Reconceptualizing the Factor Structure of the Depression Anxiety Stress Scales (DASS) for Traumatic Brain Injury

Supplemental Materials

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# Supplemental Appendix 1. DASS21 Factor Analysis

The following tables provide the parameter estimates of the DASS21 unidimensional and bifactor models (Table S1), along with the first- and second-order models (Tables S2 and S3, respectively).

**Table S1**

*DASS21 Factor Loadings: Unidimensional and Bifactor Models* (n = 136)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Factor loading, λ (95% confidence interval) | | | | |
|  | Unidimensional model | Bifactor model | | | |
| Indicator | General Distress | General Distress | Depression | Anxiety | Stress |
| DASS21\_3 – No positive feeling | **.66\*** (0.53–0.79) | **.57\*** (0.41–0.74) | **.35\*** (0.09–0.61) | — | — |
| DASS21\_5 – Difficult to initiate | **.71\*** (0.62–0.81) | **.66\*** (0.54–0.78) | .29\* (0.03–0.54) | — | — |
| DASS21\_10 – Nothing look forward to | **.84\*** (0.78–0.89) | **.71\*** (0.57–0.86) | **.54\*** (0.31–0.76) | — | — |
| DASS21\_13 – Down-hearted and blue | **.78\*** (0.71–0.86) | **.70\*** (0.57–0.83) | **.37\*** (0.16–0.58) | — | — |
| DASS21\_16 – Unable to be enthusiastic | **.83\*** (0.77–0.89) | **.75\*** (0.61–0.88) | **.41\*** (0.15–0.66) | — | — |
| DASS21\_17 – Not worth much as a person | **.79\*** (0.72–0.87) | **.69\*** (0.55–0.83) | **.45\*** (0.20–0.70) | — | — |
| DASS21\_21 – Life was meaningless | **.74\*** (0.66–0.82) | **.60** (-2.63–3.83) | **.59** (-3.50–4.68) | — | — |
| DASS21\_2 – Dryness of mouth | **.47\*** (0.32–0.62) | **.49\*** (0.33–0.66) | — | .27 (-0.13–0.67) | — |
| DASS21\_4 – Breathing difficulty | **.47\*** (0.30–0.65) | **.46** (-21.87–22.79) | — | **.78** (-41.12–42.69) | — |
| DASS21\_7 – Experienced trembling | **.56\*** (0.41–0.71) | **.61\*** (0.44–0.78) | — | .19 (-0.34–0.72) | — |
| DASS21\_9 – Make fool of self | **.66\*** (0.55–0.77) | **.74\*** (0.63–0.86) | — | -.05 (-0.65–0.56) | — |
| DASS21\_15 – Close to panic | **.75\*** (0.66–0.84) | **.83\*** (0.69–0.98) | — | -.02 (-0.78–0.73) | — |
| DASS21\_19 – Aware of heart no exercising | **.43\*** (0.27–0.59) | **.44** (-6.53–7.40) | — | **.39** (-7.67–8.45) | — |
| DASS21\_20 – Scared without reason | **.54\*** (0.41–0.67) | **.63\*** (0.47–0.78) | — | .05 (-0.70–0.81) | — |
| DASS21\_1 – Hard to wind down | **.69\*** (0.58–0.81) | **.72** (-34.12–35.56) | — | — | .03 (-2.95.–3.01) |
| DASS21\_6 – Over-react to situations | **.69\*** (0.58–0.80) | **.64\*** (0.46–0.82) | — | — | **.38** (-0.02–0.78) |
| DASS21\_8 – A lot of nervous energy | **.72\*** (0.63–0.82) | **.74\*** (0.60–0.87) | — | — | .11 (-0.40–0.61) |
| DASS21\_11 – Getting agitated | **.76\*** (0.66–0.85) | **.71** (-11.72–13.14) | — | — | **.41** (-8.41–9.24) |
| DASS21\_12 – Difficult to relax | **.78\*** (0.71–0.86) | **.79** (-10.22–11.80) | — | — | .17 (-4.03.–4.36) |
| DASS21\_14 – Intolerant of interruptions | **.70\*** (0.61–0.78) | **.66** (-0.43–1.75) | — | — | .27 (-0.07–0.60) |
| DASS21\_18 – Rather touchy | **.67\*** (0.56–0.79) | **.56** (-24.61–25.74) | — | — | **.61** (-29.66–30.87) |
| Mean λ (range) | .68 (.43–.84) | .65 (.44–.83) | .43 (.29–.59) | .23 (-.05–.78) | .28 (.03–.61) |

*Note.* DASS21 = Depression Anxiety Stress Scales 21-item version. Factor loadings in bold are considered adequate (λ ≥ .32).

\**p* ˂ .05

**Table S2**

*DASS21 Factor Loadings and Inter-Factor Correlations: First-Order Model* (n = 136)

|  |  |  |  |
| --- | --- | --- | --- |
| Indicator | Factor loading, λ (95% confidence interval) | | |
| Depression | Anxiety | Stress |
| DASS21\_3 – No positive feeling | **.68\*** (.53–.81) | — | — |
| DASS21\_5 – Difficult to initiate | **.72\*** (.60–.83) | — | — |
| DASS21\_10 – Nothing look forward to | **.89\*** (.84–.93) | — | — |
| DASS21\_13 – Down-hearted and blue | **.80\*** (.72–.87) | — | — |
| DASS21\_16 – Unable to be enthusiastic | **.86\*** (.80–.91) | — | — |
| DASS21\_17 – Not worth much as a person | **.82\*** (.74–.90) | — | — |
| DASS21\_21 – Life was meaningless | **.80\*** (.73–.87) | — | — |
| DASS21\_2 – Dryness of mouth | — | **.51\*** (.34–.66) | — |
| DASS21\_4 – Breathing difficulty | — | **.50\*** (.27–.68) | — |
| DASS21\_7 – Experienced trembling | — | **.65\*** (.49–.77) | — |
| DASS21\_9 – Make fool of self | — | **.76\*** (.64–.87) | — |
| DASS21\_15 – Close to panic | — | **.88\*** (.83–.94) | — |
| DASS21\_19 – Aware of heart no exercising | — | **.46\*** (.28–.62) | — |
| DASS21\_20 – Scared without reason | — | **.70\*** (.56–.81) | — |
| DASS21\_1 – Hard to wind down | — | — | **.72\*** (.61–.82) |
| DASS21\_6 – Over-react to situations | — | — | **.73\*** (.61–.82) |
| DASS21\_8 – A lot of nervous energy | — | — | **.75\*** (.65–.83) |
| DASS21\_11 – Getting agitated | — | — | **.79\*** (.70–.88) |
| DASS21\_12 – Difficult to relax | — | — | **.82\*** (.73–.88) |
| DASS21\_14 – Intolerant of interruptions | — | — | **.71\*** (.61–.79) |
| DASS21\_18 – Rather touchy | — | — | **.70\*** (.57–.81) |
| Mean λ (range) | .80 (.68–.89) | .64 (.46–.88) | .75 (.70–.82) |
| Inter-factor correlations |  |  |  |
| Depression with anxiety | .74\* |  |  |
| Depression with stress | .87\* |  |  |
| Anxiety with stress | .82\* |  |  |

*Note.* DASS21 = Depression Anxiety Stress Scales 21-item version. Factor loadings in bold are considered adequate (λ ≥ .32).

\**p* ˂ .001

**Table S3**

*DASS21 Factor Loadings: Second-Order Model* (n = 136)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Indicator | Factor loading, λ (95% confidence interval) | | | |
| General distress | Depression | Anxiety | Stress |
| Depression | **.89\*** (.82–.97) | — | — | — |
| Anxiety | **.83\*** (.73–.92) | — | — | — |
| Stress | **.98\*** (.92–1.00) | — | — | — |
| DASS21\_3 – No positive feeling | — | **.68\*** (.53–.81) | — | — |
| DASS21\_5 – Difficult to initiate | — | **.72\*** (.58–.82) | — | — |
| DASS21\_10 – Nothing look forward to | — | **.89\*** (.83–.93) | — | — |
| DASS21\_13 – Down-hearted and blue | — | **.80\*** (.71–.87) | — | — |
| DASS21\_16 – Unable to be enthusiastic | — | **.86\*** (.79–.91) | — | — |
| DASS21\_17 – Not worth much as a person | — | **.82\*** (.74–.89) | — | — |
| DASS21\_21 – Life was meaningless | — | **.80\*** (.73–.87) | — | — |
| DASS21\_2 – Dryness of mouth | — | — | **.51\*** (.33–.66) | — |
| DASS21\_4 – Breathing difficulty | — | — | **.50\*** (.27–.69) | — |
| DASS21\_7 – Experienced trembling | — | — | **.65\*** (.50–.78) | — |
| DASS21\_9 – Make fool of self | — | — | **.76\*** (.64–.86) | — |
| DASS21\_15 – Close to panic | — | — | **.88\*** (.82–.94) | — |
| DASS21\_19 – Aware of heart no exercising | — | — | **.46\*** (.28–.63) | — |
| DASS21\_20 – Scared without reason | — | — | **.70\*** (.56–.81) | — |
| DASS21\_1 – Hard to wind down | — | — | — | **.72\*** (.60–.82) |
| DASS21\_6 – Over-react to situations | — | — | — | **.73\*** (.63–.83) |
| DASS21\_8 – A lot of nervous energy | — | — | — | **.75\*** (.65–.83) |
| DASS21\_11 – Getting agitated | — | — | — | **.79\*** (.69–.88) |
| DASS21\_12 – Difficult to relax | — | — | — | **.82\*** (.74–.88) |
| DASS21\_14 – Intolerant of interruptions | — | — | — | **.71\*** (.61–.79) |
| DASS21\_18 – Rather touchy | — | — | — | **.70\*** (.57–.80) |
| Mean λ (range) | .90 (.83–.98) | .80 (.68–.89) | .64 (.46–.88) | .75 (.70–.82) |

*Note.* DASS21 = Depression Anxiety Stress Scales 21-item version. Factor loadings in bold are considered adequate (λ ≥ .32).

\**p* ˂ .05

To consider possible sources of multidimensionality of the DASS21 at the level of individual items, item-level explained common variance and relative parameter bias for each item were inspected (Table S4). This identified several items (depression items 3, 10, 13, 16, 17, and 21, and stress item 18) which may be considered as having a meaningful association with their respective specific factor and therefore as contributing some multidimensionality to the DASS21 data structure.

**Table S4**

DASS21 Item-Level Bifactor Statistical Indices (n = 136)

|  |  |  |  |
| --- | --- | --- | --- |
| Scale | Item | I-ECV | RPB |
| Depression | **DASS21\_3 – No positive feeling** | **.73** | **.15** |
| DASS21\_5 – Difficult to initiate | .84 | .08 |
| **DASS21\_10 – Nothing look forward to** | **.64** | **.17** |
| **DASS21\_13 – Down-hearted and blue** | **.78** | **.12** |
| **DASS21\_16 – Unable to be enthusiastic** | **.77** | **.11** |
| **DASS21\_17 – Not worth much as a person** | **.70** | **.14** |
| **DASS21\_21 – Life was meaningless** | **.51** | **.23** |
| Anxiety | DASS21\_2 – Dryness of mouth | .77 | .05 |
| DASS21\_4 – Breathing difficulty | .26 | .03 |
| DASS21\_7 – Experienced trembling | .91 | .08 |
| DASS21\_9 – Make fool of self | 1.00 | .11 |
| DASS21\_15 – Close to panic | 1.00 | .10 |
| DASS21\_19 – Aware of heart no exercising | .56 | .01 |
| DASS21\_20 – Scared without reason | .99 | .14 |
| Stress | DASS21\_1 – Hard to wind down | 1.00 | .04 |
| DASS21\_6 – Over-react to situations | .74 | .07 |
| DASS21\_8 – A lot of nervous energy | .98 | .02 |
| DASS21\_11 – Getting agitated | .75 | .06 |
| DASS21\_12 – Difficult to relax | .96 | .01 |
| DASS21\_14 – Intolerant of interruptions | .86 | .05 |
| **DASS21\_18 – Rather touchy** | **.46** | **.20** |

*Note.* DASS21 = Depression Anxiety Stress Scales 21-item version; I-ECV = item-level explained common variance; RPB = relative parameter bias. Items in bold represent those which may be considered as having a meaningful association with their respective specific factor and therefore as contributing some multidimensionality to the DASS21 data structure (based on I-ECV < .85 and RPB ≥.10).

# Supplemental Appendix 2. DASS42 Analyses

The DASS42 was also analyzed, to assess whether the increase in items would provide greater reliability of the specific factors or multidimensionality. As for the DASS21, both unidimensional and bifactor models were estimated.

### DASS42 Factor Loadings were Stronger on the General Factor than Specific Factors

Factor loadings in the DASS42 unidimensional and bifactor model were evaluated using Tabachnick and colleagues' (2019) criteria: ≥ .71 = ‘excellent’, ≥ .63 = ‘very good’, ≥ .55 = ‘good’, ≥ .45 = ‘fair’, ≥ .32 = ‘poor’, ˂ .32 = ‘very low’ and inadequate. For both the models, loadings on the general distress factor were on average ‘very good’ (unidimensional model: mean λ= .67, range = .30–.84; bifactor model: mean λ= .65, range = .26–.83). Loadings on the specific factors in the bifactor model were weaker. They were on average ‘poor’ for depression (mean λ = .38; range = .08–.64) and anxiety (mean λ = .35; range = .15–.66) and ‘very low’ and inadequate for stress (mean λ = .21; range = –.15–.46). There were also non-significant and negative specific factor loadings, especially for anxiety and stress, suggesting these items were in particular only indicators of general distress. As depicted in Table S3, the combination of consistently strong loadings on the general factor and inadequate and anomalous loadings on the specific factors suggested a relative dominance of the general factor.

**Table S5**

*DASS42 Model Fit Statistics*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Factor model | *df* | *χ*2 | CFI | TLI | RMSEA |
| Unidimensional | 819 | 2216.683a,b | .708 | .693 | .112 |
| First- and second-order | 816 | 1787.131a,c | .797 | .786 | .094 |
| Bifactor | 777 | 1583.423b,c | .831 | .813 | .087 |

*Note*. *df* = degrees of freedom; CFI = comparative fit index; TFI = Tucker-Lewis Index; RMSEA = root mean square error of approximation. Subscripts indicate statistically significant differences in model fit.

aThe first- and second-order factor models had significantly better fit than the unidimensional model according to the *χ*2 statistic.

bThe bifactor model had significantly better fit than the unidimensional model according to the *χ*2 statistic.

cThe bifactor model had significantly better fit than the first- and second-order factor models according to the *χ*2 statistic.

**Table S6**

*DASS42 Factor Loadings: Unidimensional and Bifactor Models* (n = 136)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Factor loading, λ (95% confidence interval) | | | | |
|  | Unidimensional model | Bifactor model | | | |
| Indicator | General Distress | General Distress | Depression | Anxiety | Stress |
| DASS42\_3 – No positive feeling | **.66\*** (.52–.78) | **.61\*** (.46–.74) | .25\* (.07–.46) | — | — |
| DASS42\_5 – Couldn’t get going | **.62\*** (.50–.74) | **.63\*** (.48–.74) | .08 (-.22–.34) | — | — |
| DASS42\_10 – Nothing look forward to | **.84\*** (.78–89.) | **.77\*** (.64–.85) | **.40\*** (.15–.59) | — | — |
| DASS42\_13 – Sad and depressed | **.80\*** (.70–.87) | **.74\*** (.60–.83) | **.35\*** (.13–.55) | — | — |
| DASS42\_16 – Lost interest in everything | **.79\*** (.72–.86) | **.70\*** (.54–.81) | **.45\*** (.20–.65) | — | — |
| DASS42\_17 – Not worth much as a person | **.80\*** (.72–.87) | **.71\*** (.58–.81) | **.44\*** (.27–.62) | — | — |
| DASS42\_21 – Life wasn’t worthwhile | **.77\*** (.69–.85) | **.64\*** (.47–.75) | **.59\*** (.45–.73) | — | — |
| DASS42\_24 – Couldn’t get enjoyment | **.82\*** (.75–.89) | **.77\*** (.68–.85) | .29\* (.05–.49) | — | — |
| DASS42\_26 – Down-hearted and blue | **.79\*** (.70–.86) | **.71\*** (.58–.81) | **.37\*** (.18–.53) | — | — |
| DASS42\_31 – Unable to be enthusiastic | **.82\*** (.75–.87) | **.77\*** (.64–.86) | .29\* (.02–.51) | — | — |
| DASS42\_34 – Pretty worthless | **.84\*** (.78–.90) | **.75\*** (.64–.83) | **.49\*** (.33–.62) | — | — |
| DASS42\_37 – Nothing future hopeful about | **.83\*** (.78–.88) | **.72\*** (.58–.82) | **.50\*** (.30–.66) | — | — |
| DASS42\_38 – Life was meaningless | **.77\*** (.70–.83) | **.63\*** (.48–.77) | **.64\*** (.39–.76) | — | — |
| DASS42\_42 – Difficult to initiate | **.72\*** (.61–.81) | **.69\*** (.56–.79) | .20 (-.12–.44) | — | — |
| DASS42\_2 – Dryness of mouth | **.45\*** (.30–.59) | **.44\*** (.29–.60) | — | .28\* (-.03–.53) | — |
| DASS42\_4 – Breathing difficulty | **.46\*** (.27–.62) | **.43\*** (.24–.61) | — | **.37\*** (.03–.63) | — |
| DASS42\_7 – Feeling of shakiness | **.36\*** (.17–.52) | **.32\*** (.15–.52) | — | **.66\*** (.31–.84) | — |
| DASS42\_9 – Anxious over situations | **.67\*** (.55–.76) | **.71\*** (.57–.82) | — | .15 (-.15–.43) | — |
| DASS42\_15 – Feeling of faintness | **.45\*** (.28–.59) | **.43\*** (.23–.61) | — | **.52\*** (.21–.77) | — |
| DASS42\_19 – Perspired without exercise | **.47\*** (.31–.61) | **.49\*** (.32–.62) | — | **.35\*** (.05–.61) | — |
| DASS42\_20 – Scared without reason | **.53\*** (.40–.65) | **.56\*** (.40–.72) | — | **.34** (-.04–.64) | — |
| DASS42\_23 – Difficulty swallowing | .30\* (.12–.46) | .26\* (.10–.44) | — | **.37\*** (.03–.69) | — |
| DASS42\_25 – Aware of heart no exercising | **.42\*** (.27–.57) | **.43\*** (.26–.58) | — | .28 (-.04–.55) | — |
| DASS42\_28 – Close to panic | **.74\*** (.65–.84) | **.78\*** (.68–.89) | — | .26 (-.07–.53) | — |
| DASS42\_30 – Fear of unfamiliar task | **.68\*** (.58–.78) | **.69\*** (.58–.78) | — | .17 (-.09–.42) | — |
| DASS42\_36 – Terrified | **.46\*** (.30–.60) | **.48\*** (.28–.69) | — | **.44\*** (.07–.63) | — |
| DASS42\_40 – Make fool of self | **.65\*** (.53–.75) | **.69\*** (.55–.83) | — | .20 (-.14–.54) | — |
| DASS42\_41 – Experienced trembling | **.54\*** (.36–.68) | **.54\*** (.38–.70) | — | **.53\*** (.20–.70) | — |
| DASS42\_1 – Upset by trivial things | **.77\*** (.70–.84) | **.74\*** (.62–.83) | — | — | .30\* (.05–.53) |
| DASS42\_6 – Over-react to situations | **.69\*** (.56–.80) | **.70\*** (.53–.81) | — | — | .26 (-.12–.57) |
| DASS42\_8 – Difficult to relax | **.76\*** (.66–.83) | **.82\*** (.68–.88) | — | — | -.07 (-.34–.33) |
| DASS42\_11 – Getting upset easily | **.79\*** (.70–.86) | **.77\*** (.61–.87) | — | — | .27 (-.09–.60) |
| DASS42\_12 – A lot of nervous energy | **.71\*** (.60–.80) | **.77\*** (.62–.85) | — | — | -.05 (-.35–.37) |
| DASS42\_14 – Impatient when delayed | **.59\*** (.46–.70) | **.60\*** (.46–.72) | — | — | .27\* (.00–.48) |
| DASS42\_18 – Rather touchy | **.69\*** (.56–.79) | **.65\*** (.44–.77) | — | — | **.46\*** (.01–.66) |
| DASS42\_22 – Hard to wind down | **.70\*** (.58–.80) | **.74\*** (.60–.82) | — | — | -.07 (-.31–.26) |
| DASS42\_27 – Very irritable | **.76\*** (.66–.84) | **.74\*** (.54–.84) | — | — | **.46\*** (.00–.70) |
| DASS42\_29 – Hard to calm down after upset | **.77\*** (.68–.84) | **.77\*** (.65–.84) | — | — | .27\* (-.06–.52) |
| DASS42\_32 – Tolerating interruptions | **.70\*** (.61–.78) | **.68\*** (.49–.80) | — | — | .25 (-.14–.61) |
| DASS42\_33 – State of nervous tension | **.77\*** (.69–.84) | **.83\*** (.72–.88) | — | — | -.15 (-.29–.20) |
| DASS42\_35 – Intolerant of interruptions | **.72\*** (.63–.79) | **.68\*** (.53–.80) | — | — | .28 (-.09–.61) |
| DASS42\_39 – Getting agitated | **.78\*** (.66–.85) | **.76\*** (.57–.86) | — | — | **.38\*** (.06–.61) |
| Mean λ (range) | .67 (.30–.84) | .65 (.26–.83) | .38 (.08–.64) | .35 (.14–.66) | .21 (-.15–.46) |

*Note.* DASS42 = Depression Anxiety Stress Scales 42-item version. Factor loadings in bold are considered adequate (λ ≥ .32).

\* *p* ˂ .05

**Table S7**

*DASS42 Factor Loadings and Inter-Factor Correlations: First-Order Model* (n = 136)

|  |  |  |  |
| --- | --- | --- | --- |
| Indicator | Factor loading, λ (95% confidence interval) | | |
| Depression | Anxiety | Stress |
| DASS42\_3 – No positive feeling | **.67\*** (.52–.80) | — | — |
| DASS42\_5 – Couldn’t get going | **.60\*** (.45–.72) | — | — |
| DASS42\_10 – Nothing look forward to | **.87\*** (.81–.92) | — | — |
| DASS42\_13 – Sad and depressed | **.82\*** (.73–.89) | — | — |
| DASS42\_16 – Lost interest in everything | **.84\*** (.78–.89) | — | — |
| DASS42\_17 – Not worth much as a person | **.83\*** (.75–.90) | — | — |
| DASS42\_21 – Life wasn’t worthwhile | **.83\*** (.75–.89) | — | — |
| DASS42\_24 – Couldn’t get enjoyment | **.82\*** (.72–.90) | — | — |
| DASS42\_26 – Down-hearted and blue | **.81\*** (.73–.87) | — | — |
| DASS42\_31 – Unable to be enthusiastic | **.82\*** (.76–.88) | — | — |
| DASS42\_34 – Pretty worthless | **.88\*** (.81–.93) | — | — |
| DASS42\_37 – Nothing future hopeful about | **.87\*** (.82–.91) | — | — |
| DASS42\_38 – Life was meaningless | **.85\*** (.79–.90) | — | — |
| DASS42\_42 – Difficult to initiate | **.71\*** (.57–.82) | — | — |
| DASS42\_2 – Dryness of mouth | — | **.51\*** (.32–.66) | — |
| DASS42\_4 – Breathing difficulty | — | **.51\*** (.31–.69) | — |
| DASS42\_7 – Feeling of shakiness | — | **.52\*** (.32–.69) | — |
| DASS42\_9 – Anxious over situations | — | **.73\*** (.62–.81) | — |
| DASS42\_15 – Feeling of faintness | — | **.60\*** (.44–.74) | — |
| DASS42\_19 – Perspired without exercise | — | **.57\*** (.41–.71) | — |
| DASS42\_20 – Scared without reason | — | **.69\*** (.56–.80) | — |
| DASS42\_23 – Difficulty swallowing | — | **.36\*** (.18–.54) | — |
| DASS42\_25 – Aware of heart no exercising | — | **.48\*** (.29–.65) | — |
| DASS42\_28 – Close to panic | — | **.86\*** (.80–.91) | — |
| DASS42\_30 – Fear of unfamiliar task | — | **.73\*** (.62–.81) | — |
| DASS42\_36 – Terrified | — | **.61\*** (.44–.76) | — |
| DASS42\_40 – Make fool of self | — | **.76\*** (.63–.87) | — |
| DASS42\_41 – Experienced trembling | — | **.68\*** (.54–.80) | — |
| DASS42\_1 – Upset by trivial things | — | — | **.80\*** (.73–.86) |
| DASS42\_6 – Over-react to situations | — | — | **.75\*** (.65–.84) |
| DASS42\_8 – Difficult to relax | — | — | **.77\*** (.67–.84) |
| DASS42\_11 – Getting upset easily | — | — | **.83\*** (.75–.90) |
| DASS42\_12 – A lot of nervous energy | — | — | **.74\*** (.63–.82) |
| DASS42\_14 – Impatient when delayed | — | — | **.65\*** (.54–.74) |
| DASS42\_18 – Rather touchy | — | — | **.73\*** (.61–.83) |
| DASS42\_22 – Hard to wind down | — | — | **.70\*** (.57–.81) |
| DASS42\_27 – Very irritable | — | — | **.82\*** (.75–.88) |
| DASS42\_29 – Hard to calm down after upset | — | — | **.82\*** (.74–.88) |
| DASS42\_32 – Tolerating interruptions | — | — | **.72\*** (.62–.80) |
| DASS42\_33 – State of nervous tension | — | — | **.75\*** (.66–.83) |
| DASS42\_35 – Intolerant of interruptions | — | — | **.73\*** (.65–.81) |
| DASS42\_39 – Getting agitated | — | — | **.82\*** (.73–.89) |
| Mean λ (range) | .80 (.60–.88) | .62 (.36–.86) | .76 (.65–.83) |
| Inter-factor correlations |  |  |  |
| Depression with anxiety | .73\* |  |  |
| Depression with stress | .86\* |  |  |
| Anxiety with stress | .81\* |  |  |

*Note.* DASS21 = Depression Anxiety Stress Scales 21-item version. Factor loadings in bold are considered adequate (λ ≥ .32).

\* *p* ˂ .001

**Table S8**

*DASS42 Factor Loadings: Second-Order Model* (n = 136)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Indicator | Factor loading, λ (95% confidence interval) | | | |
| General distress | Depression | Anxiety | Stress |
| Depression | **.88\*** (.83–.95) | — | — | — |
| Anxiety | **.83\*** (.74–.90) | — | — | — |
| Stress | **.98\*** (.91–1.00) | — | — | — |
| DASS42\_3 – No positive feeling | — | **.67\*** (.52–.80) | — | — |
| DASS42\_5 – Couldn’t get going | — | **.60\*** (.45–.73) | — | — |
| DASS42\_10 – Nothing look forward to | — | **.87\*** (.81–.92) | — | — |
| DASS42\_13 – Sad and depressed | — | **.82\*** (.72–.90) | — | — |
| DASS42\_16 – Lost interest in everything | — | **.84\*** (.76–.89) | — | — |
| DASS42\_17 – Not worth much as a person | — | **.83\*** (.75–.89) | — | — |
| DASS42\_21 – Life wasn’t worthwhile | — | **.83\*** (.74–.89) | — | — |
| DASS42\_24 – Couldn’t get enjoyment | — | **.82\*** (.73–.90) | — | — |
| DASS42\_26 – Down-hearted and blue | — | **.81\*** (.72–.87) | — | — |
| DASS42\_31 – Unable to be enthusiastic | — | **.82\*** (.75–.88) | — | — |
| DASS42\_34 – Pretty worthless | — | **.88\*** (.81–.93) | — | — |
| DASS42\_37 – Nothing future hopeful about | — | **.87\*** (.81–.91) | — | — |
| DASS42\_38 – Life was meaningless | — | **.85\*** (.79–.90) | — | — |
| DASS42\_42 – Difficult to initiate | — | **.71\*** (.58–.82) | — | — |
| DASS42\_2 – Dryness of mouth | — | — | **.51\*** (.32–.66) | — |
| DASS42\_4 – Breathing difficulty | — | — | **.51\*** (.29–.70) | — |
| DASS42\_7 – Feeling of shakiness | — | — | **.52\*** (.33–.69) | — |
| DASS42\_9 – Anxious over situations | — | — | **.73\*** (.62–.83) | — |
| DASS42\_15 – Feeling of faintness | — | — | **.60\*** (.41–.72) | — |
| DASS42\_19 – Perspired without exercise | — | — | **.57\*** (.41–.70) | — |
| DASS42\_20 – Scared without reason | — | — | **.69\*** (.55–.81) | — |
| DASS42\_23 – Difficulty swallowing | — | — | **.36\*** (.19–.53) | — |
| DASS42\_25 – Aware of heart no exercising | — | — | **.48\*** (.31–.63) | — |
| DASS42\_28 – Close to panic | — | — | **.86\*** (.80–.91) | — |
| DASS42\_30 – Fear of unfamiliar task | — | — | **.73\*** (.63–.82) | — |
| DASS42\_36 – Terrified | — | — | **.61\*** (.44–.76) | — |
| DASS42\_40 – Make fool of self | — | — | **.76\*** (.63–.85) | — |
| DASS42\_41 – Experienced trembling | — | — | **.68\*** (.53–.80) | — |
| DASS42\_1 – Upset by trivial things | — | — | — | **.80\*** (.74–.87) |
| DASS42\_6 – Over-react to situations | — | — | — | **.75\*** (.64–.85) |
| DASS42\_8 – Difficult to relax | — | — | — | **.77\*** (.68–.84) |
| DASS42\_11 – Getting upset easily | — | — | — | **.83\*** (.75–.90) |
| DASS42\_12 – A lot of nervous energy | — | — | — | **.74\*** (.64–.82) |
| DASS42\_14 – Impatient when delayed | — | — | — | **.65\*** (.53–.75) |
| DASS42\_18 – Rather touchy | — | — | — | **.73\*** (.62–.83) |
| DASS42\_22 – Hard to wind down | — | — | — | **.70\*** (.58–.81) |
| DASS42\_27 – Very irritable | — | — | — | **.82\*** (.74–.88) |
| DASS42\_29 – Hard to calm down after upset | — | — | — | **.82\*** (.76–.88) |
| DASS42\_32 – Tolerating interruptions | — | — | — | **.72\*** (.63–.80) |
| DASS42\_33 – State of nervous tension | — | — | — | **.75\*** (.65–.83) |
| DASS42\_35 – Intolerant of interruptions | — | — | — | **.73\*** (.65–.81) |
| DASS42\_39 – Getting agitated | — | — | — | **.82\*** (.73–.89) |
| Mean λ (range) | .90 (.83–.98) | .80 (.60–.88) | .62 (.36–.86) | .76 (.65–.83) |

*Note.* DASS21 = Depression Anxiety Stress Scales 21-item version. Factor loadings in bold are considered adequate (λ ≥ .32).

\* *p* ˂ .05

### The DASS42 Comprised a Dominant General Factor

Omega reliability indices were computed to evaluate the reliability of DASS42 general and specific factors. Consistent with our inspection of the factor loadings, 90% of the systematic variance in DASS42 scores was attributable to the general factor (ω*h* = .90), reflecting good reliability of the general factor (ω*h* ≥ .80 sufficient). After controlling for the general factor, little residual systematic variance in subscale scores was attributable to the specific depression (*ωhs* = .22), anxiety (*ωhs* = .29), and stress factors (*ωhs* = .07), reflecting inadequate reliability (*ωhs* ≥ .50 required). The high *ωh*and relatively small *ωhs* values indicates that the DASS did not reliably capture more specific constructs beyond general distress but rather comprised a dominant general distress factor.

### The DASS42 Largely Represented a Unidimensional Measure

We used another set of bifactor statistical indices to assess the dimensionality of the DASS42. The explained common variance (ECV) indicated that 77% of common variance across items was attributable to the general factor (ECV ≥.70 sufficient for unidimensionality). An insignificant proportion of common variance was explained by the specific factors after controlling for the general factor (S-ECVDepression = .10; S-ECVAnxiety = .08; S-ECVStress = .05; S-ECV ≥ 0.70 sufficient for unique specific factors), and additionally, the individual scale scores did not add meaningful value above and beyond the total score (VARDepression = 1.02; VARAnxiety = 0.99; VARStress = 0.98). Further, the percentage of uncontaminated (PUC) correlations indicated that 68% of correlations between items were attributable to the general factor, which was marginally below our *a priori* threshold for unidimensionality (≥ 0.70 sufficient). We compared the unidimensional and bifactor models of the DASS42 and extracted the average relative parameter bias (ARPB) to quantify the effect of not including the specific factors in the model. The ARPB was .07, meaning the loadings on the general factor differed on average by only 7% between the unidimensional and bifactor models (ARPB < .10 sufficient for unidimensionality).

These findings suggest the DASS42 could be used as a unidimensional measure with minimal bias compared with the traditional scales. Despite this, the DASS42 unidimensional model had a poor fit (Table S5). Therefore, there may be some multidimensionality in the DASS42 data structure, but this was not adequately captured by the traditional depression, anxiety, and stress scales. We investigated possible sources of multidimensionality at the level of individual items using item-level explained common variance (I-ECV) and relative parameter bias (RPB; Table S4). Items which were found to have a meaningful association with their respective specific factor (based on ECV < .85 and RPB ≥ .10) were: 7 (feeling of shakiness) 16 (lost interest in everything), 17 (not worth much as a person), 21 (life was not worthwhile), 23 (difficulty swallowing), 26 (down-hearted and blue), 34 (pretty worthless), 37 (nothing future hopeful about), and 38 (life was meaningless). Similar to findings for the DASS21, most of the DASS42 items highlighted in this analysis (16, 17, 21, 26, 34, 37, 38) belong to the depression scale, reflecting a broad range of depressive symptomatology such as anhedonia, hopelessness, dysphoria, lack of interest/involvement, self-deprecation, and devaluation of life. Items 7 and 23 are part of the anxiety scale are intended to reflect experiences of physiological hyperarousal (Lovibond & Lovibond, 1995b).

**Table S9**

DASS42 Item-Level Bifactor Statistical Indices (n = 136)

|  |  |  |  |
| --- | --- | --- | --- |
| Scale | Item | I-ECV | RPB |
| Depression | DASS42\_3 – No positive feeling | .86 | .07 |
| DASS42\_5 – Couldn’t get going | .98 | .01 |
| DASS42\_10 – Nothing look forward to | .78 | .09 |
| DASS42\_13 – Sad and depressed | .82 | .09 |
| **DASS42\_16 – Lost interest in everything** | **.71** | **.12** |
| **DASS42\_17 – Not worth much as a person** | **.73** | **.12** |
| **DASS42\_21 – Life wasn’t worthwhile** | **.54** | **.20** |
|  | DASS42\_24 – Couldn’t get enjoyment | .88 | .06 |
|  | **DASS42\_26 – Down-hearted and blue** | **.78** | **.11** |
|  | DASS42\_31 – Unable to be enthusiastic | .88 | .06 |
|  | **DASS42\_34 – Pretty worthless** | **.70** | **.13** |
|  | **DASS42\_37 – Nothing future hopeful about** | **.68** | **.15** |
|  | **DASS42\_38 – Life was meaningless** | **.49** | **.22** |
|  | DASS42\_42 – Difficult to initiate | .92 | .04 |
| Anxiety | DASS42\_2 – Dryness of mouth | .71 | .02 |
| DASS42\_4 – Breathing difficulty | .57 | .08 |
| **DASS42\_7 – Feeling of shakiness** | **.19** | **.11** |
| DASS42\_9 – Anxious over situations | .96 | .06 |
| DASS42\_15 – Feeling of faintness | .41 | .04 |
| DASS42\_19 – Perspired without exercise | .66 | .04 |
| DASS42\_20 – Scared without reason | .74 | .07 |
|  | **DASS42\_23 – Difficulty swallowing** | **.34** | **.15** |
|  | DASS42\_25 – Aware of heart no exercising | .71 | .01 |
|  | DASS42\_28 – Close to panic | .90 | .05 |
|  | DASS42\_30 – Fear of unfamiliar task | .94 | .01 |
|  | DASS42\_36 – Terrified | .54 | .04 |
|  | DASS42\_40 – Make fool of self | .93 | .06 |
|  | DASS42\_41 – Experienced trembling | .51 | .01 |
| Stress | DASS42\_1 – Upset by trivial things | .86 | .04 |
| DASS42\_6 – Over-react to situations | .88 | .02 |
| DASS42\_8 – Difficult to relax | .99 | .08 |
| DASS42\_11 – Getting upset easily | .89 | .03 |
| DASS42\_12 – A lot of nervous energy | .995 | .08 |
| DASS42\_14 – Impatient when delayed | .83 | .03 |
| DASS42\_18 – Rather touchy | .67 | .06 |
|  | DASS42\_22 – Hard to wind down | .99 | .05 |
|  | DASS42\_27 – Very irritable | .72 | .02 |
|  | DASS42\_29 – Hard to calm down after upset | .89 | .01 |
|  | DASS42\_32 – Tolerating interruptions | .88 | .04 |
|  | DASS42\_33 – State of nervous tension | .97 | .07 |
|  | DASS42\_35 – Intolerant of interruptions | .85 | .06 |
|  | DASS42\_39 – Getting agitated | .80 | .03 |

*Note.* DASS42 = Depression Anxiety Stress Scales 42-item version; I-ECV = item level explained common variance; RPB = relative parameter bias. Items in bold represent those which may be considered as having a meaningful association with their respective specific factor and therefore as contributing some multidimensionality to the data (based on I-ECV < .85 and RPB ≥.10).