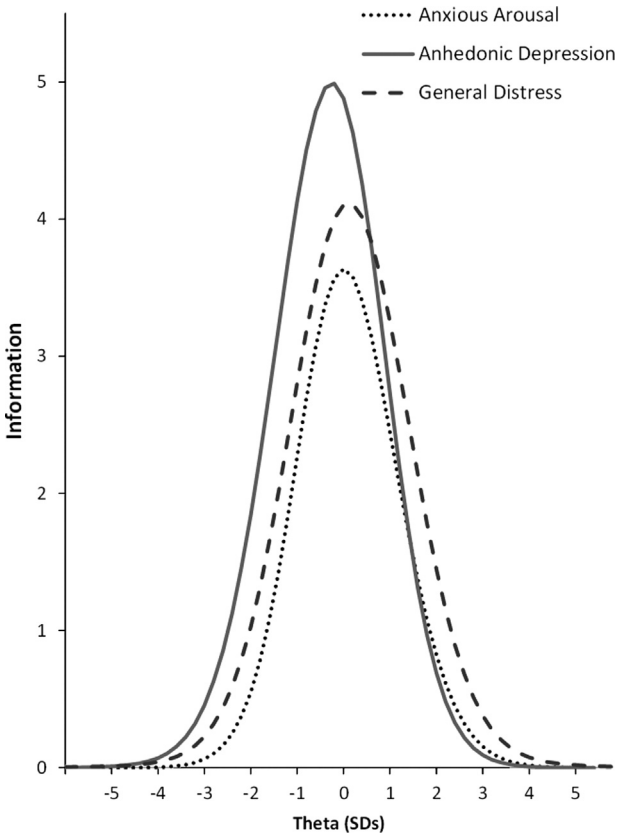

Fig. 1. Information function curves for each of the MASQ-D30 scales as a function of θ S.D.'s.

Table 2
Spearman correlations and Cronbach's α coefficients for the scales of the MASQ-D30 and the original MASQ ($n=147$).

Version	Scales	General distress	Anhedonic depression	Anxious arousal
MASQ-D30	General distress	0.91 [0.94]	–	–
	Anhedonic depression	0.54 (0.38–0.66)	0.92 [0.96]	–
	Anxious arousal	0.66 (0.55–0.75)	0.36 (0.19–0.52)	0.85 [0.91]
Original MASQ	General distress	0.95 [0.98]	–	–
	Anhedonic depression	0.62 (0.49–0.73)	0.95 [0.98]	–
	Anxious arousal	0.71 (0.60–0.79)	0.39 (0.20–0.54)	0.91 [0.96]

All correlations are given with 95% confidence intervals between parentheses, estimated through 1000 bootstrap draws. Underlined numbers on the diagonal are Cronbach's α coefficients greatest Lower Bound reliability coefficients are displayed between brackets. MASQ=Mood and Anxiety Symptoms Questionnaire; MASQ-D30=30-item adaptation of the MASQ.

model, the general scale of GD showed moderately strong correlations with both AD ($\rho=0.54$) and AA ($\rho=0.66$), whereas the specific AD and AA scales were moderately correlated ($\rho=0.36$). The 95% CI's of the correlations between AA and GD and between AA and AD did not overlap, indicating significantly different interrelatedness. The pattern of correlations was similar to that for the original MASQ, which indicates that the discrimination between the scales was largely unaffected by the scale-shortening process.

3.5. Correlations with the CES-D

The correlations of the MASQ-D30 and original MASQ scales with the CES-D subscales are presented in Table 3. GD was most strongly correlated with the CES-D subscale 'depressed affect' ($\rho=0.75$) and moderately correlated with all other CES-D subscales. In line with its specific anhedonic nature, AD was correlated highest with 'lack of happiness' ($\rho=0.72$). AD showed lower correlations with 'somatic & retardation' ($\rho=0.53$) and 'interpersonal problems' ($\rho=0.39$), which are outside the AD measurement domain. As expected, AA was correlated highest with 'somatic & retardation' ($\rho=0.70$). AA was correlated lower with 'lack of happiness' ($\rho=0.47$), consistent with its specifically somatic nature and distinctness from depression-specific AD. The patterns of correlations of the original MASQ with the CES-D subscales were largely similar, indicating that both scales have similar convergent and divergent properties.

3.6. Discriminative ability

The mean MASQ-D30 scale-scores for different diagnostic groups are shown in Table 4. Patients with any mood disorder (including all kinds of comorbidity; $n=59$) had higher scores on all scales than patients without mood disorders (all other diagnoses; $n=74$). Patients with any anxiety disorder (including all kinds of comorbidity; $n=53$) had a significantly higher mean GD score than those without an anxiety disorder (all other diagnoses; n=80). In addition, the mean AA scale score was higher, but this difference was marginally significant ($p=0.07$). Anxiety and non-anxiety patients showed no difference on the AD scale. This pattern of difference was similar to the pattern that was found for the full-length scales. Taken together, these analyses give some preliminary evidence for the discriminative ability of the MASQ-D30 scales among different patient groups. The GD scale is increased in both mood and anxiety disorder groups; the AD scale is only increased in those with mood-disorders. The AA-scale was increased in mood and anxiety-disorders and failed to discriminate anxiety- from non-anxiety patients.

Table 3
Spearman correlations between the scales of the MASQ-D30/original MASQ and the CES-D subscales ($n=131$).

Version	Scales	CES-D scales			
		Depressed affect	Happiness	Somatic & retardation	Interpersonal
MASQ-D30	General distress	0.75	0.65	0.71	0.61
	Anhedonic depression	0.57	0.72	0.53	0.39
	Anxious arousal	0.63	0.47	0.70	0.41
Original MASQ	General distress	0.81	0.66	0.73	0.62
	Anhedonic depression	0.59	0.74	0.56	0.44
	Anxious arousal	0.64	0.44	0.70	0.41

All correlations pairwise and with $p<0.01$. MASQ=Mood and Anxiety Symptoms Questionnaire; MASQ-D30=30-item adaptation of the MASQ; CES-D=Center for Epidemiologic Studies Depression Scale.

4. Discussion

The aim of the current study was to evaluate the validity and reliability of the MASQ-D30 in a sample of help-seeking young people. This was done by comparing the MASQ-D30 factor structure with that of the original MASQ. We also investigated associations between MASQ-D30 and original MASQ subscales and those of the CES-D. Using CFA, it was shown that the MASQ-D30 scales represent an underlying 3-dimensional structure. Internal consistencies were satisfactory and comparable to the original MASQ. MASQ-D30 subscales showed divergent and convergent correlations with the various subscales of the CES-D.

Preliminary tests of the ability of the MASQ-D30 scales to discriminate between mood and anxiety showed partly satisfactory results with GD being increased in both disorders and AD only in mood-disorders, which is in line with tripartite model expectations. The AA scale, however, did not show the anxiety-specific increases that would be expected based on the model. On the one hand, results could reflect the fact that our sample was mostly comprised of severe patients with several co-occurring disorders (e.g. mood, substance and conduct disorders), making any differentiation between them on the basis of a specific (AA) scale very difficult. On the other hand, the results may reflect the issue that the AA-scale is mostly specific to panic disorder and not to anxiety disorders as a whole (Mineka et al. 1998). Despite this, the majority of the presented results support the psychometric quality of the MASQ-D30 in the target population.

Given that the 90-item MASQ is lengthy and time consuming to complete, the MASQ-D30 is a viable alternative. It is short and easier to complete, which in research equates to lower costs and

Table 4
Comparison of mean MASQ-D30 scales between DSM-IV-based diagnostic groups.

		Any mood disorder Mean (S.D.)	No mood disorder Mean (S.D.)	*t*	*p*	Any Anxiety Disorder Mean (S.D.)	No anxiety Disorder Mean (S.D.)	t	p
MASQ-D30	N[a]	59	74			53	80		
	GD	31.5 (10.0)	23.2 (8.6)	−5.2	<0.001	29.2 (9.1)	25.3 (9.2)	−2.2	0.03
	AD	41.2 (8.4)	35.7 (8.4)	−3.7	<0.001	39.6 (8.2)	37.1 (9.1)	−1.6	0.12
	AA	22.4 (8.0)	17.1 (6.3)	−4.3	<0.001	20.9 (7.4)	18.5 (7.5)	−1.8	0.07
Original MASQ	GD	62.3 (19.5)	44.6 (16.6)	−5.6	<0.001	57.4 (21.4)	49.2 (18.3)	−2.4	0.02
	AD	86.9 (16.5)	76.0 (17.4)	−3.7	<0.001	84.0 (16.5)	78.7 (18.4)	−1.7	0.09
	AA	39.8 (14.5)	30.6 (11.1)	−4.1	<0.001	37.6 (14.2)	32.6 (12.7)	−2.1	0.04

GD=General Distress; AD=Anhedonic Depression; AA=Anxious Arousal.

[a] Diagnostic information and full MASQ-D30 assessments were available for 146 subjects.

participant burden. Moreover, the MASQ-D30 overcomes the problem of weak or complex factor loadings of the original MASQ, which makes it a stronger operationalization of the tripartite model (Wardenaar et al., 2010).

The hypothesized 3-factor model showed adequate fit to MASQ-D30 data. Fit indices were comparable to those of the original MASQ. This finding is similar to that of Wardenaar et al. (2010). They demonstrated that the MASQ-D30 fit was similar to that of the original MASQ in large samples of adults with depression (mean ages 38–42 years). It has previously been shown that the tripartite model can be effectively applied to adolescent and young adult populations (Chorpita et al., 2000; Daleiden et al., 2000; Joiner and Lonigan, 2000; Laurent and Ettelson, 2001; De Bolle, et al., 2010). The current findings suggest that the MASQ-D30 provides a good index of these three dimensions of psychopathology in young people, and that it should be considered as a very useful assessment tool in this population.

Other support for the validity of the MASQ-D30 in young people comes from its satisfactory internal consistency, showing that item responses within the same subscale are highly correlated. This was further supported by the average inter-item correlations. Although internal consistencies of the MASQ-D30 were slightly lower than the original MASQ in this sample, adjusting them for equivalency of the length of the two measures suggested that internal consistencies of the MASQ-D30 and original MASQ were comparable. In addition, when only common variance was considered in the calculation of the internal consistencies for each scale by use of the GLB, internal consistency was good (GLB=0.91–0.96).

A final psychometric test of the MASQ-D30 conducted in the present study was a comparison to the CES-D, which has been validated in younger populations (Radloff, 1991). Correlations were only marginally lower than those between the CES-D and the original MASQ. As expected, CES-D total scores were most highly correlated with the GD subscale of the MASQ-D30. Correlations between subscales of the two measures showed the expected patterns: GD was also most strongly associated with the 'depressed affect' subscale of the CES-D, AD was most strongly associated with the 'lack of happiness' subscale, and AA was most strongly associated with 'somatic & retardation'. Taken together, the results indicated good convergent and divergent properties for the MASQ-D30 scales.

For the current study we chose to primarily focus on the MASQ-D30. However, for completeness, we also evaluated the psychometric properties of the other two MASQ short forms, Mini-MASQ (Casillas and Clark, 2000) and the ADDI-27 (Osman et al., 2011) (see Supplementary data). We compared the items in each of the scales and found that there was substantial overlap (for 40% to 61% of items). With regard to the internal consistencies, similar results were found for each of the short forms. Scale intercorrelations indicated the most substantial differentiation between AD and AA on all scales (ρ=0.33–0.46), although this was stronger in the MASQ-D30 and ADDI-27 than in the Mini-MASQ. Correlations with CES-D subscales indicated similar convergent and divergent properties for each scale. Overall, the three short-forms of the MASQ performed comparatively to each other and to the original MASQ. Therefore, the choice of which scale to use should be guided by a preference for certain item coverage or the scale's prior use in similar populations. In psychiatric epidemiological research, the MASQ-D30 appears to have been the most robustly tested and most often used.

In summary, this is the first validation of the MASQ-D30 in an adolescent and young adult sample. It is also the first validation of the short measure in English. The MASQ-D30 was found to be a reliable and valid measure of affect and arousal in this young help-seeking sample. There are limitations to the study. The sample was relatively small, which was suboptimal for the factor analyses that was conducted and may have affected the precision of results. Also, all short form analyses were based on data collected with the 90-item original MASQ. As such, the current analyses can only be seen as an evaluation of the usefulness and feasibility of a MASQ short form in the current population. The results do suggest that the MASQ-D30 can be used without compromising psychometric quality. However, subsequent, work is needed with independent (preferably larger) data collected with autonomous MASQ-D30 administrations, to gain a full psychometric validation of the MASQ-30 as a standalone instrument.. Validation of the measure should also be conducted in samples with varying severity of symptoms and in samples with comorbid psychosis and/or bipolar symptoms. Test-retest reliability could be investigated by the use of two closely spaced administrations in the same sample.

In conclusion, the current work shows that it is possible to reliably and validly measure the tripartite dimensions in adolescent help-seekers by use of a short form measure.

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Appendix. Supplementary material

Supplementary data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.psychres.2013.12.018.

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