VALIDATION OF THE ADOLESCENT SELF-ESTEEM QUESTIONNAIRE

Technical report

Contents

SUMMARY

This document describes the validation of the adolescent Self-Esteem Questionnaire (ASQ) which was developed for the purpose of measuring self-esteem in *Young Minds Matter: the second Australian child and adolescent survey of mental health and wellbeing* (YMM).

The existing gold standard measure of global self-esteem, the Rosenberg Self-esteem Scale (RSES) was identified to be somewhat outdated, in language and concepts, for use in a contemporary Australian youth population. Therefore, we sought to develop a short scale which captured global self-esteem which could be included in the youth self-report component of YMM. In order to validate the scale we used data from two study populations. The first was the nationally representative sample of 2,964 11 to 17 year-olds who participated in YMM. These data were used to undertake a factor analysis of the items, and also to establish population norms for the scale. The second study included 304 Western Australian school students aged between 14 and 17 years, which was used to compare the ASQ with the RSES and to assess the test-retest stability of the ASQ.

The properties of the scale were examined, and its reliability and validity were compared to the existing gold standard measure of self-esteem, the Rosenberg Self-Esteem Scale (RSES). Factor analysis allowed for investigation of the underlying concepts captured by the ASQ, and population norms and a clinically meaningful threshold which was used to define low levels of self-esteem, were calculated.

The ASQ performed as well as the RSES. In addition, the ASQ was highly predictive of depression, suggesting good construct validity. The inclusion of the ASQ in YMM provided us with nationally representative data from which sex-specific population norms, and a clinically meaningful definition of self-esteem, could be derived. Population norms are provided in this report, and a threshold for low self-esteem has been identified to assist researchers using the ASQ measure with the YMM Confidentialised Unit Record File (CURF). This information may also allow the ASQ to be useful as a tool in future research and practice.

About Young Minds Matter

Mental health problems are among the most common and burdensome health conditions in children and young people. Without appropriate treatment, they can be persistent and disabling, and can adversely affect children's learning and development. *Young Minds Matter*, the second Australian Child and Adolescent Survey of Mental Health and Wellbeing was conducted as part of the Australian Government Department of Health's National Survey of Mental Health and Wellbeing programme. The survey was conducted to provide information to support improving mental health services for children and adolescents experiencing mental health problems and their families. Over 6,300 families with children and adolescents aged 4-17 years from around Australia participated in the survey. Information was collected from primary carers via a face-to-face diagnostic interview, and directly from adolescents aged 11-17 years via a self-complete questionnaire administered using tablet computers.

The main aims of the survey were to determine

- how many children and adolescents had which mental health problems and disorders
- the nature and impact of these problems and disorders
- how many children and adolescents had used services for mental health problems; and
- the role of the education sector in providing these services.

Further information about YMM is available at www.youngmindsmatter.org.au

BACKGROUND

Young Minds Matter sought to collect information about mental health and wellbeing of Australian children and young people including identifying the prevalence of mental health problems and disorders, the environments in which children live and the relationship of mental health and wellbeing to family and school characteristics, the impact of mental disorders, risk factors associated with mental health and wellbeing, and use of services and unmet need for services.

Self-esteem has been identified as being associated with mental health and wellbeing, and has been associated with health risk behaviours that are also associated with poor mental health. Recognising that self-esteem is an important component of adolescent wellbeing, a measure of self-esteem was sought for inclusion in YMM. As there were a substantial number of content areas to be covered in the YMM questionnaire, and practical constraints on the length of the questionnaire, a brief measure of global self-esteem was desirable.

While there is no single agreed definition and theory of self-esteem, it is generally considered to represent an individual's overall appraisal of themselves and their value as a person [1]. It is considered to be the evaluative and affective components of the sense of self [2,3]. Self-esteem is thought to be an assessment of competency and worth as a person in relation to others [4]. Self-esteem reflects the components of self-concept that are considered to be important by the individual. It spans across domains and roles, and consists of both positive and negative self-judgements [5].

A number of different constructs of self-esteem have been discussed in the literature. For example, global or trait self-esteem refers to an individual's assessment of themselves overall, or general feelings about themselves relative to others. In contrast, domain-specific self-esteem refers to evaluations in a particular area. For example, an individual could have low academic self-esteem and high self-esteem regarding their athletic ability. State self-esteem is typically used to capture self-esteem in a specific moment or setting [6]. While self-esteem is a topic of much research, the difficulties in measuring self-esteem, and using self-esteem scores to accurately predict life outcomes and behaviours, have been documented [6].

Self-esteem is not static but rather it fluctuates in response to situational factors, and over the life course. Robins and Trzeniewski note that self-esteem is typically high in childhood and adulthood but is lower in adolescence and old age [7]. The authors attributed the decline in self-esteem in adolescence to improvements in abstract thinking, greater comprehension of abilities relative to

others, growing awareness of body image, and academic and social challenges associated with school transitions. This decline in self-esteem has been linked to antisocial behaviour, academic underachievement and risk-taking behaviours such as alcohol and substance use, and early sexual activity [8][9].

Self-esteem has also been demonstrated to be associated with mental health and has been implicated in the diagnostic criteria for several mental health disorders including mood and anxiety disorders [3]. Low self-esteem in adolescence has been associated with problem eating behaviours, difficulty with peer interactions, and suicidal ideation and it has been found to be an indicator of poor long-term outcomes and impairments in functioning [10][11]. It is well accepted that early identification and intervention for mental health problems is critical. Given that self-esteem can be seen as an indicator for how an individual approaches the challenges of adolescence, and suggestive of mental health status, measures of self-esteem which are specifically developed for an adolescent population are an important tool for identifying and assessing at-risk youth [12].

Due to the link between self-esteem and outcomes such as mental health status, there are a large number of self-esteem measures. These measures vary depending on the construct (i.e. global versus domain or state specific self-esteem) they aim to capture, the population of interest and the setting in which they are used. In studies such as YMM where self-esteem is one of several concepts that need to be measured, short measures of global self-esteem, which have low respondent burden, are favoured. One of the most widely used measures in this setting, which is considered to be the current gold standard measure of global self-esteem, is the Rosenberg Self Esteem Scale (RSES) [2][13]. The RSES was designed in 1965 for adolescent populations. It is a short, self-report questionnaire which contains both positively and negatively worded items relating to the feelings a person has about themselves [4]. The scale was designed for use in population studies rather than in clinical settings [2]. The RSES has been demonstrated to have sound psychometric properties and has been used extensively in research [14][15]. However, since the development of the RSES in the 1960s, there have been many societal changes which may impact on the relevance of the items within the RSES and their ability to capture self-esteem in surveys of contemporary adolescent population.

One factor, which has substantially changed the adolescent experience over recent years, is the marked increase in access to the internet and social media. This vastly different environment for today's young people, compared to previous generations, may impact on the issues relevant to self-esteem and, as a result, its measurement. For example, greater social media use and image sharing may have altered the relationship between self-esteem and body image in young people. Recent studies have identified body image and perception of physical appearance as one of the strongest

sources of self-esteem in adolescents [12][16]. The RSES does not include an item relating to body image or perceptions and, as a result, may not evaluate a key factor which contributes to youth self-esteem. A further consideration is the language of the RSES. Hinkin suggests that the language of scales needs to be familiar to the target audience, and revision of scales is needed to maintain their effectiveness [17]. The language included in the RSES could be considered somewhat outdated. For example, the RSES asks participants to respond to the statement 'I feel that I'm a person of worth, at least on an equal plane with others'. The outdated language may impact on a young person's ability to understand and respond appropriately to the scale and, as a result, the ability of the scale to accurately capture self-esteem.

Therefore, we hypothesised that a revised measure of self-esteem, the Adolescent Self-Esteem Questionnaire (ASQ) would provide an improved measure for assessing self-esteem in an adolescent population setting. It was anticipated that this updated measure of self-esteem, which was designed to be more relevant for young people in their current context, would allow for more accurate assessment of self-esteem and would enable better detection of youth with low self-esteem who may be at risk of mental health problems.

Project Aims

The aims of this project were to:

- Determine whether the ASQ was a valid and reliable measure of self-esteem in a youth population
- Ascertain whether the ASQ performed better than current gold standard measure, the RSES, in relation to scale consistency, reliability and construct validity
- Determine population norms and clinically meaningful threshold scores for the ASQ which are of use to future research and in practice.

METHODS

Validation of the ASQ involved two studies. The first study used data collected in YMM. Factor analysis of the ASQ items was undertaken using these data, as well as the establishment of population norms. In order to measure additional aspects of the performance of the ASQ, a second study was also conducted. In this study, both the ASQ and the RSES were administered to the same group of students, allowing a comparison of the performance of both instruments. A subset of students also completed the instrument on two occasions to assess the test-retest reliability of the instrument.

Study 1

Young Minds Matter: The Second Australian Child and Adolescent Survey of Mental Health and Wellbeing (YMM)[18] was funded by the Australian Government Department of Health . The aims of YMM were to determine the prevalence of mental health problems and disorders among children and adolescents in Australia, examine the nature of these disorders, assess the degree of functional impairment associated with these disorders, determine the mental health services used by young people with disorders, and examine the role of the education sector in providing services to young people with mental health problems and disorders.

Of relevance to this analysis, YMM provided a population representative sample of Australian youth aged between 11 and 17 years. This allowed for the underlying constructs and population norms of the ASQ to be assessed. In addition, this sample allowed for derivation of clinically meaningful thresholds.

Participants

The YMM survey had a final sample of over 6,000 families with children aged 4 – 17 years from across Australia. In total, 2,964 young people between the ages of 11 and 17 years completed the ASQ self-esteem questionnaire within the self-report youth interview. This sample, which included 1,529 boys and 1,435 girls, represents 89% of eligible youth.

Procedure

The YMM survey approached Australian households over an 11 month period in 2013/2014. Young Minds Matter was a population representative sample of over 6,000 families. Data were collected from parents using household-based interviewing. For children aged 11 years and older, where

parent and child consent was provided, additional information was collected from the young person via a self-complete interview on a tablet computer. The parent questionnaire collected information about the child's mental health, service use, and demographic and family information. The youth self-complete survey collected information on mental health status, service use, wellbeing, risk taking behaviours, use of technology, bullying, health, and self-esteem.

The current analysis primarily made use of the youth self-report data. Variables of interest included: demographic information; self-esteem as measured by the ASQ; risk taking behaviours including alcohol use, drug use and sexual activity; being a victim of bullying; self-harming behaviours; and mental health status. The primary measure of mental health status was the diagnosis of major depressive disorder which had impacted on functioning in the previous 12 months. This diagnosis was obtained with use of the Diagnostic Interview Schedule for Children (Youth Informant) Version IV (DISC-IV) which is described below.

Diagnostic Interview Schedule for Children (Youth Informant) Version IV (DISC-IV)

The Diagnostic Interview Schedule for Children (Youth Informant) Version IV applies Diagnostic and Statistical Manual of Mental Disorders criteria to allow for the existence, or absence, of specific mental disorders to be identified in young people. The DISC-IV is a structured interview which includes six modules covering 22 specific psychiatric diagnoses. Only the major depressive disorder module was included in the YMM youth self-complete survey.

Statistical Analysis

Statistical analyses were carried out using SAS 9.3 (SAS Institute, Inc., Cary, NC). Confirmatory factor analysis was performed using Mplus Version 7.4 [19].

Survey data was weighted using calibration on marginal totals to population figures obtained in the 2011 Census of Population and Housing. All analyses took into account population weights.

For the purpose of factor analysis, the data set was randomly split into two equal samples to provide an analysis and test dataset. This was completed to allow for cross validation, and improving the generalisability of results. In order to examine the structure of the ASQ, an exploratory factor analysis using maximum likelihood estimation and a promax rotation was performed. The number of factors was determined based on associated eigenvalues of greater than one and the shape of the scree plot. Fit statistics included measures of absolute fit (chi-square goodness of fit), parsimony corrected fit (root mean square error of approximation (RSMEA), and comparative fit (comparative fit index (CFI)). Cut-off values against which fit was assessed were a significant RMSEA and its

confidence interval ≤ 0.08 and CFI > 0.90. Confirmatory factor analysis, using the weighted least squares method, was completed with the fit of both a one and a two factor model examined. Item response theory analysis was used to examine the ability of items to distinguish between individuals with low and high levels of self-esteem. In order to help ascertain whether the negative and positive items captured two meaningful factors, the ability of these sub-scores to predict depression, which had impacted on functioning in the previous 12 months, was examined. The Area under the Receiver Operating Characteristic Curve was compared to determine the relative predictive ability of the individual subscales and the total ASQ score.

Population norms were determined for ASQ scores for both males and females. In addition, ASQ scores were compared to the predicted probability of the young person being identified as having major depressive disorder which had impacted on functioning via the DISC using logistic regression. Generalised additive models were used rather than restricting the nature of the relationship between ASQ scores and major depressive disorder to be linear or any other fixed functional form. This was undertaken with the aim of identifying meaningful a cut-point or threshold in the scale which could distinguish those with low self-esteem. The use of this threshold was subsequently tested using logistic regression models. Demographic and mental health factors which were theoretically associated with low self-esteem were also included in the model. Non-significant variables were excluded from the model (alpha = 0.05) and the most parsimonious model was reported.

Study 2

The second study included 304 school students aged between 14 and 17 years. The data obtained from this study allowed the ASQ to be compared to the RSES. In addition, this sample allowed the reliability, validity and test-retest stability of the ASQ to be determined.

Participants

Young people between the ages of 14 and 17 years were recruited from four schools in metropolitan Western Australia. The sample comprised 160 girls and 144 boys. The young people were aged between 14 and 17 years old with the majority of children aged 14 (n = 117) and 15 (n =133) years. Students from three schools were asked to complete the questionnaire on two occasions approximately two weeks apart. As the data did not contain an identifying number or name, results from the two time points were matched on school, gender and date of birth. Records which were not unique, based on these identifying characteristics, were excluded from the analysis. The final

sample of young people who completed two questionnaires, and whose records could be successfully matched, was 81.

Procedure

Schools were approached for permission for researchers to speak to students about their participation in the study. Participant consent was sought from all students. No students refused to participate in the study. In addition, parental consent was required for students in one school. Once the required consents were obtained, participants were provided with a link to the online questionnaire. Participants completed the questionnaire in the classroom, on a personal computer, and were asked to answer the questions individually, without the input of others. The questionnaire comprised three scales which were combined to form the single, online questionnaire. The three scales were the ASQ, the RSES and the Beck Depression Inventory – Youth scale. These scales are described below.

The Adolescent Self-Esteem Questionnaire (ASQ)

A 13-item measure of global self-esteem. The ASQ includes both negatively and positively worded items which are on a 5-point Likert scale. Item scores were summed, with positively worded items reverse coded, to determine an individual's self-esteem score. A higher score reflects higher levels of self-esteem. The ASQ, and sample scoring code (SAS), is included in Appendix 1.

The Rosenberg Self-Esteem Scale (RSES; 1965)

A 10-item scale which provides a measure of global self-esteem. Items are answered on a four point Likert scale that range from strongly agree to strongly disagree. The RSES uses both positive and negatively worded items. Negatively worded items are reverse coded and item scores are summed to calculate a total score. Higher scores are associated with higher global self-esteem.

The Beck Depression Inventory – Youth (BDI-Y)

A 20-items self-report assessment that is used to identify symptoms of depression (Beck, 2008). The BDI-Y measures children's and adolescents' negative view of self, their world and their future and is designed for young people aged between seven and 18 years old. It captures a range of thoughts, feelings, and behaviours which are characteristic of depression such as hopelessness, suicidal ideation, and sleep disturbance. The BDI-Y scale is scored by summing all the items to obtain a total score. This raw total score is then converted into a t-score equivalent which is specific to age-group and gender.

With the aim of reducing potential order effects in the data, two versions of the online questionnaire were developed. The first version included the ASQ first and RSES last (i.e. ASQ, BDI-Y, RSES). The second version of the questionnaire included the RSES first and the ASQ last (i.e. RSES, BDI-Y, ASQ). As no identifying information was collected, the survey version was randomised at the classroom, rather than individual level. In addition age, sex and date of birth information was obtained.

Participants from three schools were asked to complete the questionnaire on a second occasion. The fourth school did not complete a second testing occasion due to school holidays. The time between the two testing occasions was approximately two weeks. As we did not collect names on the questionnaire, in an effort to preserve anonymity and reduce social desirability biases, an individual's questionnaires were matched based on school, classroom, sex, and date of birth. In the case of duplicate date of birth and sex within a single classroom, questionnaires were excluded from the test-retest analysis. Questionnaires excluded from the test-retest analysis due to duplicate matching criteria remained in all other analyses.

Statistical analysis

The internal reliability of the scale was determined using Cronbach's alpha. Test-retest stability was determined via correlations between time one and time two scores. In addition, paired *t*-tests allowed for comparisons of scores at the two time points for the same individual. Theoretically, low self-esteem is linked with higher levels of depression and depressive symptoms. Therefore, in order to examine construct validity, the relationship between the ASQ and BDI-Y was examined. Correlations between scores obtained on the self-esteem scales and scores obtained on the BDI-Y were determined.

RESULTS

Study 1

Demographic characteristics

Demographic characteristics of the sample, which includes weighted population estimates from YMM, and population comparisons from the 2011 Census of Population and Housing, are displayed in Table 1. These data demonstrate that the YMM data were comparable to the Australia population in relation to age and sex. The YMM data were weighted based on Estimated Resident Population counts for Australian children and adolescents. These figures adjust for under-enumeration in the census, and explain why the YMM weighted estimates are slightly higher than the census figures.

Table 1. Demographic characteristics of the weighted YMM sample

		YMM		Census	
		Weighted n	**%**	**n**	**%**
Age (years)	**11**	278,031	14.0	272,786	14.0
	12	280,063	14.2	275,033	14.1
	13	279,314	14.2	274,668	14.1
	14	284,886	14.3	277,579	14.3
	15	279,066	14.2	278,716	14.3
	16	287,812	14.5	282,605	14.5
	17	290,141	14.7	284,758	14.6
Sex	**Male**	1,019,308	51.5	999,493	51.4
	Female	960,005	48.5	946,652	48.6
Total		1,979,313	100	1,946,145	100

Factor analysis

Exploratory factor analysis identified two underlying factors in the ASQ. In addition, it was identified that one item, ' I make an effort to look good', did not fit well with other scale items. This item was removed from the ASQ and the fit of the adjusted scale was reassessed. Again, two factors were identified and these factors corresponded with the positively and negatively worded items within the scale. Factor loadings ranged between 0.40 and 0.81 and items typically loaded clearly on one factor with lower minor loadings on the second factor. Factor loadings for the rotated model are included in Table 2.

The Kaiser-Meyer-Olkin measure of sampling adequacy was high (0.914) and Bartlett's test of sphericity was significant (df = 66, x2 = 7082.17, p < 0.001). The total weighted communality was 12.37.

Table 2. Rotated factor loadings and final communality estimates for the ASQ scale

Question	Factor 1	Factor 2	Communality
I am able to stand up for myself and what I believe in	0.40	0.19	0.20
How I feel about myself depends on what others think of me	0.10	0.46	0.23
I feel I can be myself around other people	0.54	0.34	0.41
Overall I feel good about my abilities compared to others (e.g. at school, playing sports or socially)	0.62	0.22	0.43
If I make an innocent mistake I let it get me down	0.19	0.71	0.54
I feel useless	0.39	0.66	0.59
Overall I like who I am	0.73	0.37	0.67
I am a good person who has a lot to offer	0.81	0.18	0.68
I feel that I am a valuable person who is at least equal to other people	0.75	0.17	0.59
How I feel about my body makes me feel less confident	0.27	0.52	0.34
I feel confident in my abilities to achieve the things I set my mind to	0.65	0.26	0.49
I think other people like me	0.60	0.22	0.40

The exploratory factor analysis suggested a two factor model. However, when the two factors were extracted and rotated with an oblique rotation, they were correlated (0.57) which suggests a strong general factor of self-esteem.

Scores for positive and negative items were cross tabulated to examine whether the two factors identified the same populations. This would provide further evidence for a one factor solution. As seen in Tables 3a and b. These results suggest that the individual factors identify a similar group of young people with high levels of self-esteem, but there is some discrepancy at the opposite end of the scale, particularly those with low scores on the negative item scale. This was more obvious for females when compared to males, as females tended to have lower scores on the negative item scale.

Table 3a. Negative and positive scores for the ASQ – Males

Positive (Reverse coded)	Negative				
	0-4 n(%)	5-8 n(%)	9-12 n(%)	13-16 n(%)	Total n(%)
0-8	4 (0.3)	3 (0.2)	1 (0.1)	3 (0.2)	11 (0.7)
9-16	16 (1.1)	28 (1.8)	24 (1.6)	9 (0.6)	77 (5.0)
17-24	13 (0.9)	107 (7.0)	214 (14.0)	97 (6.3)	431 (28.2)
25-32	24 (1.6)	84 (5.5)	348 (22.8)	554 (36.2)	1010 (66.1)
Total	57 (3.7)	222 (14.5)	587 (38.4)	663 (43.4)	1529 (100.0)

Table 3b. Negative and positive scores for the ASQ – Females

Positive (Reverse coded)	Negative				
	0-4 n(%)	5-8 n(%)	9-12 n(%)	13-16 n(%)	Total n(%)
0-8	18 (1.25)	5 (0.4)	3 (0.2)	0 (0.0)	26 (1.8)
9-16	59 (4.1)	47 (3.3)	22 (1.5)	1 (0.1)	129 (9.0)
17-24	57 (4.0)	184 (21.8)	235 (16.4)	60 (4.2)	536 (37.4)
25-32	10 (0.7)	115 (8.0)	275 (19.2)	344 (24.0)	744 (51.9)
Total	144 (10.0)	351 (24.5)	535 (37.3)	405 (28.2)	1435 (100.0)

Confirmatory factor analysis using weighted least squares was conducted to test model fit for a one ($\chi2$ = 656.9, CFI = 0.93, RMSEA (95% CI) = 0.086 (0.080-0.092)) and two factor model ($\chi2$ = 537.9, CFI = 0.94, RMSEA (95% CI) = 0.078 (0.072-0.084)). The two factor model appeared to be a stronger fit than the one factor model. Of note, both models had relatively high RMSEA values when compared to accepted cut-points (95% CI for RMSEA ≤ 0.08). Diagrams for the one and two factor model are shown in Figure 1 and Figure 2.

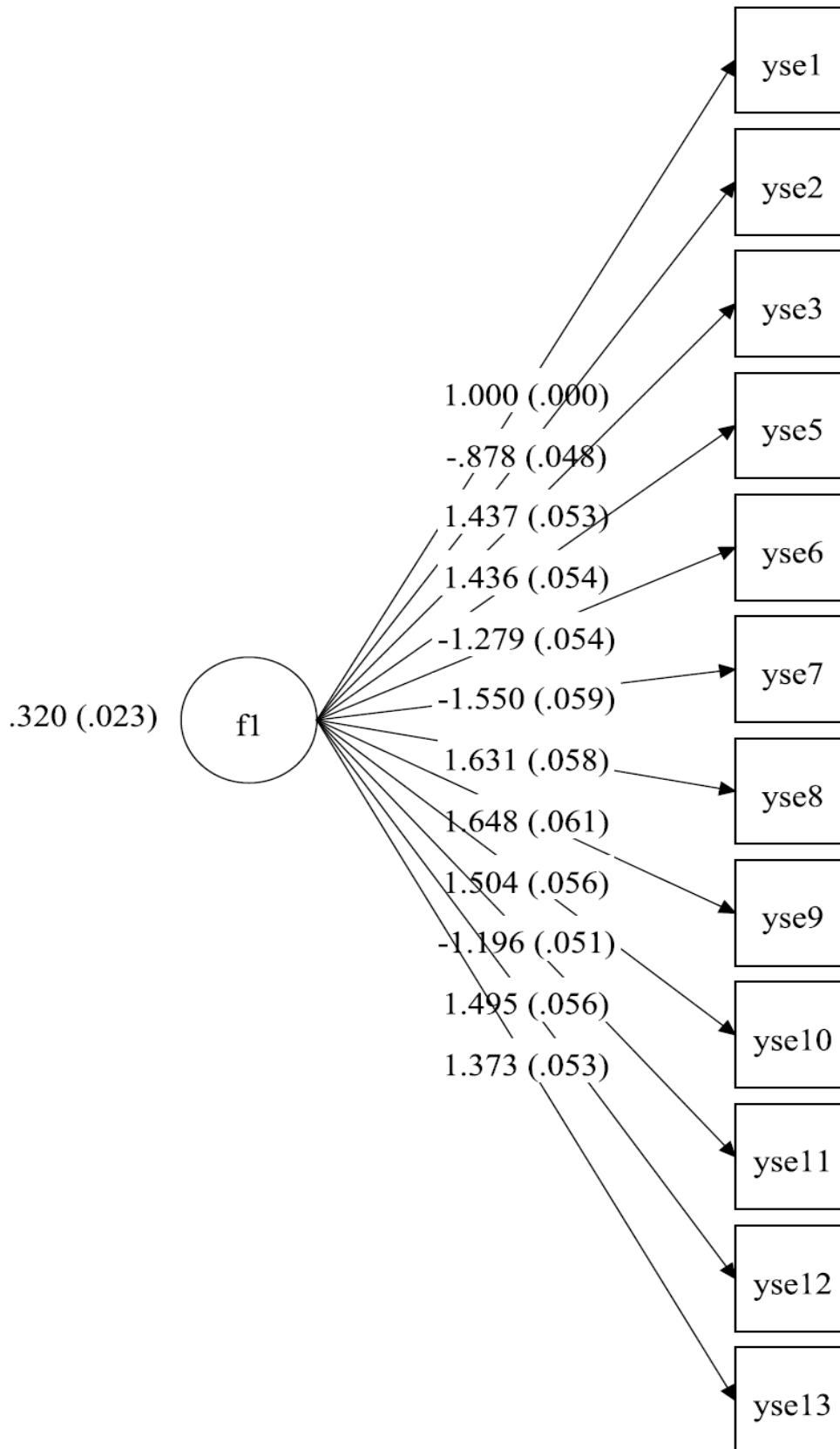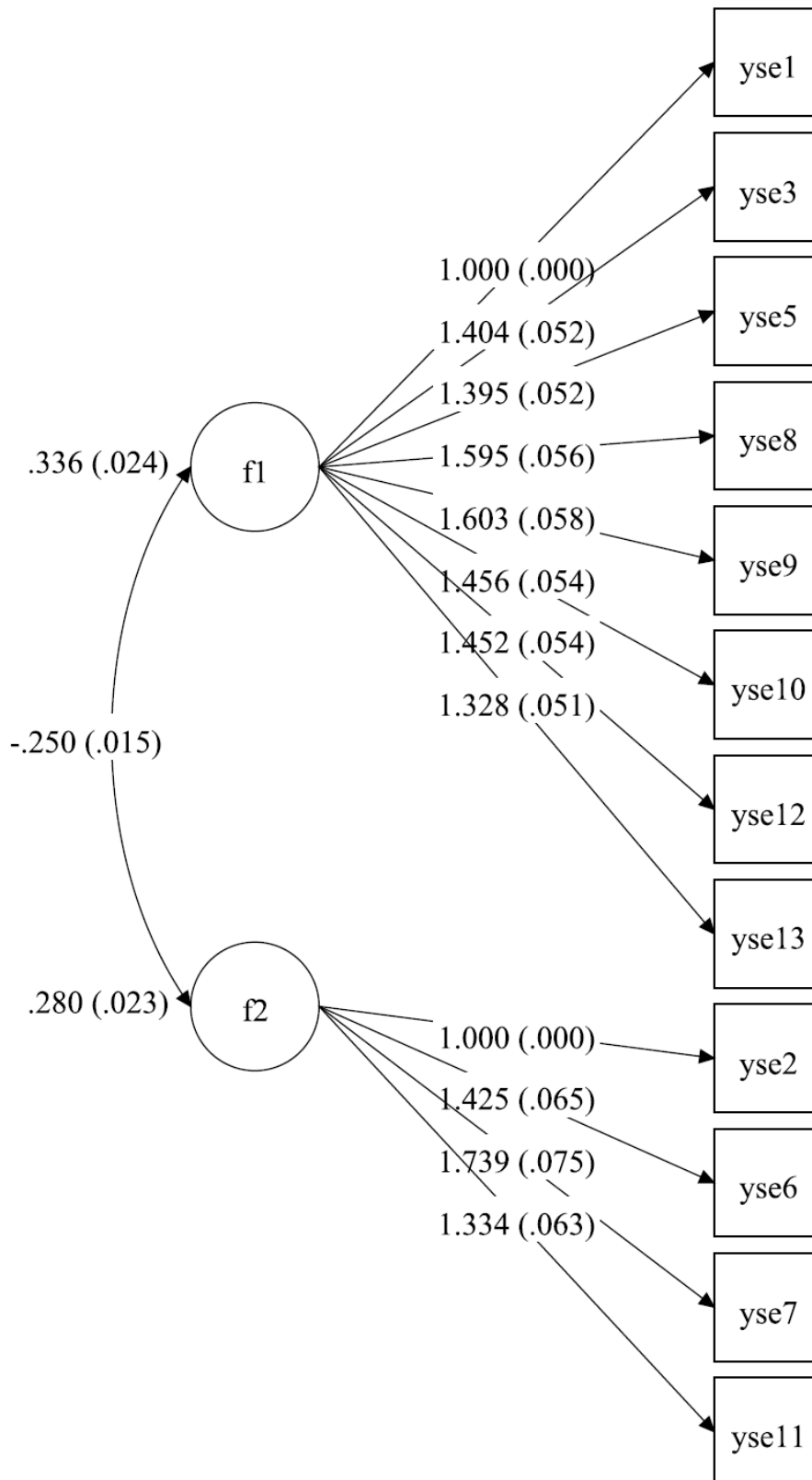**Figure 1. Confirmatory factor analysis of the one factor model**

Figure 2. Confirmatory factor analysis of the two factor model

Scale characteristics

The mean ASQ scores are displayed in Table 4. Males reported significantly higher self-esteem scores than females ($t(2,804) = 10.3$, $p < 0.001$). Older children had, on average, lower self-esteem scores than younger children. Young people who were classified as having major depressive disorder in the past 12 months which had impacted their functioning via the DISC-IV had significantly lower self-esteem (n = 271, mean ASQ score = 24.5, 95% CI = 23.3 – 25.6) compared to young people who were not classified as having major depressive disorder in the previous 12 months (n = 2,693, mean ASQ score = 36.9, 95% CI = 36.6 – 37.2, $t(305) = 22.15$, $p < 0.001$).

The total ASQ score was highly predictive of major depressive disorder which impacted on functioning in the previous 12 months (AUC = 0.86). However, the negatively and positively worded sub-scales also had high AUC values (AUC = 0.83 and 0.82 respectively).

Table 4. Mean ASQ score by age and sex

|		n	Mean	95% CL for Mean	
Age	**11**	310	38.4	37.6	39.1
	12	341	37.7	36.9	38.5
	13	310	36.8	36.0	37.6
	14	340	35.6	34.6	36.6
	15	311	34.7	33.7	35.6
	16	717	33.8	33.2	34.4
	17	635	34.6	34.0	35.3
Sex	**Male**	1,529	37.4	37.0	37.8
	Female	1,435	34.4	33.9	34.9

Sex-specific norms for the ASQ are displayed in Table 5. There was some difference in the distribution of scores by sex, with a greater proportion of females reporting lower self-esteem scores compared to males.

Table 5. Sex-specific norms of the ASQ

Percentile	Male (n = 1,529)	Female (n = 1, 435)
1	16	9
5	23	18
10	28	21
15	30	24
20	31	27
25	33	29
30	34	30
35	35	31
40	36	33
45	37	34
50	38	35
55	39	36
60	40	37
65	41	38
70	42	39
75	43	40
80	44	41
85	45	42
90	46	44
95	47	46
99	48	48

In order to determine a meaningful threshold or cut-point in the ASQ scale the relationship between the DISC-IV classification of major depressive which had impacted the young person's functioning in the previous 12 months and ASQ score was examined. Again, there was some difference between males and females (Figure 3). However, a score of 17 corresponded with a predicted probability of greater than approximately 0.5. Approximately three percent of the sample reported scores equal to or below 17.

Figure 3. Relationship between ASQ score and predicted probability of 12m prevalence of major depressive disorder, by sex
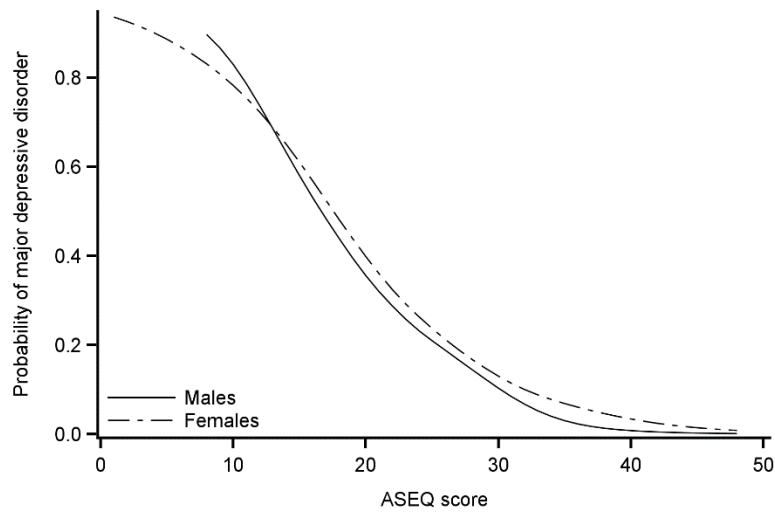
In order to determine whether this threshold score provided a useful measure for research and practice, factors associated with low self-esteem were examined. Low self-esteem, defined by a score of 17 or less on the ASQ, was associated with increased odds of being classified as having major depressive disorder which had impacted on functioning in the previous 12 months (OR = 3.7, 95 CI = 2.0-7.0), self-harm (yes: OR = 7.8, 95% CI = 3.1-19.8; prefer not to say: OR = 9.0, 95% CI = 3.2-25.2), feeling that life was not worth living (OR = 6.3, 95% CI = 1.9 – 20.5) and experiencing bullying in the previous year (OR = 2.0, 95% CI = 1.1 – 3.7).

Study 2

Demographic characteristics

Three hundred and four students completed the study at time one. In addition, 107 students completed the study at time two. Eighty-one students completed the test at two time points and had records which were able to be matched based on date of birth, gender and school. Participant characteristics are displayed in Table 6. As the survey was anonymous, and aimed to have low respondent burden, no additional demographic information was collected from participants.

Table 6. Participant characteristics

		Frequency	Percent
	Male	143	47.0
Sex	Female	160	52.6
	Missing	1	0.3
	14 years	117	38.5
Age	15 years	133	43.8
	16 years	47	15.5
	17 years	7	2.3
	1	20	6.6
School	2	49	16.1
	3	54	17.8
	4	181	59.5

Scale characteristics

The average and range of scores obtained on the three scales are displayed in Table 7.

Table 7. Scale characteristics of the ASQ, RSES, and Beck scales

Scale	n	Mean	Std Dev	Median	Minimum	Maximum	% missing
ASQ	293	34.9	8.8	35	1	52	3.6
RSES	292	19.2	5.6	19	0	30	4.0
BDI-Y	293	15.9	10.3	13	0	58	3.6

Missing data

There was little missing data in either the ASQ or the RSES. All items on both self-esteem scales had less than two per cent missing data. There did not appear to be any single item which was associated with a poorer response compared to other items.

Internal consistency and reliability

The internal consistency of the two self-esteem scales was assessed using Cronbach's alpha correlation coefficient. The ASQ (Cronbach's alpha = 0.91) and the RSES (Cronbach's alpha = 0.91) both demonstrated excellent, and identical, internal consistency.

The test-retest reliability of the scales was assessed using a paired t-test. On average self-esteem scores were slightly higher at time two compared to time one (time one: mean = 35.6, std. dev = 7.6, time two: mean = 37.0, std dev = 8.4, n = 81, mean difference = 1.00, 95% CI = 0.05 – 2.00, t = 2.09, p = 0.04). While statistically significant, this difference was small. The correlation between time one and time two scores was 0.86.

Construct validity

To provide an indication of the validity of the two scales, results obtained on the ASQ and the RSES were compared to those on the BDI-Y as depressive symptoms are theoretically linked with low levels of self-esteem. Both the ASQ and the RSES demonstrated strong, negative correlations with scores on the BDI-Y (ASQ = -0.78, RSES= -0.75) with high self-esteem scores being associated with fewer depressive symptoms.

The association between the positively and negatively worded items on the ASQ and scores obtained on the BDI-Y were examined with the aim of determining whether these items corresponded with two meaningful factors. Both positive and negative subscales were highly correlated with the BDI-Y scores (r = -0.73 for both positive and negative item subscales).

FINDINGS

The aim of this work was to establish whether the newly developed ASQ, which was included in YMM, was a valid and reliable measure of self-esteem for use in a youth population. In addition, we compared the characteristics of the ASQ to the current gold standard measure of self-esteem, the RSE. Further, we aimed to provide sex-specific population norms, and a scale threshold which can be used to classify individuals with low levels of self-esteem, for use in analysing the YMM data, and in future research and in practice.

There was little difference in the validity and reliability of the ASQ and RSES. They both had excellent internal consistency and demonstrated stability between testing periods. In addition, both scales were highly correlated with depressive symptoms, which were theoretically linked with levels of self-esteem. This finding supports the use of either scale to measure self-esteem in a youth population. However, the revision of the ASQ to include language which is more commonly used and easily understood by adolescents, and in particular young adolescents, may provide an advantage of the ASQ over the RSES.

At the outset we hypothesised that, with increasing connectedness and image sharing via the internet and smart phones, body image may be of greater importance to young people now in comparison to those in the 1960s. It was thought that the inclusion of an item relating to body image would provide strength relative to the existing RSES. Contrary to this expectation this item, which asked the participant to rate how often they make an effort to look good, did not fit well with other items in the scale. The item appeared to have poor sensitivity and failed to distinguish between those with high and low levels of self-esteem. As a result, the item was dropped from the final ASQ scale. However, previous research has consistently linked body image with self-esteem in adolescent populations and, in particular, in adolescent girls. For example, Clay and colleagues demonstrated that, in females, reductions in self-esteem across adolescence were in part related to a downward trend in body satisfaction [20]. In addition, Kostanski identified body dissatisfaction was related to the interplay of gender, self-esteem and body mass in a sample of 12 to 18 year olds [21]. Therefore, the poor fit of the body image item in the ASQ may reflect the failure of the question to adequately capture thoughts about body image as it relates to self-esteem in young people.

Factor analysis identified two constructs underpinning the ASQ. These factors corresponded with the positively and negatively worded items in the scale. Previous literature has identified that the RSES also contains two factors. There has been substantial debate in the literature as to whether these

factors are a methodological artefact, relating to different response styles to negatively and positively worded items, or the measurement of two substantively different factors [15]. In order to ascertain whether the ASQ contained two meaningful factors the predictive ability of the positive items, which correspond with one factor, and negative items, which correspond with the second factor, to accurately predict youth major depressive disorder was examined. This analysis suggested that the use of both positive and negative item subscales did not result in a better predictive model when compared to the use of the overall ASQ score. These findings suggest that the identification of two factors in the model does not correspond with different aspects of self-esteem but rather relates to different response styles to negatively and positively worded questions in this population.

A significant strength of the ASQ is that we were able to provide population norms for both males and female adolescents. As the data obtained from YMM is representative of the Australian youth population, these norms provide a reference population for future comparisons. In addition, the inclusion of a meaningful threshold score, which was derived based on the predicted probability of major depressive disorder in the previous 12 months, has application in future research. This threshold allows for the ASQ to be used as a screening tool for young people at risk of low self-esteem and associated negative mental health problems such as risk of depression. The inclusion of representative norms and a threshold value to indicate meaningful levels of low self-esteem provides the ASQ with an advantage over the RSES.

Limitations

The cross sectional nature of the data means that direction of the relationship between mental health outcomes and self-esteem is unknown. This makes it impossible to determine whether interventions which target self-esteem in young people are likely to reduce the risk of negative mental health outcomes in youth populations. Further research into the temporal relationship between self-esteem and mental health outcomes, and the effectiveness of self-esteem interventions on later outcomes, would provide a worthwhile contribution to the literature.

Conclusion

The ASQ was designed to measure self-esteem in an Australian youth population. The scale was demonstrated to be a valid and reliable measure of self-esteem. The ASQ demonstrated high internal consistency, construct validity and test-retest reliability. The ASQ did not perform significantly better than the RSES, which is the current gold standard measure of self-esteem. However, due to the inclusion of the ASQ in YMM, we were able to determine current, normative population scores, and a meaningful threshold value which can be used to define low self-esteem. The inclusion of population norms and a meaningful threshold could allow the ASQ to be used in future research. In addition, it could allow the ASQ to be used as a screening tool to identify at risk youth who require additional support.

DATA ACCESS

A Confidentialised Unit Record File dataset, which includes data from YMM, is available on request from the Australian Data Archive at www.ada.edu.au. The YMM CURF is held under sub-archive ADA Social Science on the website www.ada.edu.au/social-science/acasmhw. Full information regarding accessing data from the ADA is available from www.ada.edu.au/ada/data-access .

The YMM CURF has a special restricted access condition which requires all researchers to have obtained ethics approval for their research from their own relevant ethics body before seeking access to the YMM CURF. By agreeing to the access conditions for this CURF, researchers will be providing an undertaking to maintain respondent confidentiality by using the CURF for specified statistical purposes only and not attempting to identify any particular persons by matching the YMM CURF information with any other list of persons or in any other way. Ethics committees are asked to ensure that proposed research using the YMM CURF conforms to the National Statement on Ethical Conduct in Human Research and that researchers do not attempt to identify any individuals from the CURF data.

The CURF is available in SAS, SPSS and STATA formats. The survey user's guide, CURF technical manual and survey questionnaires are available for download from the YMM web site at

www.youngmindsmatter.org.au/information/for-researchers/

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APPENDIX 1 - ADOLESCENT SELF-ESTEEM QUESTIONNAIRE

Note: In the final version of the ASQ item 4 was dropped as this item was identified to have poor fit.

Adolescent Self-esteem Questionnaire

These questions ask you how you feel about yourself. Please answer each question. Remember there is no right or wrong answer.

YSE1. I am able to stand up for myself and what I believe in

> 1 – Almost all of the time
> 2 – A lot of the time
> 3 - Some of the time
> 4 - A little of the time
> 5 – Hardly ever

YSE2. How I feel about myself depends on what others think of me

> 1 – Almost all of the time
> 2 – A lot of the time
> 3 - Some of the time
> 4 - A little of the time
> 5 – Hardly ever

YSE3. I feel I can be myself around other people

> 1 – Almost all of the time
> 2 – A lot of the time
> 3 - Some of the time
> 4 - A little of the time
> 5 – Hardly ever

YSE5. Overall I feel good about my abilities compared to others (e.g. at school, playing sports or socially)

> 1 – Almost all of the time
> 2 – A lot of the time
> 3 - Some of the time
> 4 - A little of the time
> 5 – Hardly ever

YSE6. If I make an innocent mistake I let it get me down

        1 – Almost all of the time
        2 – A lot of the time
        3 - Some of the time
        4 - A little of the time
        5 – Hardly ever

YSE7. I feel useless

        1 – Almost all of the time
        2 – A lot of the time
        3 - Some of the time
        4 - A little of the time
        5 – Hardly ever

YSE8. Overall I like who I am

        1 - Strongly agree
        2 - Agree
        3 - Neither agree nor disagree
        4 - Disagree
        5 - Strongly Disagree

YSE9. I am a good person who has a lot to offer

        1 - Strongly agree
        2 - Agree
        3 - Neither agree nor disagree
        4 - Disagree
        5 - Strongly Disagree

YSE10. I feel that I am a valuable person who is at least equal to other people

        1 - Strongly agree
        2 - Agree
        3 - Neither agree nor disagree
        4 - Disagree
        5 - Strongly Disagree

YSE11. How I feel about my body makes me feel less confident

  1 - Strongly agree
  2 - Agree
  3 - Neither agree nor disagree
  4 - Disagree
  5 - Strongly Disagree

YSE12. I feel confident in my abilities to achieve the things I set my mind to

  1 - Strongly agree
  2 - Agree
  3 - Neither agree nor disagree
  4 - Disagree
  5 - Strongly Disagree

YSE13. I think other people like me

  1 - Strongly agree
  2 - Agree
  3 - Neither agree nor disagree
  4 - Disagree
  5 - Strongly Disagree

Items included in the Young Minds Matter questionnaire but not included in the final version of the ASQ

YSE4. I make an effort to look good

  1 – Almost all of the time
  2 – A lot of the time
  3 - Some of the time
  4 - A little of the time
  5 – Hardly ever

Sample SAS code for scoring the ASQ

- Item 4 is dropped from the final scale.
- Recode positively worded items so that higher scores equal higher self esteem
- Low self-esteem (greater than 50% probability of depression) is equivalent to a score of 17 or below.

```
data ymmA;

     set ymm;


     array asq(9) yse1 yse3 yse4 yse5 yse8 yse9 yse10 yse12 yse13;

     array asqA(9) yseA1 yseA3 yseA4 yseA5 yseA8 yseA9 yseA10 yseA12 yseA13;


      do i = 1 to 9;

               if asq(i) = 1 then asqA(i) = 4 ;

               else if asq(i) = 2 then asqA(i) = 3;

               else if asq(i) = 3 then asqA(i) = 2;

               else if asq(i) = 4 then asqA(i) = 1;

               else if asq(i) = 5 then asqA(i) = 0;

               else if asq(i) = . then delete;

      end;


     array asqB(4) yse2 yse6 yse7 yse11;

     array asqC(4) yseA2 yseA6 yseA7 yseA11;


      do i = 1 to 4;

               if asqB(i) = 1 then asqC(i) = 0 ;

               else if asqB(i) = 2 then asqC(i) = 1;

               else if asqB(i) = 3 then asqC(i) = 2;

               else if asqB(i) = 4 then asqC(i) = 3;

               else if asqB(i) = 5 then asqC(i) = 4;

               else if asqB(i) = . then delete;

      end;
```

```
ysescore = sum (yseA1 + YseA2 + yseA3 + yseA5 + YseA6 + yseA7 + YseA8 + yseA9 + YseA10 +
yseA11 + YseA12 + YseA13);


if ysescore <= 17 then lowselfesteem = 1;

else lowselfesteem = 0;


run;
```