

**Warwick-Edinburgh Mental Well-being Scale
(WEMWBS) acceptability and validation in
English and Scottish secondary school
students
(The WAVES Project)**

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The opinions expressed in this publication are those of the authors and do not necessarily reflect those of NHS Health Scotland.

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Summary

Introduction and Background

Assessing mental wellbeing (positive mental health) in addition to mental health problems is vital in developing indicators of overall mental health. Previously, to assist in the assessment of mental wellbeing, NHS Health Scotland commissioned work which led to the development and validation of the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) for adults (aged 16+). WEMWBS was found to be user-friendly and psychometrically sound as a measure of mental wellbeing in adults in the UK. We undertook this study to find out whether the scale could also be used to measure mental wellbeing for children of secondary school age. Our aim was to establish the validity, reliability and acceptability of WEMWBS in teenage school students in two secondary school year groups, aged 13-14 and 15-16 years, in two cities, one in Scotland and one in England.

Methods

After receiving ethics committee approval, we designed, piloted and administered a survey to teenagers in six schools across the two cities. The questionnaire included: socio-demographic details including family affluence; a measure of physical health; WEMWBS and comparator scales of both mental wellbeing and mental health problems (for assessment of convergent and discriminant construct validity, respectively). We analysed the results to establish how WEMWBS performed in comparison to these other measures of mental health when adjusted for relevant variables. Other psychometric properties investigated were internal consistency using Cronbach's alpha, confirmatory factor analysis and test-retest analysis.

We additionally undertook 12 single sex focus/discussion groups (3 boys' groups and 3 girls' groups in each city) selected from both age groups. We designed and piloted a schedule which covered acceptability and comprehensibility of WEMWBS. Focus group meetings were taped and transcribed and analysed thematically.

Findings

One thousand six hundred and fifty teenagers completed the questionnaire with an overall response rate of 80.8%. WEMWBS scores covered the full range of possible scores (14-70) with no ceiling or floor effects and very few missing items. Both convergent and discriminant measures of construct validity gave values as predicted, with strong and significant positive correlations between WEMWBS and measures of mental wellbeing (Mental Health Continuum-Short Form (MHC-SF) correlation coefficient (CC) total score = 0.65 (95% confidence interval (CI) [0.62; 0.69]); psychological wellbeing domain of the Kidscreen-27 CC = 0.59 (95% CI [0.55; 0.62]) and WHO (Five) Well-being Index (1998 version) (WHO-5) CC = 0.57 (95% CI [0.53; 0.61]) and strong, significant negative correlations with measures of mental health problems (Strengths and Difficulties Questionnaire (SDQ) total score CC = -0.44 (95% CI [-0.49; -0.40]); and the 12-item General Health Questionnaire (GHQ12) CC = -0.45 (95% CI [-0.49; -0.40])).

There were strong internal positive correlations between WEMWBS items and a high Cronbach's alpha (0.87 (95% CI [0.85; 0.88])). This high Cronbach's alpha indicates good consistency of the scale between items (internal consistency). It also suggests that there may be some item redundancy and, as in adults, it may be possible to reduce the length of the scale, although this was not formally investigated. Confirmatory factor analysis demonstrated that WEMWBS contains one strong

underlying factor. Taken together these two results mean that the scale is likely to be a homogeneous measure of one underlying construct – in this case mental wellbeing.

The correlation between tests and retests for WEMWBS within two weeks of original administration was slightly lower than anticipated with an intra class correlation coefficient of 0.66 (95% CI [0.59; 0.72] $n = 212$): a moderate rather than a strong correlation. Given our large numbers and response rate, it is unlikely that this finding of a moderate correlation is a chance one. The finding, based as it is on correlations between scores at the individual level, may mean that WEMWBS in teenagers is subject to fluctuation at this individual level although findings are stable at the population level for which the scale is intended.

There were no strong associations between WEMWBS and either age or gender in this group of teenagers, although we found significant associations with both the Family Affluence Scale score and the physical health dimension of the Kidscreen-27. We repeated all tests of validity and internal consistency, separately among those aged 14 years and under and those aged over 14 years. However, no difference was found by age. The strong psychometric properties of WEMWBS were replicated in both age groups. There were no independent effects of school, once socio-demographic differences had been taken into account.

Eighty students took part in the focus/discussion group study. The overall underlying construct of WEMWBS was understood by the majority of these teenagers. Most of the focus group participants felt that the scale was of a suitable length and that the response categories were understandable. However, whilst the overall length of the scale was acceptable, it was felt that there was some redundancy which could be removed through the amalgamation of items and some participants made suggestions for additional items to be added to the scale.

Several focus group participants found some of the individual words or terms either difficult to understand or open to misinterpretation, and some items as a whole were considered vague or unclear, for example, some students were not clear what the item 'interested in other people' meant. The school setting for administration of the scale also tended to confuse some participants, thus restricting the intended scope of the mental wellbeing construct.

Conclusions and recommendations

WEMWBS is suitable for use at a population level for those aged from 13 years to adulthood. Our findings suggest that it is currently the only solely positive single scale for measuring mental wellbeing which has been fully validated for use in the UK at a population level in this age group. Because of the more moderate test-retest findings and the qualitative results, we recommend that it should not be used in small scale studies of teenagers aged 13-15 with samples less than 100.

Recommendation 1: WEMWBS is suitable for use at a population level to measure mental wellbeing in teenagers amongst those aged 13 years and over. It is safe to use in samples of over 100 people.

Our study shows that WEMWBS performs well psychometrically for teenagers aged 13-16 years. However, our qualitative findings suggest that face validity could be

improved.¹ In addition, our findings suggest that individual levels of mental wellbeing may fluctuate in teenagers. An improved understanding of fluctuation in levels of both eudaimonic and hedonic constructs of mental wellbeing in this age group is needed. Whilst the length of the scale was acceptable, it may be possible to shorten it.

Recommendation 2: Measurement of mental wellbeing in teenagers would benefit from research to improve our understanding of this issue and to adapt WEMWBS to improve its face validity in this age group. Development of an adapted version should build on the quantitative and qualitative findings of the WAVES study as well as on other published research. Research should be undertaken simultaneously to identify and if necessary remove redundancy from WEMWBS for use with teenagers.

Qualitative findings suggested that the school setting for administration of the scale might confuse some participants who may be more likely to relate items concretely to the school context, thus restricting the intended more global scope of the mental wellbeing construct.

Recommendation 3: When WEMWBS is introduced to teenagers in a school environment, it is important to emphasise its holistic nature.

¹ Note, most assessments of scales and measures do not include an in-depth, concurrent qualitative investigation and it is possible that many other scales in common use with children and young people, if assessed in the same rigorous qualitative way, might reveal similar issues with face validity.

1. Introduction

Improving mental health is a national priority in Scotland, as indicated most recently in *Towards a Mentally Flourishing Scotland: Policy and Action Plan 2009-2011* (TAMFS) (Scottish Government, 2009) and *Better Health, Better Care: Action Plan* (Scottish Government, 2007a). To provide a means of assessing the overall mental health (mental wellbeing and mental health problems) of Scotland's population, NHS Health Scotland has established a core set of national, sustainable mental health indicators for adults (aged 16 and above) (Parkinson, 2007).² These will determine whether mental health and its context are improving for the adult Scottish population and track progress.

Continuing the commitment to the mental health indicators originally made in *Improving Health in Scotland: The Challenge* (Scottish Executive, 2003), TAMFS sets out clearly the need to develop 'a national picture of mental wellbeing and mental health problems among infants, children and young people in Scotland' to assess progress in improving mental health and to monitor future trends.

TAMFS Commitment 4: NHS Health Scotland will work with key stakeholders to develop a set of national indicators for children and young people's mental wellbeing, mental health problems and related contextual factors by 2011 (Scottish Government, 2009 (p.17)).

NHS Health Scotland is now working to establish a similar set of mental health indicators for children and young people (individuals aged under 18) in line with the TAMFS commitment.³

Assessing mental wellbeing in addition to mental health problems is vital to NHS Health Scotland's work of developing indicators to assess the overall mental health of Scotland's population. A suitable UK validated scale has not been available until recently for the assessment of overall mental wellbeing. Previous work commissioned in 2004 for NHS Health Scotland's adult mental health indicators programme led to the development and validation of the Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Tennant, Fishwick, Platt *et al.*, 2006) (see Box 1.1 and section 1.4).⁴ WEMWBS was designed specifically to assess population mental wellbeing of adults (aged 16+) and is being used in the Scottish Health Survey from 2008 to obtain this information (Corbett, Given, Gray *et al.*, 2009). The mental health indicators for children and young people will need to assess mental wellbeing in addition to mental health problems.

Initial scoping by NHS Health Scotland of current mental health data collected nationally in Scotland, showed that no overall assessment of mental wellbeing is made in Scotland for children and young people of secondary school age. This study was therefore commissioned by NHS Health Scotland's children and young people's mental health indicator programme to establish whether WEMWBS could be used for young people of secondary school age.

² For information on the adult mental health indicators work and outputs see www.healthscotland.com/scotlands-health/population/mental-health-indicators-index.aspx.

³ For further information on the work see www.healthscotland.com/scotlands-health/population/mental-health-indicators/children.aspx.

⁴ For further information on the work see www.healthscotland.com/scotlands-health/population/Measuring-positive-mental-health.aspx

1.1 What is meant by mental health? Terminology used in this report

There are many definitions of and terms used for mental health. In NHS Health Scotland 'mental health' is used as an umbrella term to refer to both the concepts of mental health problems and mental wellbeing. This is consistent with a dual continua model of mental health in which mental health problems and mental wellbeing are viewed as two separate continua, rather than as ends of the same continuum (Tudor, 1996). Good mental health is therefore more than the absence of mental health problems.

The terms mental health, mental health problems and mental wellbeing have been agreed as the terms which will be used by NHS Health Scotland and in this report we have also tried to follow these terms:⁵

- mental health: this is used as an umbrella term to refer to both the concepts of mental health problems and mental wellbeing
- mental health problems: this refers to symptoms that meet the criteria for clinical diagnosis of mental illness or symptoms at a sub-clinical threshold which interfere with emotional, cognitive or social function. Examples include common mental health problems such as depression and anxiety, and severe and enduring mental health problems such as schizophrenia. The term mental health problems is often used interchangeably in the literature with mental health, negative mental health, mental illness, mental ill-health and mental distress
- mental wellbeing: there is greater variety in definitions of mental wellbeing; however, most tend to emphasise that mental wellbeing includes aspects of subjective wellbeing (affect and life satisfaction) and psychological wellbeing (which covers a wider range of cognitive aspects of mental health than affect and life satisfaction such as mastery and a sense of control, having a purpose in life, a sense of belonging and positive relationships with others) i.e. mental wellbeing is considered to cover both the hedonic and eudaimonic perspectives of wellbeing. The concept of mental wellbeing is less well established and the term is also often used interchangeably with mental health, positive mental health or wellbeing.

Different disciplines use different terminology as noted by Shucksmith and colleagues in their analysis of the literature on what children and young people think impacts on their mental health:

'While 'mental health' and 'mental health problem' and 'mental wellbeing' are terms used within health services, schools tend to use the term 'emotional and behavioural difficulties' (EBD) or 'social emotional and behavioural difficulties' (SEBD) to refer to a range of difficulties that can create barriers to children's learning and 'social and emotional wellbeing' when referring to mental wellbeing.' (Shucksmith, Spratt, Philip *et al.*, 2009).

1.2 Who is our study group? Terminology used in this report

In this report we will use the term 'teenagers' to describe our participants who are in the main aged 13-16 years. When describing participants of this particular study we also use the term 'secondary school students or pupils' because they were recruited

⁵ Exceptions are certain instances when reporting on others' research, where it has been important to remain true to the language used by the original author(s).

from secondary schools. In the qualitative results section, our 'younger' participants (aged 13/14 years) are differentiated from our 'older' participants (aged 15/16 years). We will reserve the terms adolescence and adolescent to refer to discussion of the stage of transition in physical, mental and emotional maturity which normally occurs between the ages of 12 and 15 years.

1.3. Background

Since 1948, the World Health Organization (WHO) has defined human health as more than the absence of illness (World Health Organization, 1952). Traditionally, public health priorities have remained focused on preventing the negative health states of illness and disease. This approach although necessary, does not give sufficient weight to the components of positive health in human functioning which underpin the way people live their lives physically, socially, emotionally and psychologically.

1.3.1 Defining mental wellbeing

Mental wellbeing can be defined as a *positive and sustainable* mental state that allows individuals, groups and nations to *thrive and flourish*. It is more than the absence of mental health problems and encompasses both experience and functioning (Huppert, Baylis and Keverne, 2004). However, the precise nature of mental wellbeing is much debated, and the extent to which it impacts on our health in the short and the long term, yet with little doubt of both its complexity and importance.

Studies examining mental wellbeing tend to distinguish two main subtypes: hedonic and eudaimonic. Hedonic wellbeing (which can be called subjective wellbeing), encompasses positive affective or 'feeling' states like happiness, calm, joy, excitement, while eudaimonic wellbeing (which can be called psychological wellbeing) covers cognitive and developmental traits such as autonomy, self-acceptance, positive relationships with others and a sense of purpose in life that lead to sustainable life satisfaction (Huppert, Baylis and Keverne, 2004; Ryff, 1989).

In adults, eudaimonic traits have been found protective for a range of health outcomes including health-related lifestyles and predictors of cardiovascular disease. This is in contrast to hedonic traits where no such biological effect has been shown (Keyes, 2004; Ryff, Singer and Love, 2004). Eudaimonic wellbeing is also positively correlated with educational attainment and occupational status but as the number of years in education decreases, the variability in eudaimonic wellbeing increases (Ryff, Magee, King *et al.*, 1999; Marmot, Ryff, Bumpass *et al.*, 1997; Diener and Lucas, 1999). Diener and Biswas-Diener (2002) reviewed research on this relationship and found that the wellbeing 'predictors' of social class and wealth tend to reflect a nation's national wealth status not an individual's. That is, poorer nations were not as happy as richer nations, but gains in personal wealth did not increase individual happiness, demonstrating that mental wellbeing cannot necessarily be predicted from an individual's socioeconomic status and educational attainment. These findings emphasise the necessity of defining and measuring mental wellbeing amongst the population: mental wellbeing cannot be simply inferred from measurement of other socioeconomic variables.

Eudaimonic and hedonic constructs of mental wellbeing have been found to fluctuate over the life course (Ryff and Singer 2000, Ryff, Singer and Love, 2004, Ryan and Deci, 2001, Blanchflower and Oswald, 2008). Ryff and Keyes (1995) demonstrated that some elements of eudaimonic wellbeing show patterns based on age. Young

adults (aged 25-29) had lower mental wellbeing scores (on the Scales for Psychological Wellbeing) than middle aged and older people in the dimensions of environmental mastery (the capacity to manage effectively one's life and surrounding world), positive relations with others (the possession of quality relations with others) and autonomy (sustaining individuality within a larger social context) which increased incrementally with age.

1.3.2 Mental wellbeing in teenagers: approaches

It is clear that the move towards considering mental wellbeing as distinct from mental health problems is rapidly progressing. The independence of these two dimensions of mental state in their influence on health has been consistently demonstrated: in adults, the absence of mental wellbeing is a stronger prediction of 7-year mortality than the presence of psychological symptoms (Huppert and Whittington, 2003; Huppert and Whittington, 1995). Amongst young people, a 2003 systematic review demonstrated that the promotion of mental wellbeing during adolescence was more effective in sustaining good mental health than interventions which concentrated on mental health problems (Wells, Barlow and Stewart-Brown, 2003). However, interventions for mental health problems do have a part to play, since there is good evidence that treatment of childhood mental health problems may have later benefits in adulthood via improved general health, educational and occupational functioning and slowing down or stopping of the progression of such mental health problems (Hazell, 2007). Promoting good mental wellbeing need not come at the expense of treatment of mental health problems, instead a multi-method approach to addressing the mental health of children and teenagers should be encouraged.

Research in the area of children and young people's mental wellbeing describes positive correlations between subjective wellbeing and healthy behaviours such as physical activity and a good diet and negative correlations with drug-use (Park, 2004). In a large US sample, children with higher life satisfaction were less likely to smoke, drink, and take illegal drugs (Zulig, Valois, Huebner *et al.*, 2001). In the UK, Bergman and Scott used the 1994-1997 youth panel of the British Household Survey to examine the self-reported mental wellbeing of 11-15 year-olds (Bergman and Scott, 2001). Assessing mental wellbeing as a multi-dimensional construct, they used confirmatory factor analysis to explore the extent to which selected variables acted as indicators of mental wellbeing, and the extent to which they measured the constructs 'self-esteem', 'happiness' and 'past worries'. Complex interconnections were found with a marked gender difference. Girls reported lower self-esteem and higher levels of negative self-efficacy, unhappiness and more frequent past worries.

A review of life satisfaction in young people made recommendations for intervention and prevention programmes. It concluded that in programmes targeting younger children it is appropriate to work to improve family relationships, but that for older children and adolescents, interventions should be more complex, targeting peer relationships and self-appraisal (Park, 2004).

1.3.4 Measuring mental wellbeing in teenagers and the role of schools

The promotion of emotional, social and mental wellbeing in teenagers is a national priority in the UK. The increasing emphasis in the promotion of mental health and emotional wellbeing in children and young people across Scotland has been evident in a number of key policy documents over recent years. Documents such as *The Mental Health of Children and Young People: A Framework for Prevention, Promotion and Care* (Scottish Government 2005), *Schools (Health Promotion and Nutrition) (Scotland) Act 2007* (Scottish Government, 2007b), *A Curriculum for*

Excellence (Scottish Executive, 2004) and its associated Experiences and Outcomes (Learning and Teaching Scotland, 2009) and most recently in Scottish Government *TAMFS* (Scottish Government 2009) clearly highlight the importance of education as a setting for activity. For England similar policy documents include *Every Child Matters* and the *National Service Framework for Children, Young People and Maternity Services* (Department for Education and Schools, 2003; Department of Health, 2004). Compared to research and policy targeting children and young people with mental health problems, relatively little is known about their mental wellbeing (Stewart-Brown, 2002).

The National Institute for Health and Clinical Excellence (NICE) has recently issued guidance recommending programmes to promote mental wellbeing in schools (Taylor, Taske, Swann *et al.*, 2007).⁶ At the same time, the World Health Organization's Atlas project found the lack of appropriate worldwide systems for gathering data on child and young people mental health (both mental health problems and mental wellbeing) problematic (World Health Organization, 2005). In the UK, the Office for Standards in Education (Ofsted) is currently considering a number of indicators to assess school performance in promotion of mental wellbeing including pupil self-report (Office for Standards in Education, 2008).

Schools may be ideally placed both to identify individuals experiencing poor mental wellbeing and to deliver interventions (Barlow and Underdown, 2005), providing the opportunity to serve all young people. In addition, schools may be more effective at identifying mental health problems in 'at-risk' as well as not 'at-risk' pupils (Sawyer, Arney, Baghurst *et al.*, 2001). Problems that impact on mental health in children and young people often occur at school. Involvement in school bullying, either as victim or perpetrator is strongly associated with negative self-reported physical and mental health, psychosomatic complaints, sleep problems and risk taking behaviour (Barker and Olukoya, 2005). Many of the specific predictors of poor mental wellbeing, including bullying (Ritcher and Bowles, 2007), teenage pregnancy (Paranjothy, Broughton, Adappa *et al.*, 2008) and reduced physical activity (Ussher and Owen, 2007) can be directly tackled by schools, as can potential consequences e.g. substance misuse, smoking and poor educational attainment. School-based mental health services have been found to be cost-effective (Armbruster, 2002).

1.4 WEMWBS

Currently only a small number of potential scales is available, for measuring mental wellbeing in teenagers. Examples include the WHO (Five) Well-being Index (1998 version) (WHO-5) (World Health Organization, 2009), the Mental Health Continuum-Short Form (MHC-SF) (Keyes, 2006) and Kidscreen-27 (Ravens-Sieberer, Auquier, Erhart *et al.*, 2007). None of these scales incorporate all of the desired components of mental wellbeing for use in UK teenage populations.

The newly developed Warwick-Edinburgh Mental Well-being Scale (WEMWBS) covers most aspects of mental wellbeing in the literature (Tennant, Fishwick, Platt *et al.*, 2006). Currently only validated for use in UK with those aged 16 and above, WEMWBS could have the potential for better assessing mental wellbeing in teenagers if valid for this age group.

⁶ The National Institute for Health and Clinical Excellence (NICE) is the independent organization responsible for providing national guidance in England and Wales on the promotion of good health and the prevention and treatment of ill health

1.4.1 Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

The Warwick-Edinburgh Mental Well-being Scale (WEMWBS) has 14 positively worded items with a 5-point Likert scoring scale for each item (with scores from 1 = 'none of the time' to 5 = 'all of the time'). WEMWBS covers most aspects of mental wellbeing in the literature (Tennant, Fishwick, Platt *et al.*, 2006). It includes both hedonic (positive affect; mainly feelings of optimism, cheerfulness, and relaxation) and eudaimonic (autonomy, self-acceptance, environmental mastery, positive relations with others, personal growth and purpose in life) perspectives. WEMWBS is scored by summing responses to each item, giving a minimum score of 14 and a maximum of 70. It has a reference period for assessment of two weeks prior to completion.

1.4.2 Validation of WEMWBS

In university students in Warwick and Edinburgh, WEMWBS performed well (Tennant, Fishwick, Platt *et al.*, 2006; Tennant, Hiller, Fishwick *et al.*, 2007). Scores were normally distributed, with analysis indicating a single underlying construct and high internal consistency (Cronbach's alpha = 0.89). Construct validity (convergent and discriminant) was assessed as moderate to high in comparison with other scales. Confirmatory factor analysis showed a single construct. Reliability was good, with mean scores remaining stable over a one week period. WEMWBS also had a lower measure of response bias, comparable to other mental health scales.

WEMWBS was included in two adult population surveys (individuals aged 16 and above) in Scotland to test the results from the initial validation population; the September 2006 wave of the Scottish Health Education Population Survey (Gosling, Bassett, Gilby *et al.*, 2008) and the 2006 Well? What Do You Think? survey (Braunholtz, Davidson, Myant *et al.*, 2006). WEMWBS scores were shown to vary to a small but statistically significant degree by certain demographic variables, for example:

- men had higher scores than women ($p < 0.05$)
 - married people had higher scores ($p < 0.01$)
 - the highest scores were found in the least deprived groups ($p < 0.01$)
- (Tennant, Hiller, Fishwick *et al.*, 2007).

The adult population mean score was 50.7 (95% confidence interval (CI) 50.3 to 51.1) whilst in university students the mean score was 49.66 (95% CI 48.86 to 50.46) (Tennant, Fishwick, Platt *et al.*, 2006; Stewart-Brown, Janmohamed, Parkinson, 2008). Further psychometric analysis published recently, which tested the internal construct validity of WEMWBS from the perspective of the Rasch measurement model, indicated that a 7 item version, the Short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS), provides a better fit to the Rasch model. (Stewart-Brown, Tennant, Tennant *et al.*, 2009) However, the 14-item WEMWBS maintains a higher level of face validity.

WEMWBS also underwent face validity testing validation using qualitative methods, where it proved popular in adult focus groups (Tennant, Fishwick, Platt *et al.*, 2006). Participants reported it as easy to complete, clear, and unambiguous. No comments were made about modifications or improvements to the scale. Completion generated discussion about mental wellbeing rather than mental health problems.

Box 1.1 Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

Below are some statements about feelings and thoughts.

Please tick the box that best describes your experience of each over the **last 2 weeks**.

| STATEMENTS | None of the time | Rarely | Some of the time | Often | All of the time |
|--|------------------|--------|------------------|-------|-----------------|
| I've been feeling optimistic about the future | 1 | 2 | 3 | 4 | 5 |
| I've been feeling useful | 1 | 2 | 3 | 4 | 5 |
| I've been feeling relaxed | 1 | 2 | 3 | 4 | 5 |
| I've been feeling interested in other people | 1 | 2 | 3 | 4 | 5 |
| I've had energy to spare | 1 | 2 | 3 | 4 | 5 |
| I've been dealing with problems well | 1 | 2 | 3 | 4 | 5 |
| I've been thinking clearly | 1 | 2 | 3 | 4 | 5 |
| I've been feeling good about myself | 1 | 2 | 3 | 4 | 5 |
| I've been feeling close to other people | 1 | 2 | 3 | 4 | 5 |
| I've been feeling confident | 1 | 2 | 3 | 4 | 5 |
| I've been able to make up my own mind about things | 1 | 2 | 3 | 4 | 5 |
| I've been feeling loved | 1 | 2 | 3 | 4 | 5 |
| I've been interested in new things | 1 | 2 | 3 | 4 | 5 |
| I've been feeling cheerful | 1 | 2 | 3 | 4 | 5 |

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1.5 Rationale for this study

Previous research suggests that WEMWBS is a user-friendly and psychometrically sound tool for measuring mental wellbeing at a population level in adults in the UK (Tennant, Hiller, Fishwick *et al.*, 2007). WEMWBS is already validated and in use in Scotland for the assessment of mental wellbeing in those aged 16 and over. It was therefore logical to establish whether it could also be used to obtain valid data on the overall mental wellbeing of children of secondary school age (for younger children a different scale would be required). If WEMWBS proves to be valid for secondary school aged children then the next step would be seeking to gain its inclusion in a Scottish national survey.

The Scottish Health Survey is now well established (previous surveys were carried out in 1995, 1998, 2003, 2008 and 2009). Since becoming continuous in 2008, around 6,400 adults and 2,000 children will be interviewed each year between 2008 and 2011. And as part of the survey 13-15 year olds living in households are invited to fill in a self completion booklet which includes the 12-item General Health Questionnaire (GHQ12) to assess possible common mental health problems (Goldberg and Williams, 1988). The Scottish Health Survey would be an ideal place to position WEMWBS and together with the GHQ12 it would provide an overall assessment of the mental health status of children aged 13-15. Equally, the Scottish Schools Adolescent Lifestyle and Substance Use Survey (SALSUS), which samples secondary 2 and 4 pupils (aged mainly 13 and 15 years old) every two years with alternating sample sizes of around 10,000 and 23,000, would be another suitable national survey in which to include WEMWBS. Already containing the Strengths and Difficulties Questionnaire (SDQ), a brief behavioural screening questionnaire covering areas of emotional and behavioural difficulties (Goodman, 2001), the inclusion of WEMWBS in SALSUS would also ensure a complete assessment of mental health status in this survey.

NHS Health Scotland therefore wished to continue its support for establishing the validity of WEMWBS for use with children of secondary school age in the UK. In addition, it is hoped that this research will inform other ongoing surveys and work by NHS Health Scotland and more widely internationally on mental health indicators for children and young people.

1.6 Structure of this report

In the following chapters of this report we describe the study aims and objectives and the methods – both quantitative and qualitative. Results follow in the same order. Subsequently we present the discussion, including a summary of our findings and our assessment of the strengths and weaknesses of the work. Finally we present our conclusions and recommendations. Following the references, appendices are attached, including the questionnaire used and information letters etc. Appendix 10 is a glossary where psychometric terms are defined for readers who are not familiar with them.

2. Study Aims and Objectives

2.1 Aims

The overall aim of this research was to enhance our ability to measure mental wellbeing in teenagers in two secondary school year groups (aged 13/14 and 15/16 years) by assessing the validity and reliability of the WEMWBS instrument in a representative population sample of students in secondary schools in Scotland and England.

2.2 Objectives

The study objectives were to:

1. obtain Warwick University Ethics Committee and Education Authority approval for the research and to identify secondary schools in Scotland and England in order to undertake formal validity and reliability testing of WEMWBS
2. test WEMWBS in the selected population using formal psychometric techniques: (validity assessment (construct and content validity) and reliability assessment (test-retest reliability and internal consistency))
3. design and pilot a questionnaire to measure socio-demographic variables and variables associated with teenage and school student mental wellbeing and mental health, which includes WEMWBS and comparator measures
4. administer the questionnaire during school-time to school students in England and Scotland
5. undertake test-retest reliability testing with school students in England and Scotland within two weeks of administration of the original questionnaire
6. undertake focus/discussion groups in England and in Scotland
7. analyse quantitative and qualitative data to assess face validity and acceptability; content and construct validity; internal consistency and test-retest reliability
8. report on findings, to produce a research report and to publish results in peer-reviewed publications
9. provide clear practical recommendations to NHS Health Scotland about the use of WEMWBS as a measure of population mental wellbeing in teenagers.

3. Methods

3.1 Ethical approval and consent

Ethical approval was granted from the University of Warwick Biomedical Research Ethics Committee (BREC) on 29th May 2008 (see Appendix 1). Following discussion with the ethical committee it was agreed to offer parents/carers the opportunity to 'opt out' of the study.

In agreement with ethical committee recommendations, consent was obtained from each of the head teachers of the participating schools. Consent forms and copies of information including the objectives of, and rationale for, the research were sent to all teachers, students and parents/carers at least two weeks prior to the administration of the questionnaires, along with the opt-out form for parents/carers. Individual signed consent was obtained from each student on the day of administration of the questionnaires, retests and focus groups. Any student who did not him or herself consent or who was 'opted-out' of the study by a parent/carer was not included in the study.

3.2 Pilot study

A pilot study was carried out in July 2008 with two single sex schools in the West Midlands with appropriate age groups in which 95 out of a possible 100 students participated. A small informal pre-pilot was also conducted with four similarly-aged teenagers, identified as contacts of the authors, to confirm the content and design of the pilot questionnaire. A report of the pilot phase of the work is included (Appendix 2). Changes made in the light of pilot findings are shown in Box 3.1.

3.3 Sample size calculation

The sample size was determined based on the following considerations. Assessment of correlations of WEMWBS with other measures was a central part of the investigations in order to demonstrate construct validity of WEMWBS. Assuming a non-response rate of 40%, a sample size of 1,200 students would lead to approximate 95% confidence intervals (based on Fisher's z-transformation) of the Pearson correlation coefficient that are not wider than 0.15. The sample size calculation for the test-retest correlation was based on similar methods (using calculation of likely confidence intervals) and suggested that a 10% sample would be appropriate. This was considered sufficiently precise to allow judgment of validity criteria.

3.4 Recruitment of schools

For the main study, three schools were recruited from one city in Scotland and three from one city in England. In the English city, the Local Authority's Strategic Head Teachers' Group was approached to raise awareness of the research through the support of the Local Education Authority's lead. In the Scottish city, the council's Children's Department gave permission to approach the three identified schools.

In order to obtain a broad demographic sample, information was obtained for all schools in each city on:

- number of pupils in the school
- geographical location (for English schools)
- the proportion of pupils in receipt of free school meals (as an estimate of deprivation in the catchment area)

- educational attainment as measured by Standardised Assessment Tests (SATs) (age 13-14) and GCSE (age 15-16) results for English schools: for Scottish schools attainment at SCQF Level 4 (Standard Grade General level or equivalent)
- head teacher's willingness to participate in the research.

Three schools in each city were then selected purposively, and invited to participate to reflect criteria of variability of location, school size, deprivation and willingness to participate. Demographic representativeness of the selected sample was assessed using routinely available population data for each city. All selected schools recruited were mixed and all English schools were state schools. One of the Scottish schools was a private school.

Box 3.1 Conclusions and recommendations from pilot report

In general the pilot went smoothly. Valuable lessons were learned for the main study. Recommendations and amendments to plans and processes included plans for the following:

1. Ensuring that head teachers fully understood the purpose and process of the research from the first meeting at his/her office.
2. Identification of a senior school lead contact point (e.g. year group teacher) e.g. in case of emergencies on the planned day of administration.
3. Ensuring that parents were able to access all materials and information on request.
4. Inclusion of a glossary of 12 words and phrases that students found difficult (see Appendix 3). This was included as a result of the interviews held during the pilot. Items from WEMWBS included in the glossary were 'optimistic' (defined as 'expecting the best') and 'interested in other people' (defined as 'wondering how other people (e.g. family, friends) are; how they're getting on'). Other scales also had words which some of the students found difficult e.g. Kidscreen-27 used 'seldom' which we defined as 'not very often' (see Appendix 2). The glossary was included for every use of WEMWBS subsequent to the pilot, including in the focus groups.
5. Amendments to the database to add variables representing subscales and scale totals for the different instruments.
6. Agreement and confirmation of an exact research team site-specific data management plan to ensure confidentiality and anonymity (separate storage in locked cabinets for consent forms and completed questionnaires; designated access and amendment rights for master database).

3.5 Questionnaire design, administration and test-retest reliability testing

3.5.1 Questionnaire design

The questionnaire (see Appendix 3) was designed to include recognised valid reliable measures whenever possible. These measures included WEMWBS; socio-demographic variables; questions about disease or long-standing disability and comparator scales to allow for assessment of validity. The final questionnaire contents are shown in Box 3.2.

Box 3.2 Contents of the questionnaire pack for students

1. Consent form
2. Questionnaire
 - i. socio-demographic variables: age, gender, Family Affluence Scale (FAS) used to measure individual socioeconomic status (Boyce, Torsheim, Currie *et al.*, 2006), postcode and ethnicity (using UK National Census questions)
 - ii. questions regarding ill health, disability and long-standing illness using questions from the RELACHS study in East London (Clark, Haines, Head *et al.*, 2007)
 - iii. WEMWBS (Tennant, Hiller, Fishwick *et al.*, 2007)
 - iv. comparator measures:
 - WHO (Five) Well-being Index (1998 version) (WHO-5) (World Health Organization, 2009)
 - Mental Health Continuum-Short Form (MHC-SF) (Keyes, 2006),
 - Strengths and Difficulties Questionnaire (SDQ) (Goodman, 2001)
 - KIDSCREEN-27 scale (Ravens-Sieberer, Auquier, Erhart *et al.*, 2007)
 - General Health Questionnaire-12 (GHQ12) (GL Assessment, 2009)
 - v. glossary of terms
3. Contact details of groups for further advice/support

3.5.2 Choice of comparator scales to assess construct validity

Assessment of validity requires the use of comparator scales. Construct validity was assessed by comparing the functioning of WEMWBS in teenagers with other recognised measures of both mental wellbeing (convergent validity) and mental health problems (discriminant validity). We used the expertise of the research team, a previous published review (Stewart-Brown and Edmunds, 2003) and a rapid current overview of published literature to identify relevant scales for use with teenagers and school students as comparators for WEMWBS. Three suitable mental wellbeing scales were identified from this process. These were the WHO (Five) Well-being Index (1998 version) (WHO-5) (Bech, Olsen, Kjoller *et al.*, 2003; (World Health Organization, 2009); the KIDSCREEN-27 (Ravens-Sieberer, Auguier, Erhart *et al.*, 2007; Ravens-Sieberer, Gosch, Rajmil *et al.*, 2005); and the Mental Health Continuum-Short Form (MHC-SF) (Keyes, 2006). Two suitable scales for measuring mental health problems were identified, the 12-item General Health Questionnaire

(GHQ12) (Goldberg and Williams, 1988) and the Strengths and Difficulties Questionnaire (SDQ) (Goodman, Meltzer and Bailey, 1998; Goodman, 2001). In this section we describe the characteristics of these scales. (See Appendix 3 for the scales included in the final questionnaire).⁷

WHO (Five) Well-Being Index (1998 version) (WHO-5)

The WHO-5 scale is valuable in this context because it is validated in teenagers aged 13-17, however, the sample was from the Netherlands and not validated in the UK (de Wit, Pouwer, Gemke, *et al.*, 2007). It is short and includes only wholly positive items (as does WEMWBS). (See Box 3.3). Participants are asked to mark each of five statements to show which is closest to how they have been feeling over the preceding two weeks. Higher numbers indicate higher emotional wellbeing.

Box 3.3 WHO-5 Scale items

WHO-5: WHO (Five) Well-being Index (1998 version)

Over the last two weeks:

1. I have felt cheerful and in good spirits
2. I have felt calm and relaxed
3. I have felt active and vigorous
4. I woke up feeling fresh and rested
5. My daily life has been filled with things that interest me

Each of the five items is rated on a 6-point Likert scale (from 0 = 'at no time' to 5 = 'constantly present'). The theoretical raw score (calculated by totalling answers) ranges from 0 to 25 and is transformed into a percentage with higher scores indicating better emotional wellbeing. It can also be used to monitor possible changes in emotional wellbeing. Of the comparator scales for validation of WEMWBS in teenagers, only the WHO-5 has the potentially beneficial characteristics of WEMWBS, in that it measures a single construct of mental wellbeing whilst being short and easy to complete.

KIDSCREEN-27

The Kidscreen-27 is a well validated scale for children and teenagers aged 8-18 years. It was developed in a 13-country European collaborative project (including the UK) with over twenty two thousand participants (N = 22,827) and is described as a health-related quality of life scale (Ravens-Sieberer, Auquier, Erhart *et al.*, 2007; Ravens-Sieberer, Gosch, Ramjil *et al.*, 2005). It includes 27 items in five dimensions:

⁷ A number of other possible scales were considered for assessing validity of the WEMWBS in teenagers. One is a measure of social functioning outside school known as the Perceived Social Competence Scale (PSCS) (Anderson-Butcher, Iachini, Amrose *et al.*, 2008) – it is extremely short, has been validated for use in teenagers, and was developed to assess social functioning. Another was the EQ-5D Visual Analogue Scale (VAS) which might be used as an overall indicator of quality of life. The EQ-5D has undergone preliminary validation for use in teenagers and further validation studies are planned (Hennessy and Kind, 2002). And finally the Behavioural and Emotional Rating Scale (BERS) (Epstein, Ryser and Pierce, 2004). BERS is well validated for use with teenagers to assess important areas of functioning a) interpersonal strength b) family involvement c) intrapersonal strength d) school functioning and e) affect functioning but long. These scales were omitted mainly due to pressure of space within the questionnaire.

Psychological wellbeing (7 items) includes items on positive emotions, satisfaction with life and feeling emotionally balanced; Physical wellbeing (5 items) looks at the level of physical activity, energy and fitness; Parent relations & autonomy (7 items) includes items on home atmosphere, relationships with parents, feelings of having appropriate freedom and satisfaction with financial situation; Social support and peers (4 items) examines the nature of a child's relationship with peers and friends; and School environment (4 items) looks at a child's perception of their own cognitive capacity, learning, concentration and feelings about school. For each question there are 5 response categories, typically: 'never', 'seldom', 'quite often', 'very often', 'always' e.g. in answer to the question 'Have you felt lonely?'. The Kidscreen-27 is scored using a complex statistical method resulting in Rasch-scores for each dimension which are standardised to give means of 50 and standard deviations of 10, where the higher the score the better the health-related quality of life. It is not advised to attempt to derive an overall scale score.

The Mental Health Continuum-short form (MHC-SF)

This scale was validated for use in people aged 12-18 in the USA but is not validated in the UK. It is said to cover three dimensions of wellbeing: emotional (hedonic), psychological (positive functioning) and social wellbeing reflecting three main states of mental wellbeing 'flourishing' (a high level of mental wellbeing), 'moderately mentally healthy' and 'languishing' (a low level of mental wellbeing) (Keyes, 2006). Aspects of the three dimensions included in the scale are described as 'positive affect, avowed quality of life, self acceptance, personal growth, purpose in life, environmental mastery, autonomy, positive relationships with others, social acceptance, social actualisation, social contribution, social coherence and social integration'. The fourteen questions (See Appendix 3, Section 6) ask about the frequency of experiencing each item in the past month and are recorded on a 6-point Likert scale ranging from 0 = 'never' to 5 = 'every day'. Assessment can either be made using a categorical scale: a diagnosis of flourishing is made if someone feels 1 of the 3 hedonic wellbeing symptoms (items 1-3) 'every day' or 'almost every day' and feels 6 of the 11 positive functioning (including social wellbeing) symptoms (items 4-14) 'every day' or 'almost every day' in the past month. A person is considered to be 'languishing' if they mark 1 of the 3 hedonic wellbeing symptoms (items 1-3) 'never' or 'once or twice' and marks 6 of the 11 positive functioning (including social wellbeing) symptoms (items 4-14) 'never' or 'once or twice' in the past month. Individuals who are neither 'languishing' nor 'flourishing' are considered 'moderately mentally healthy.' A continuous scale can also be derived, summing responses to give a range of scores from 0 to 70, where the higher the score the higher the level of 'flourishing.'

General Health Questionnaire-12 (GHQ12)

The General Health Questionnaire-12 (GHQ12) has also been used extensively with teenagers and has been validated in children aged 11-15, however, this was an Australian sample (Tait, French, Hulse, 2003). The GHQ12 is a standard screening measure of common mental health problems consisting of 12 questions on recent concentration abilities, sleeping patterns, self-esteem, stress, despair, depression, and confidence with a 4-point response scale. There are four possible ways of scoring the GHQ12 and the two most commonly used are described here (GL Assessment, 2009). In the method preferred by the designers of the GHQ, known as the 'GHQ method', responses to items are scored, with one point given each time a particular feeling or type of behaviour is reported to have been experienced 'more than usual' or 'much more than usual' over the past few weeks (0-0-1-1). These scores are combined to create an overall score of between zero and twelve. Various cut-off points have been used for interpretation of the scores, but for the adult mental

health indicators a score of four or more (referred to as a 'high' GHQ12 score) has been used to indicate the presence of a possible common mental health problem (Parkinson, 2007). In the other 'Likert' method, responses to items are scored on a Likert scale (0-1-2-3). In this case, the higher the overall score: the more severe the possible mental health problems. This method produces a wider and smoother scoring distribution. Both scoring methods are utilised in this report and are called GHQ12 Scores and GHQ12 Likert, respectively.

Strengths and Difficulties Questionnaire (SDQ)

The Strengths and Difficulties Questionnaire (SDQ) is a behavioural screening questionnaire validated in UK 4-16 year olds in multiple versions for completion by teachers, parents, and the children themselves. The SDQ assesses social, emotional, and physical aspects of behaviour (Muris, Meesters, Eijkelenboom *et al.*, 2004) and can be used to audit everyday practice and evaluate specific interventions in individuals and it is sensitive to treatment effects. In the Scottish Health Survey the SDQ has been used for children aged 4-12 (parent completion) whilst in the SALSUS the SDQ has been completed by pupils in years S2 (13/14 years) and S4 (15/16 years) (Black, MacLardie, Mailhot *et al.*, 2009). There are 5 subscales (emotional symptoms, conduct problems, hyperactivity/inattention, peer relationship problems and prosocial behaviour), with 5 items each, totalling 25 items and three response options, for how true a statement is: 'not true' 'somewhat true' and 'certainly true'. Total scores are calculated by summing scores from each domain (0-1-2 for each response respectively) not including prosocial behaviour, to give an overall score ranging from 0 to 40.

3.5.2 Questionnaire administration

We selected whole year groups in the relevant age groups (aged 13/14 years and 15/16 years) in each school and sampled whole classes (whole school years were sampled rather than selected classes as originally proposed since this was the express wish of the head teachers involved). Teachers' information packs (see Appendix 7) were sent to head teachers (and year heads/school contacts) of the proposed schools detailing the objectives of the study, the processes of obtaining informed consent from school pupils, and parental opt-out, the administration of the questionnaire, the questionnaire pack, arrangements for focus groups and test-retests and a summary of the results which would be fed back to the schools at the end of the study. The flow chart shows the overall process and practical arrangements in each school (see Appendix 4).

At least two weeks before the arranged date with the school, a letter was posted to the homes of all pupils and parents in the relevant years via the school, with information for parents/carers about the study, which included an opt-out form if they wished to remove their child from the study (see Appendix 5). Copies of the questionnaires were left in each school's reception area for parents to view if they wished. Several copies of the teacher's information pack were sent to the school for distribution to all relevant teachers prior to the day of administration as also were student information packs (see Appendix 6) for all participating students.

On the day of the survey all participating students from each school were given a questionnaire pack (see Box 3.2) including a consent form, a questionnaire, a glossary of terms and contact numbers for further advice and support. This was given to the students during classroom time – during a lesson selected by the head teacher/contact teacher as the most convenient to fit in with the timetable of the school. A specific lesson plan was not used to introduce the questionnaire.

Teachers were flexible in including the administration of the questionnaire in their lessons and indicated to students that they should work in their own time once they had completed the questionnaire. Teachers were given an information pack (see Appendix 7) and a proforma (see Appendix 8) to record numbers of pupils completing the questionnaire, numbers of opt-outs and of non-attendees. The students were invited to complete the consent form indicating that they gave their informed consent to participate in the study and then to complete the questionnaire. The consent form contained a research number and the participating students' name. The questionnaire was only identifiable by the corresponding research number. Once the questionnaire and the consent form had been completed, they were separated and subsequently stored separately to ensure anonymity and confidentiality. After completion of questionnaires, teachers and students were provided with biscuits as a 'thank-you' (in England only).

Arrangements for retest of WEMWBS (see section 3.5.3) were made with schools to ensure that this took place within two weeks of initial administration of the questionnaire.

3.5.3 Test-retest data collection

In order to assess test-retest reliability, WEMWBS was re-administered to a sample of students who had completed the questionnaire between 7 and 14 days previously. The sample size selected for the retest study was 10% of those completing the initial questionnaire.

The retest was undertaken with one class per year group per school, randomly selected at morning registration. Consent for the retest was obtained from individual students before completion of WEMWBS. Completed retest questionnaires were matched with the original research number and separated from consent forms to ensure anonymity.

3.6 Data entry and quality

Data entry was conducted by two research assistants. All data were entered twice onto an SPSS 16 database. Each case was then compared to its double-entered counterpart and checked for errors. Errors were checked by running syntax on SPSS which identified differences by matching each variable in each case and noting non-matches. Non-matches were hand searched, verified based on the actual case questionnaire and systematically corrected.

3.7 Expected findings

The study steering group (which included the research group, the advisory group and Dr Jane Parkinson from NHS Health Scotland) jointly agreed hypotheses about construct validity (see Table 3.1) using previous experience and published data on the validity of WEMWBS for measurement of mental wellbeing in adults.

For convergent validity, we predicted that moderate positive correlations would be obtained for the WHO-5 scale (Stewart-Brown, Janmohamed, Parkinson, 2008), with scores indicating flourishing in the MHC-SF, and with the psychological component of the Kidscreen-27 scale. For discriminant validity, moderate negative correlations were predicted with the GHQ12 (Stewart-Brown, Janmohamed, Parkinson, 2008), and with the psychological components of the SDQ scale.

Table 3.1 Expected correlations with included scales

| Scale | Steering group's hypothesised correlations with WEMWBS | Type of correlation |
|---|--|---------------------|
| WHO-5 | 0.7* | Moderate positive |
| MHC-SF | 0.6 | Moderate positive |
| Kidscreen-27 psychological wellbeing domain | 0.6 | Moderate positive |
| GHQ12 | -0.53* | Moderate negative |
| SDQ | -0.6 | Moderate negative |

(*Based on adult findings: Stewart-Brown, Janmohamed, Parkinson, 2008)

The hypothesised test-retest correlation was anticipated to be moderate to high (0.6-0.9), accounting for current state while reflecting the pupil's longer-term mental wellbeing.

3.8 Quantitative data analysis

3.8.1 Descriptive statistics

Descriptive statistics for scale scores including means and standard deviations were calculated for all scales and subscales. Frequencies and percentages were computed for categorical scores.

3.8.2 WEMWBS and socio-demographic factors

Associations between WEMWBS and socio-demographic variables were investigated using linear regression models with WEMWBS as the dependent variable and the socio-demographic variables as independent variables. The socio-demographic variables considered were age group (14 years or younger vs. 15 years or older), gender, the Kidscreen-27 physical wellbeing domain as a measure of physical health and the dichotomized FAS (with cut-off 5 as recommended in the original publication (i.e. scores 0-4 vs. 5-7)) as a measure of socio-economic status. Interactions between significant effects as well as school effects were investigated.

3.8.3 Internal consistency

Cronbach's alpha (Cronbach, 1951) was calculated. Spearman's rank correlation coefficients were also calculated for each item with the total of the remaining items. 95% confidence intervals were obtained by nonparametric bootstrap with 9,999 bootstrap replications (Davison and Hinkley, 1997). For the correlations, p-values for approximate significance were calculated, based on an asymptotic t-test testing the null hypothesis of no correlation. Cronbach's alpha was also computed sequentially, leaving out one item at a time.

3.8.4 Construct validity: convergent and discriminant validity

Correlations of the WEMWBS with 95% confidence intervals were calculated with:

- WHO-5 scores
- Kidscreen-27 with its five standardised domain scores
- MHC-SF summarised as total sum

- GHQ12 as score (range 0-12) and total sum (range 0-36), Scoring and Likert scales, respectively
- SDQ summarised as total difficulties score and five subscales.

As with the assessments of 95% confidence intervals around Cronbach's alpha, Spearman's rank correlation coefficients were computed using nonparametric methods (bootstrap confidence intervals and 9,999 bootstrap replications) and p-values of approximate significance tests testing the null hypothesis of no correlation were calculated again based on an asymptotic t-test.

3.8.5 Test-retest reliability

An estimate of the intra class correlation coefficient (ICC) was obtained (Rao, 1997; Bland and Altman, 1996), with 95% confidence interval using a random effects model with individual random effects for the participants.

3.8.6 Dimensionality: confirmatory factor analysis

A confirmatory factor analysis of all 14 WEMWBS items was performed to test the hypothesis of a one-factor structure of WEMWBS. A structural equation model was fitted with one latent factor by weighted least squares. Initially we assumed independent residuals and subsequently added parameters allowing for pair wise dependencies between residuals in a stepwise fashion guided by analyses of the covariance structure (Harrington, 2009).

3.9 Qualitative data collection and analysis

Qualitative data collection was undertaken to explore face validity; to investigate the acceptability and comprehensibility of WEMWBS and to identify areas for potential improvement.

3.9.1 Focus/discussion group methods testing face validity

The objectives of the focus/discussion groups were to:

- investigate school students' overall views of WEMWBS and its constructs
- assess how easy or difficult students found completion of WEMWBS
- discover and discuss students' views and understanding of 'mental health' and 'mental wellbeing'
- assess students' understanding of the individual items of WEMWBS
- identify whether additional items should be added or individual items removed
- explore items which the students did not completely understand.

A protocol was developed (Appendix 9) based on these objectives. The named lead for each participating school was asked to identify between 5 and 8 students with a range of academic ability from school year groups (aged 13-14 years or 15-16 years) to participate in single gender focus groups. Those who participated in the focus groups completed WEMWBS (with the added glossary) but not the whole questionnaire pack. Each focus group was selected from a single year group and was single gender to facilitate discussion. Twelve focus groups were undertaken (selected to include six from each city; six of each gender; and six of each year group). Students selected for focus group participation were not included in the quantitative part of the project, although all information, parental opt-out opportunity and consent procedures were undertaken in exactly the same way.

Focus groups were undertaken during class time (typically lasting 35-40 minutes) and were facilitated by one or two researchers in a separate quiet room. Recording

was undertaken using an electronic digital tape recoding machine. All recordings were independently transcribed. The first three transcripts were checked to ensure that transcription was undertaken accurately. Thereafter all transcriber queries or concerns were checked individually.

3.9.2 Focus/discussion group analysis

Analysis was undertaken using the software package NVivo and an adapted Framework Approach (Ritchie and Spencer, 1994) suitable where a framework for analysis already exists (in this case the focus group protocol).

Each discussion group recording was coded thematically. Codes were based on the question prompts used to guide the discussions and subsequently combined into over-arching themes on the basis of repeated readings of the transcripts.

The main analysis was conducted across the whole dataset (all groups combined). Subsequently, the data were explored in order to identify systematic differences by location (City 1 versus City 2), gender and age group (age 13-14 versus age 15-16). Three researchers analysed transcripts independently, reading and re-reading them to identify emerging key themes, discrepancies and correspondences in the data. The three analyses were compared to identify convergence and divergence of findings and findings were discussed and agreed.

4. Results

4.1 Quantitative results

4.1.1 Response rates

One thousand six hundred and fifty questionnaires were obtained from school students aged 13-14 and 15-16 in six schools. Response rates were generally high, ranging from 62.1% to 91.9% at each school with a mean response rate of 80.8% (Table 4.1).⁸

Table 4.1 Response rates for each school

| School | Number in relevant classes | Number of completed questionnaires | Response rate (%) |
|--------------|----------------------------|------------------------------------|-------------------|
| 1 | 348 | 320 | 91.9 |
| 2 | 427 | 344 | 80.5 |
| 3 | 311 | 264 | 84.8 |
| 4 | 191 | 167 | 87.4 |
| 5 | 494 | 307 | 62.1 |
| 6 | 271 | 248 | 91.5 |
| Total | 2042 | 1650 | 80.8 |

4.1.2 Descriptive statistics: sample characteristics and scale responses

Table 4.2 describes the demographic characteristics of the sample. There were approximately equal numbers of boys and girls, ages ranged from 12 to more than 16 years, and participants were predominantly white (78%). (The age of the pupils spanned from 12-16 years because we used whole school year and class groups as our sample. A small proportion of pupils were outside the planned age range. We included all pupils in our analysis reflecting the characteristics of our school samples).

Sixty-nine per cent of our participants had a score of 5 or higher on the Family Affluence Scale (FAS) indicating that they lived in relatively affluent households and 14% had a score of 3 or lower indicating that they lived in relatively poor households. These data compare to previous published findings from survey data in 2001/2002 (Currie *et al.*, 2004). (In that work 38% of young people (aged 11, 13 and 15 years) in England and 34 % in Scotland scored 6 or more on the FAS (compared to our figure of 45%) and 15% in England and 20% in Scotland scored three or less on the FAS (compared to 14% of our sample)).

A total of 633 (39%) participants stated that they had a disease, long-standing disease or disability. Of the disease items included in the questionnaire, the commonest reported were: asthma, eczema, epilepsy, diabetes, hearing problems, eyesight problems, hay fever, chronic fatigue, and back pain.

⁸ The lowest school response rate was due to some of the older students sitting exams in one case, and a blizzard on another collection date.

Table 4.2 Sample characteristics (n = 1650) (%)

| Characteristic (number where information missing) | | N (%) |
|--|-------------------------|--------------|
| Gender (4) | Male | 808 (49.1) |
| | Female | 838 (51.0) |
| Age (3) | 12 years | 78 (4.7) |
| | 13 years | 694 (42.1) |
| | 14 years | 204 (12.4) |
| | 15 years | 564 (34.2) |
| | 16 years | 99 (6.0) |
| | Over 16 years | 8 (0.5) |
| Ethnicity (32) | White | 1269 (78.4) |
| | Mixed | 57 (3.5) |
| | Asian or Asian British | 220 (13.6) |
| | Black and Black British | 42 (2.6) |
| | Chinese | 15 (0.9) |
| | Other | 15 (0.9) |
| Family Affluence Scale (10) | 0 | 2 (0.1) |
| | 1 | 16 (1.0) |
| | 2 | 56 (3.4) |
| | 3 | 159 (9.7) |
| | 4 | 268 (16.3) |
| | 5 | 399 (24.3) |
| | 6 | 438 (26.7) |
| | 7 | 302 (18.4) |
| Long-standing disease or disability (45) | Present | 633 (39.4) |

For comparison Table 4.3 illustrates the ethnic distribution within cities in England and Scotland. City 1, in England, is more ethnically diverse than City 2 in Scotland. The samples are broadly representative of their respective city young people's populations although they reflect slightly more ethnic diversity than the populations

from which they are drawn. However, as might be expected the WAVES sample overall is slightly different to the national population as assessed by the 2001 Census (National Statistics UK, 2001), although of course there may also have been a change in demographics in the years subsequent to the census.

Table 4.3 Distribution of ethnicity by population (%)

| | White ⁱ | Mixed ⁱⁱ | Asian/Asian British | Black/Black British | Chinese & Other | Missing | Totals |
|--|--------------------|---------------------|---------------------|---------------------|-----------------|---------|--------|
| WAVES City 1 | 69.8 | 4.6 | 20.0 | 3.8 | 1.8 | 0 | 100 |
| City 1 school age pupils 11-16 (2007)ⁱⁱⁱ | 69.6 | 4.9 | 17.3 | 6.0 | - | 2.2 | 97.8 |
| WAVES City 2 | 86.7 | 2.8 | 6.1 | 1.3 | 1.8 | 1.3 | 98.7 |
| City 2 Census 12-16 (2001) | 93.9 | 0.1 | 0.3 | 0.1 | 0.1 | 5.5 | 94.5 |
| WAVES overall | 78.4 | 3.5 | 13.6 | 2.6 | 0.9 | 1.0 | 99 |
| National average 12-16 (2001 Census) | 92.1 | 1.2 | 3.9 | 2.0 | 0.1 | 0.7 | 99.3 |

ⁱ Including other white, white Irish, and other white British

ⁱⁱ Including mixed white + any mixed

ⁱⁱⁱ City 1 internal survey report data

4.1.3 Descriptive statistics for WEMWBS, GHQ12, WHO-5, SDQ, MHC-SF and Kidscreen-27

Descriptive statistics were derived for each scale. In each case, rules for dealing with missing data items in relation to scoring for the scales were followed.⁹ One thousand five hundred and seventeen of the 1650 participants (92%) completed all questions in WEMWBS. Ninety-one participants (6%) answered 13 of the 14 items, 35 (2%) students answered only one item, and 7 students (0.4%) answered none of the 14 items. No particular question was more or less likely to be missed. Figure 4.1 shows WEMWBS item responses for those who answered all items. As can be seen, all possible responses were ticked by at least some participants.

⁹ Rules differ for each scale and are described in the references available for each scale. Please see reference list.

Figure 4.1 WEMWBS item responses (n = 1517)

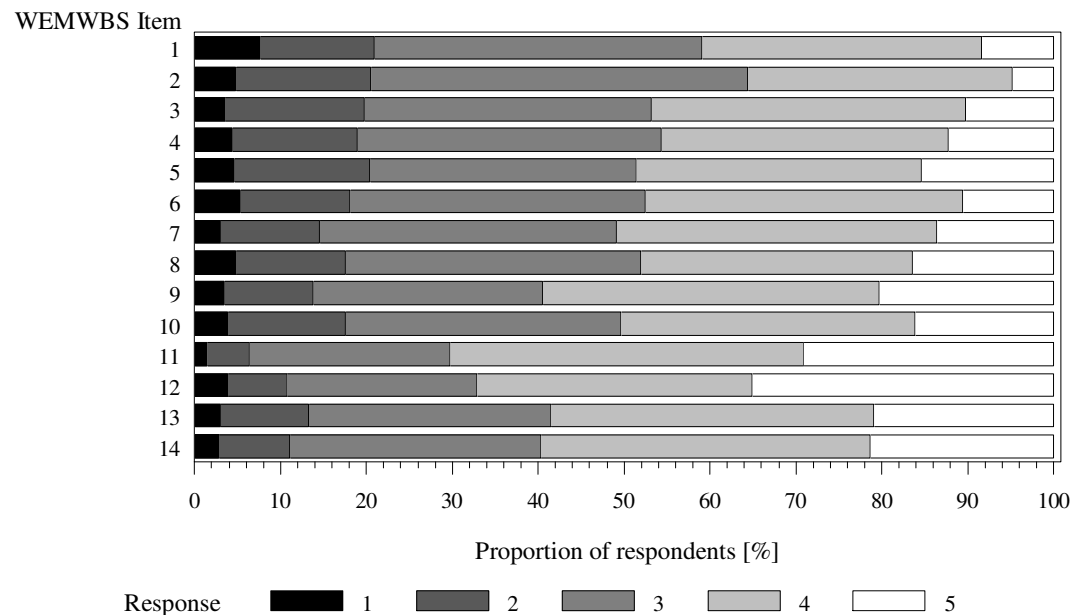


Table 4.4 gives the response rate for the other scales used in the questionnaire.

Descriptive statistics for WEMWBS, GHQ12, WHO-5, SDQ, MHC-SF and Kidscreen-27 are also given in Table 4.4. The mean WEMWBS score was 48.8 (standard deviation (SD) 8.6) and the median was 49. WEMWBS scores ranged from 14 to 70 (see Figure 4.2), i.e. the full range of possible values was used. No floor or ceiling effects were identified with very few responses close to the lower or upper boundaries (scores of 14 or 70).

The means for the five Kidscreen-27 domains observed in this study ranged from 46.0 for the School Environment domain to 50.0 for the Social Support and Peers domain. Apart from the school environment domain, all other Kidscreen-27 domain scores were statistically significantly below the standard mean of 50 expected in European children.

Using the three categories of the MHC-SF, 148/1478 (10%) students belonged to the 'languishing' category, 722/1478 (49%) to the 'moderately mentally healthy' and 608/1478 (41%) to the 'flourishing' category. This compares well to original findings in young people (aged 11-18 years) in the United States where 'flourishing' was the most prevalent diagnosis among youth ages 12-14 and 'moderate mental health' was the most prevalent diagnosis among youth ages 15-18' (Keyes, 2006).

The RELACHS study in East London (Stansfeld *et al.*, 2001) provides a valuable comparator for SDQ findings. In that study mean SDQ total scores for 11-14 year old adolescents were 12.2 (standard error ± 0.13) for boys and 12.7 (standard error ± 0.14) for girls.

Table 4.4 Descriptive statistics for questionnaire scales

| Variable | Numbers of responses for each scale ⁱ | Responses for each scale ⁱ as % of all 1650 respondents | Mean | Std Dev | Min | Lower Quartile | Median | Upper Quartile | Max |
|----------------------|--|--|------|---------|------|----------------|--------|----------------|-------|
| WEMWBS | 1517 | 91.9 | 48.8 | 8.6 | 14.0 | 44.0 | 49.0 | 55.0 | 70.0 |
| GHQ12 Scores | 1590 | 96.4 | 2.0 | 2.7 | 0.0 | 0.0 | 1.0 | 3.0 | 12.0 |
| GHQ12 Likert | 1590 | 96.4 | 10.6 | 5.7 | 0.0 | 6.0 | 9.0 | 13.0 | 36.0 |
| WHO-5 | 1626 | 98.5 | 64.2 | 21.4 | 0.0 | 52.0 | 68.0 | 80.0 | 100.0 |
| SDQ total | 1633 | 99.0 | 12.3 | 5.7 | 0.0 | 8.0 | 12.0 | 16.0 | 30.0 |
| MHC-SF total | 1478 | 89.6 | 42.3 | 15.0 | 0.0 | 32.0 | 43.0 | 54.0 | 70.0 |
| KS27 physical | 1621 | 98.2 | 47.3 | 12.2 | 12.1 | 38.5 | 47.1 | 52.4 | 73.2 |
| KS27 psych | 1604 | 97.2 | 46.6 | 10.5 | 4.5 | 39.4 | 46.5 | 53.1 | 73.5 |
| KS27 parent | 1602 | 97.1 | 48.4 | 12.0 | 1.7 | 41.7 | 47.9 | 53.3 | 74.4 |
| KS27 peers | 1615 | 97.9 | 50.0 | 11.6 | 11.2 | 42.1 | 46.9 | 57.8 | 66.3 |
| KS27 school | 1610 | 97.6 | 46.0 | 9.7 | 16.3 | 40.7 | 45.4 | 51.1 | 71.0 |

ⁱ Respondents who completed enough of each scale to allow for computation of scores according to rules

4.1.3 WEMWBS and socio-demographic factors

Total unadjusted WEMWBS scores showed the expected normal distribution with a mean of 48.8 (SD 8.6). Scores for boys were on average 1.8 points higher than for girls (see Figures 4.2i and ii). Multiple regression, adjusting for age and family affluence, failed to demonstrate statistically significant gender effects at the 5% level. After adjustment, boys' scores were on average 0.63 (95% confidence interval (CI) [-0.19; 1.46]; $p = 0.13$) points lower than girls' scores. Similarly after adjustment for other relevant factors (gender and FAS), WEMWBS score was not found to vary significantly with age. After adjustment, those 15 years and older scored on average 0.43 (95% CI [-0.37; 1.22]; $p = 0.30$) points higher than those aged 14 years and younger.

A significant association was found between WEMWBS scores and relative affluence after adjustment for other relevant socio-demographic factors (gender and age). FAS scores of 5 points or higher were associated with an increase in WEMWBS score of 1.47 (95% CI [0.61, 2.32]; $p = 0.0008$) compared to FAS scores of less than 5 points.

Higher WEMWBS scores were also associated with increasing Kidscreen-27 physical wellbeing domain scores. For each WEMWBS scale point there was an unadjusted increase of 0.32 (95% CI [0.29; 0.35]; $p < 0.0001$) on the Kidscreen-27 physical wellbeing domain score. A test for interaction between FAS and the Kidscreen-27 physical wellbeing domain was not significant ($p = 0.33$).

WEMWBS scores did not differ significantly between schools ($p = 0.35$) once adjustment for other socio-demographic variables (age, gender and FAS) had been undertaken.

Figure 4.2i Unadjusted WEMWBS scores overall

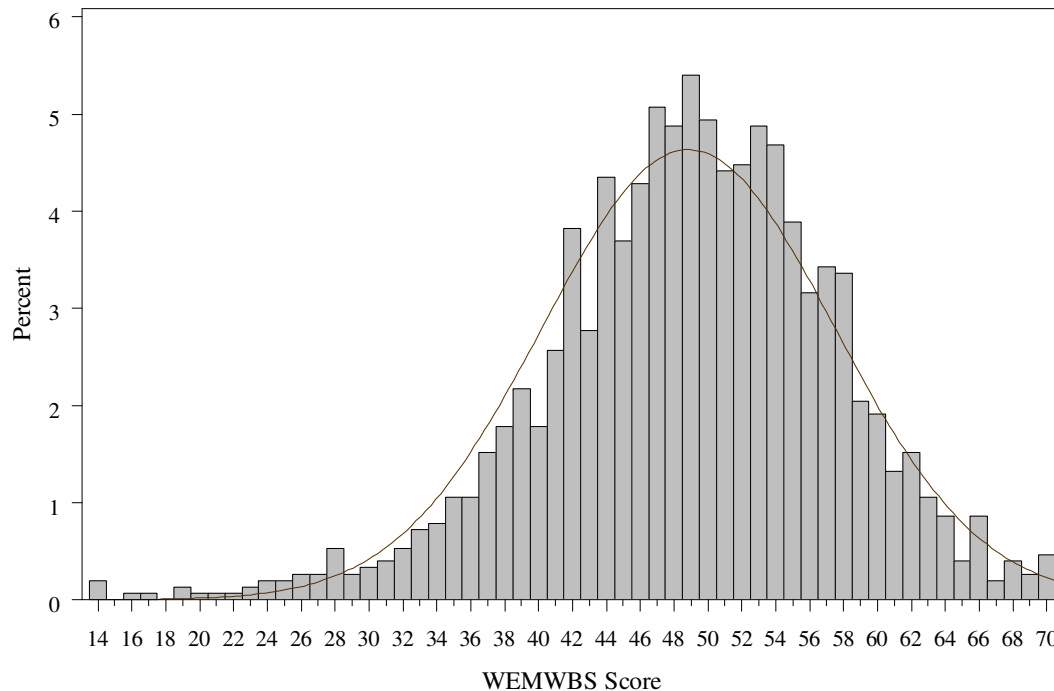
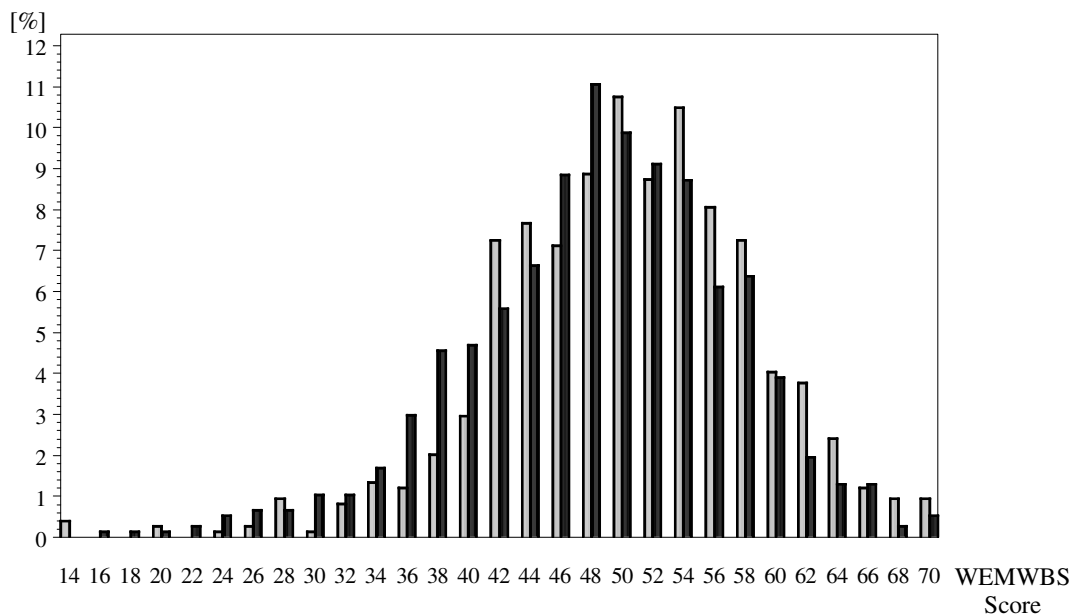


Figure 4.2ii Unadjusted WEMWBS scores by gender (boys: grey; girls: black)



4.1.4 Construct validity: convergent and discriminant validity

Table 4.5 gives Spearman's rank correlation coefficients for WEMWBS with GHQ12, WHO-5, SDQ, MHC-SF and Kidscreen-27.

Convergent Validity: The highest correlations were seen with those scales or subscales measuring mental wellbeing such as the MHC-SF (total score correlation coefficient (CC) = 0.65, 95% CI [0.62; 0.69]; categories CC = 0.57, 95% CI [0.53; 0.61]), the psychological wellbeing domain of the Kidscreen-27 (CC = 0.59, 95% CI [0.55; 0.62]) and WHO-5 (CC = 0.57, 95% CI [0.53; 0.61]). These correlations are

good and indicate satisfactory convergent validity close to predicted values (see Table 3.1).

Discriminant Validity: The correlation with the SDQ total score was -0.44 (95% CI [-0.49; -0.40]) and the correlation with the GHQ12 score was -0.45 (95% CI [-0.49; -0.40]). Again these negative correlations indicate satisfactory discriminant validity close to predicted values (see Table 3.1).

Figure 4.3 shows these relationships visually giving scatter plots for WEMWBS versus the MHC-SF total score, the psychological wellbeing domain of the Kidscreen-27, WHO-5, SDQ total score and GHQ12 score. The correlation for the scale capturing physical health - the physical wellbeing domain of the Kidscreen-27 questionnaire was 0.43 (95% CI [0.39; 0.47]). This correlation is also high and suggests a reasonably strong positive correlation between mental wellbeing and physical health in this age group.

We repeated these analyses in only the group of students who completed all scales fully ($n = 1343$) without including those where 'missing data' rules were used (results not reported here) and found that all estimated correlations were within 0.02 of the coefficients reported in Table 4.5.

Table 4.6 shows the correlations of WEMWBS with GHQ12, WHO-5, SDQ, MHC-SF and Kidscreen-27 by age group (14 years and younger vs 15 years and older). All confidence intervals for the correlation coefficients overlap, indicating no statistically significant effects of age group on the associations found between WEMWBS and GHQ12, WHO-5, SDQ, MHC-SF or Kidscreen-27.

Table 4.5 Spearman's rank correlation coefficients with 95% confidence intervals (CI) for WEMWBS with GHQ12, WHO-5, SDQ, MHC-SF and Kidscreen-27

| Scale | | N | Correlation | 95% CI | | p-value |
|---------------------|--|------|-------------|--------|-------|---------|
| GHQ12 | Scores | 1479 | -0.45 | -0.49 | -0.40 | <0.001 |
| | Likert | 1479 | -0.52 | -0.56 | -0.47 | <0.001 |
| WHO-5 | | 1508 | 0.57 | 0.53 | 0.61 | <0.001 |
| SDQ | Total | 1509 | -0.44 | -0.49 | -0.40 | <0.001 |
| MHC-SF | Total Score | 1396 | 0.65 | 0.62 | 0.69 | <0.001 |
| | Categorical scores (languishing, moderately mentally healthy or flourishing) | 1396 | 0.57 | 0.53 | 0.61 | <0.001 |
| Kidscreen-27 | Physical Well-being | 1499 | 0.43 | 0.39 | 0.47 | <0.001 |
| | Psychological Well-being | 1486 | 0.59 | 0.55 | 0.62 | <0.001 |
| | Autonomy & Parent Relation | 1484 | 0.46 | 0.42 | 0.50 | <0.001 |
| | Social Support & Peers | 1492 | 0.38 | 0.33 | 0.42 | <0.001 |
| | School Environment | 1489 | 0.51 | 0.46 | 0.55 | <0.001 |

Figure 4.3 Scatter plots: WEMWBS vs. MHC-SF total score (n = 1396), psychological well-being domain of Kidscreen-27 (n = 1486), WHO-5 (n = 1508) SDQ total score (n = 1509), GHQ12 (Scores) (n = 1479)

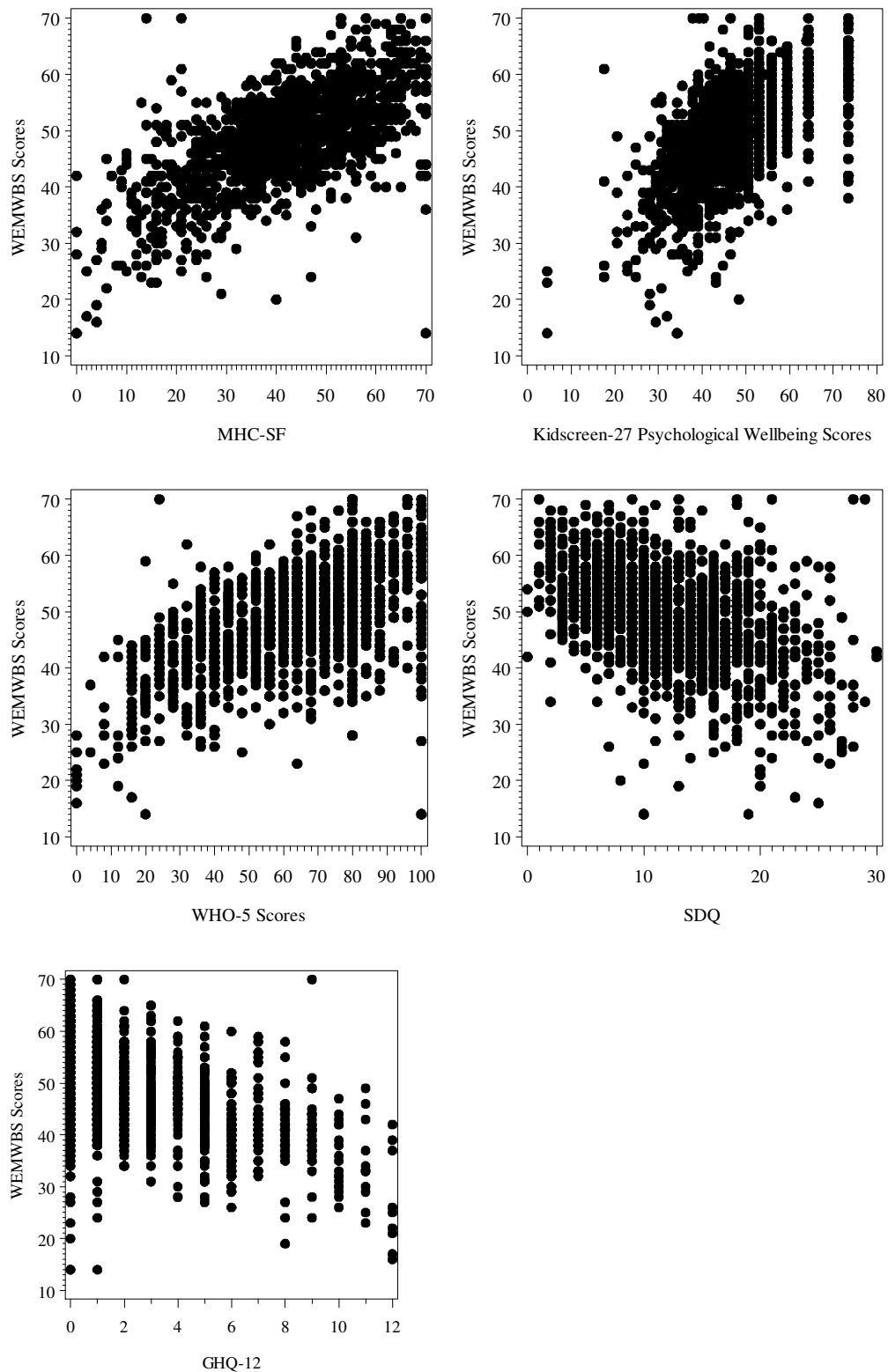


Table 4.6 Spearman's rank correlation coefficients (CCs) with 95% confidence intervals (CI) for WEMWBS with GHQ12, WHO-5, SDQ, MHC-SF and Kidscreen-27 by age group

| | | 14 years and younger | | | | | 15 years and older | | | | |
|--------------|--|----------------------|-------|--------|-------|---------|--------------------|-------|--------|-------|---------|
| Scale | | N | CC | 95% CI | | p-value | N | CC | 95% CI | | p-value |
| GHQ12 | Scores | 862 | -0.47 | -0.52 | -0.41 | <0.001 | 615 | -0.42 | -0.49 | -0.35 | <0.001 |
| | Likert | 862 | -0.52 | -0.57 | -0.46 | <0.001 | 615 | -0.51 | -0.57 | -0.45 | <0.001 |
| WHO-5 | | 880 | 0.57 | 0.51 | 0.62 | <0.001 | 626 | 0.59 | 0.52 | 0.64 | <0.001 |
| SDQ | Total | 881 | -0.47 | -0.52 | -0.41 | <0.001 | 626 | -0.41 | -0.48 | -0.34 | <0.001 |
| MHC-SF | Total | 810 | 0.67 | 0.62 | 0.71 | <0.001 | 584 | 0.63 | 0.57 | 0.68 | <0.001 |
| | Categorical scores (languishing', moderate or flourishing) | 810 | 0.61 | 0.56 | 0.66 | <0.001 | 584 | 0.53 | 0.46 | 0.59 | <0.001 |
| Kidscreen-27 | Physical Well-being | 872 | 0.43 | 0.37 | 0.49 | <0.001 | 625 | 0.43 | 0.36 | 0.50 | <0.001 |
| | Psychological Well-being | 860 | 0.58 | 0.53 | 0.63 | <0.001 | 624 | 0.60 | 0.54 | 0.65 | <0.001 |
| | Autonomy & Parent Relation | 861 | 0.48 | 0.42 | 0.53 | <0.001 | 621 | 0.44 | 0.37 | 0.50 | <0.001 |
| | Social Support & Peers | 867 | 0.39 | 0.33 | 0.45 | <0.001 | 623 | 0.35 | 0.28 | 0.43 | <0.001 |
| | School Environment | 864 | 0.53 | 0.48 | 0.58 | <0.001 | 623 | 0.47 | 0.40 | 0.54 | <0.001 |

4.1.5 Internal consistency

Cronbach's alpha for WEMWBS was 0.87 (95% CI (0.85; 0.88), $n = 1517$) in the whole sample. Very similar results were obtained when we analysed the data by age group. In the younger pupils (aged 14 years or younger) Cronbach's alpha was 0.87 (95% CI (0.85; 0.88), $n = 885$) and in the older pupils we found an alpha of 0.88 (95% CI (0.85; 0.89), $n = 629$). Values in excess of 0.7 are considered satisfactory for group comparisons (Bland and Altman, 1997). Note that all confidence intervals lie entirely above 0.7 (for the total population as well as for both age groups) demonstrating a high level of internal consistency and even possible redundancy. The omission of single WEMWBS items resulted in Cronbach's alpha values of 0.85 to 0.87 in the total population (and of 0.85-0.87 and 0.86-0.87 in the younger and the older pupils, respectively), all with lower bands of 95% confidence intervals above 0.7. This indicates satisfactory internal consistency across all items in both age groups.

Table 4.7 gives Spearman's rank correlation coefficients with 95% confidence intervals for each WEMWBS item with the total of the remaining items. Substantial but not excessive correlations (in the range 0.2 to 0.8) are desirable (Steiner and Norman, 2008). All WEMWBS items have correlations with the total of the remaining items that fall within this desirable range. Furthermore, all confidence intervals for

the correlations lie entirely within the range of 0.2 to 0.8 demonstrating that all items have the desired substantial, but not excessive correlation, indicating that the scale has strong internal consistency (the different items are tapping aspects of the same construct ie in this case mental wellbeing).

Table 4.7 Spearman's rank correlation coefficients (CCs) with 95% confidence intervals (CI) for each item with the total of the remaining items (n = 1517)

| Item | CC | 95% CI | | p-value |
|--|------|--------|------|---------|
| I've been feeling optimistic about the future | 0.39 | 0.34 | 0.44 | <0.001 |
| I've been feeling useful | 0.52 | 0.47 | 0.56 | <0.001 |
| I've been feeling relaxed | 0.51 | 0.47 | 0.55 | <0.001 |
| I've been feeling interested in other people | 0.35 | 0.30 | 0.39 | <0.001 |
| I've had energy to spare | 0.37 | 0.33 | 0.42 | <0.001 |
| I've been dealing with problems well | 0.51 | 0.47 | 0.56 | <0.001 |
| I've been thinking clearly | 0.56 | 0.52 | 0.59 | <0.001 |
| I've been feeling good about myself | 0.64 | 0.60 | 0.67 | <0.001 |
| I've been feeling close to other people | 0.51 | 0.47 | 0.55 | <0.001 |
| I've been feeling confident | 0.62 | 0.59 | 0.66 | <0.001 |
| I've been able to make up my own mind about things | 0.48 | 0.44 | 0.52 | <0.001 |
| I've been feeling loved | 0.52 | 0.48 | 0.56 | <0.001 |
| I've been interested in new things | 0.45 | 0.40 | 0.49 | <0.001 |
| I've been feeling cheerful | 0.61 | 0.57 | 0.65 | <0.001 |

4.1.6 Dimensionality: confirmatory factor analysis

The final one-factor structural equation model confirmed the hypothesised one-factor structure of WEMWBS.¹⁰

4.1.7 Test-retest reliability

In total, 237/256 retest WEMWBS were completed in 5 schools, an overall response rate of 92.5% (The retest sample was somewhat higher than originally planned but allowed for some respondents' potential failure to complete all items or the presence of attendees in the class who had not completed the original questionnaire). The average proportion of pupils retested was 14.4%, ranging from 3.8%-33.6% for individual schools. Of those who completed the retest, 227 (96%) participants answered all 14 questions of whom 212 (89%) had answered all 14 questions previously. This equated to 12.8% of the original sample answering all 14 items in

¹⁰ The final one-factor structural equation model included 28 parameters for pair wise residual correlations and was fitted using data from n = 1517 students. The goodness-of-fit test resulted in a chi-square statistic of 48.74 with 48 degrees of freedom (p = 0.443), demonstrating good model fit and thereby confirming the hypothesised one-factor structure of WEMWBS.

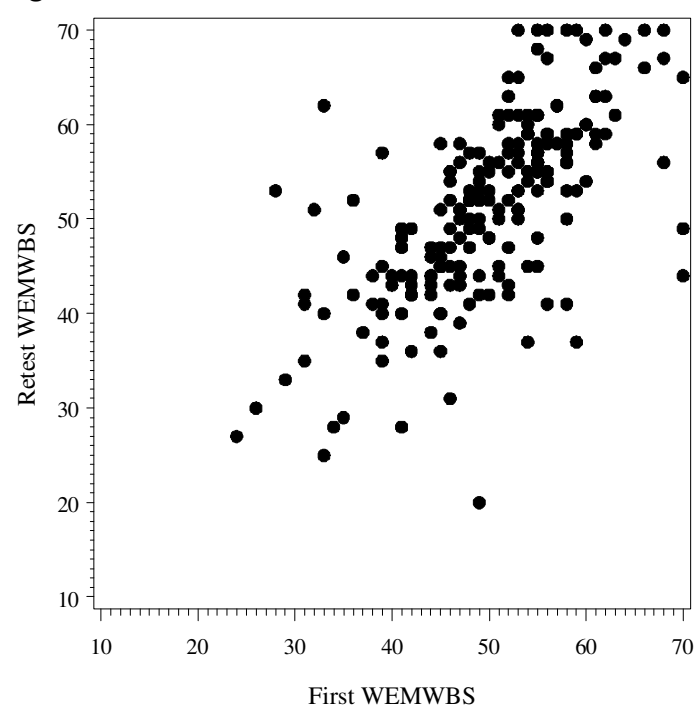
WEMWBS on both occasions separated by the requisite less than two week period (Table 4.8). Figure 4.4 shows WEMWBS retest scores versus first WEMWBS scores at baseline. The intra class correlation coefficient (ICC) was 0.66 (95% CI [0.59; 0.72] $n = 212$) indicating a moderate correlation. This correlation is lower than that found in adults (0.83) (Tennant, Fishwick, Platt *et al.*, 2006) and is commented on further in the Discussion (Section 5.1.2 and following). Considering only those pupils who completed the retest at 7-8 days after the first completion, the ICC was 0.68 ($n = 187$, 95% CI [0.61; 0.74]). Split by age group we found ICC of 0.67 ($n = 91$, 95% CI [0.56; 0.76]) and 0.65 ($n = 121$, 95% CI [0.55; 0.73]) in the younger (14 years and younger) and older (15 years and over) pupils, respectively).

Table 4.8 Retests

| Retest School | Number of completed test questionnaires | Number completed retest | Retest interval (days) | Percent of original sample (%) |
|---------------|---|-------------------------|------------------------|--------------------------------|
| 1 | 320 | 32 | 7 | 10.0 |
| 2 | 344 | 13 | 7 | 3.8 |
| 3 | 264 | 62 | 7 | 23.5 |
| 4 | 167 | -* | 7 | n/a |
| 5 | 307 | 103 | 7-8 | 33.6 |
| 6 | 248 | 27 | 14 | 10.9 |
| Total | 1650 | 237 | Range 7-14 | 14.4 |

*The retest data from school 4 could not be used due to a faulty procedure for numbering and anonymising the retests. Both the consent form and retest should have been coded with an ID number, but in the case of school 4, only the consent form was numbered making it impossible to match the consent to the retest.

Figure 4.4 Retest WEMWBS scores versus baseline WEMWBS scores (n = 212)



4.2 Qualitative results and face validity

Overall 80 students took part in focus/discussion groups of whom 50% were younger (aged 13-14 years) and 50% older (aged 15-16 years). Table 4.9 shows details of the age and gender of the participants in the focus groups. Focus groups were either male or female and reflected a single school year group. Teachers were asked to select students for focus groups to reflect a mix of ability.

Table 4.9 Focus/discussion groups participant characteristics

| Location | Age group years | Gender | Number of participants |
|-----------------|-----------------|--------|------------------------|
| City 1 England | 13-14 | Girls | 6 |
| | 13-14 | Girls | 8 |
| | 13-14 | Boys | 8 |
| | 15-16 | Boys | 7 |
| | 15-16 | Boys | 8 |
| | 15-16 | Girls | 8 |
| City 2 Scotland | 13-14 | Girls | 6 |
| | 13-14 | Boys | 6 |
| | 13-14 | Boys | 6 |
| | 15-16 | Girls | 5 |
| | 15-16 | Girls | 6 |
| | 15-16 | Boys | 6 |
| Total | | | 80 |

Findings were organised into themes and used as sub-headings below. While location was not found to be an important discriminator, some differences in responses to individual items were found by sex and age group, which are highlighted in the report. Where no differences by sex or age group are noted, the findings reported here can be assumed to apply across all groups. For one group of older boys the audio recording was unsuccessful. Findings from this group were included using notes taken from memory by the researcher involved.

4.2.1 Mental wellbeing and mental health problems

Focus group participants were prompted on their views on mental wellbeing and mental health problems. Across both year groups and genders, mental wellbeing was strongly associated with happiness and positivity, while being mentally unwell was associated with sadness, worry and depression.

Within the age 13-14 year groups, mental health problems and abnormality were sometimes linked together. For example, one younger girl demonstrated fear of the mentally ill, saying that ‘...they scare me’. One younger boy related mental health

problems to 'crazy people' and another to those who 'aren't the full shilling'. Older age groups (15-16 years) appeared to have a more rounded understanding of mental health problems. Additionally, younger participants, especially boys, perceived an association between mental wellbeing and being clever, particularly doing well at school.

4.2.2 Initial reaction/overall perception of WEMWBS

When asked about their initial response to the scale, younger boys (13/14 year age group) said that they had to think a lot about the questions before answering them, especially since these were not issues they consider every day. They also said they had difficulty in thinking about themselves as required by the scale. The items were considered unusual and unlike those in other questionnaires. One group of younger boys also initially thought that the questions were very personal and concerned with establishing their emotions and how they were feeling. This view was shared amongst the younger girls. As one participant said, [the questions ask about] 'things that you usually wouldn't share with anyone else.'

On the other hand, none of the older (aged 15/16 years) participants had the same initial reactions. Both older boys and girls said that the scale was clear and straightforward to answer. One older boy expressed the view that the scale was asking questions that 'you should be, or would be, asking yourself at that time.'

One group of younger girls and one group of older girls were amused by the scale, saying that it made them laugh. After some prompting, information was elicited about which aspects of the scale they found amusing (see below).

It should be noted that within discussion groups, understandings varied; for example with the first item some individuals may have struggled with the term 'optimistic' whilst others might have found it obvious, however, the interpretation given by one or two participants was dominant. Within groups discussion might sometimes have been led by one participant. This was especially the case within the younger groups where, for example, in discussion of the term 'optimistic', although the group understood the term, the discussion of its understanding by the group was led by one participant. This means that it is important that this section of the report is read in a narrative qualitative sense. This section highlights issues of face validity and potential problems for concern. It does not present a quantitative representation of specific misunderstandings/misinterpretations.

4.2.3 Interpretation of items

Item 1. 'I've been feeling optimistic about the future'

Although students were provided with the glossary, discussion showed that the word 'optimistic' caused difficulty for some school students in both year groups. One younger boys' group and one younger girls' group queried the term. In the older (aged 15-16) groups, one group of boys and one group of girls said they did not understand the meaning of 'optimistic'. Overall, the term 'optimistic' presented more difficulty for younger than for older participants.

One younger female participant said that she thought this item was irrelevant (when compared to other scale items). Within one older boys' group, the expendability of this item was also discussed; some considered it to be less important to mental wellbeing than other items, but another participant disagreed and it was concluded that the item needed to be modified rather than discarded. 'Worrying about the future' or 'Having ideas of what one wants for the future' were suggested as alternatives.

Item 2. 'I've been feeling useful'

Among younger participants, the boys had no problems understanding this item and did not question it, while two of the girls' groups thought that the item was unclear and difficult to interpret. This latter view was shared by *all* older discussion groups. The item was considered to be unclear/ambiguous and unspecific. As one older boy said: it 'could mean anything.' One younger and one older female participant perceived a difference between this and other items on the scale. They interpreted the item as being to do with other people and their problems, whereas the remaining scale items concerned the individual who was completing the scale.

Item 3. 'I've been feeling relaxed'

This item was understood by all groups and was considered to be an important aspect of mental wellbeing.

Item 4. 'I've been feeling interested in other people'

Across all discussion groups there was considerable difficulty interpreting this item and its relevance and necessity were queried. The overall consensus was that it could mean different things to different individuals. Older participants found the item ambiguous and confusing, with one older girl stating that it was 'ridiculous'. Within the younger groups there was similar confusion. One boy said that the question was not a good one because it required a shift from thinking about oneself (in other items) to considering others. This is a similar comment to that made previously regarding the item 'I've been feeling useful'. One younger girl, however, felt differently:

'I think it's quite important to think about how you feel about other people and if you're actually thinking about other people'

The item prompted laughter among two groups of younger girls, who interpreted 'interested in' as 'fancy' (i.e. 'be physically attracted to'). In the end they concluded that the item needs more explanation. Participants in one of these groups, however, considered the item to be an important component of the scale.

Item 5. 'I've had energy to spare'

For *every* discussion group this item caused confusion. There was difficulty interpreting the meaning of the term and many ideas were expressed about what it might signify. Participants concluded that the item was too vague and too broad and that it must be made more specific. Three discussion groups (younger boys, younger girls and older boys) stressed that the item needs to differentiate between physical and mental energy. One older girl said that this item was also very similar to the item 'I've been feeling relaxed.'

Item 6. 'I've been dealing with problems well'

Younger boys appeared to have no difficulty with this item and thought it was useful. They also tended to relate the item to the school context, i.e. how well they dealt with school issues and school work. Within all younger girls' groups, however, the item was not easily interpreted and considered to need more explanation. One group of younger girls felt that it was a difficult item to answer because it was not something that they were able to measure or something about which they have self-awareness.

This item was discussed by one group of older boys who also said it was too vague. Two older groups of girls were also uncertain of the meaning of this item and thought it needed to be narrowed down and made more specific, detailing exactly *what* problems are or are not being dealt with.

Item 7. 'I've been thinking clearly'

Interpretation of this item was varied within and between groups. One younger group of boys did not understand the item whereas another did not have problems interpreting it and agreeing on its value. The item was not discussed by one group of younger boys, possibly suggesting they did not find it difficult to interpret.

One group of younger girls struggled with the item. They understood what was being asked but found it difficult to recognise the concept ('thinking clearly') in oneself. One participant highlighted how it is not something that one thinks about and so it is not easy to know.

However, this group and another group of younger girls, who did not raise problems of interpretation, suggested that it was an important scale item. One younger girl suggested the item be re-phrased to ask 'If you're feeling confident with what you are thinking.'

One group of older boys and one of older girls said the item was too ambiguous and vague. One group of older girls appeared to have no problem interpreting the item and the three remaining older (age 15-16) discussion groups did not discuss it at all.

Item 8. 'I've been feeling good about myself'

This item was understood by all discussion groups and considered to be relevant to mental wellbeing. Younger groups (boys and girls) often related their interpretations of this item to their achievements at school. One group of older girls associated the item with confidence more generally.

Item 9. 'I've been feeling close to other people'

With the exception of one younger and one older group of girls, this item was considered to be confusing and overly broad. Discussion of this item covered a variety of interpretations as to whom, how often and in what way one has been feeling close to others. Response was similar to that when discussing 'I've been feeling interested in other people.' The item generated hilarity in one group of older boys because it was considered to have a possible connection to sex and relationships. One group of older girls appeared uncomfortable discussing this item, with one participant commenting that it was 'odd' and something that one does not usually consider.

Item 10. 'I've been feeling confident'

All younger groups of boys – with the exception of one group who did not discuss this item – understood the underlying concept and perceived it to be valuable within the scale. Again, they discussed the item in terms of how it related to school. All groups of older boys, however, thought the concept was too broad and should be refined to distinguish exactly *what* one has been feeling confident about. One participant suggested changing the item to 'I've been feeling confident at school' (older boy). There was little or no discussion within the girls' groups about the item, except to acknowledge understanding and its importance to the scale as a whole.

Additionally, one younger boy thought that this item was too similar to the item 'I've been able to make up my own mind about things.'

Item 11. 'I've been able to make up my own mind about things'

This item did not present any problems of interpretation for either year group. All regarded it as important and relevant to the assessment of mental wellbeing.

Item 12. 'I've been feeling loved'

Similarly to 'I've been feeling interested in other people' and 'I've been feeling close to other people', this item was considered too broad and ambiguous by all discussion groups (with the exception of one younger and one older group of girls who did not discuss the item). They raised questions about by whom one was supposed to be feeling loved and by how many people. Older discussion groups said the item was too vague and meant different things to different people. Two groups of older girls discussed how 'feeling loved' is not something that one thinks about and one younger female participant found the item too personal. One younger boy queried whether or not he should feel loved less because he only had one parent. Another related the item to achievement at school and how this would result in his parents loving him more.

Item 13. 'I've been interested in new things'

There was no extensive discussion of this item within the boys' groups, with the exception of one group of younger boys who did not understand the item. Younger girls expressed no problem with this item, although one group suggested it was expendable: they did not relate to it or perceive its relevance. Two older girls' groups, however, were confused by the item and said that there needs to be clarification as to what one has been interested in.

Item 14. 'I've been feeling cheerful'

One group of younger boys did not like the term 'cheerful', suggesting that 'fairly happy' is a more fitting term because this refers to a frequent and sustained feeling. The other two younger boys' groups offered no opinion. This was similar to the groups of older boys, who, with the exception of one participant, did not discuss this item in any detail. One older boy highlighted that 'cheerful' is a transient feeling that could be present one day and absent the next, even if one were feeling happy. Therefore, he felt that this was the wrong word to use. This view was reinforced by one group of older boys, who preferred the word 'happy', as did one younger girl participant. She said: 'I don't know if I ever feel cheerful as such. I may feel happy but...'. All other girls' groups understood and accepted the item.

Table 4.10 provides a summary of these item by item findings.

Table 4.10 Summary of focus/discussion group interpretations of WEMWBS Items

| Item | Summary of findings | Overview |
|--|--|---|
| <i>Item 1. 'I've been feeling optimistic about the future'</i> | Individual understandings of 'optimistic' varied. 'Optimistic' misunderstood by one older group and one younger group overall. More likely to be misunderstood by younger individuals. One group suggested modification: 'Worrying about the future' or 'Having ideas of what one wants for the future' were suggested as alternatives. | Varied interpretation - less well understood by younger individuals. |
| <i>Item 2. 'I've been feeling useful'</i> | All older discussion groups and two younger girls' groups thought the item unclear and difficult to interpret. Younger boys had no problems with this item. | Varied interpretation - difficulty of interpretation for all older and some younger groups. |
| <i>Item 3. 'I've been feeling relaxed'</i> | This item understood by <i>all</i> groups and considered an important aspect of mental wellbeing. | Understood by <i>all</i> groups and considered relevant. |
| <i>Item 4. 'I've been feeling interested in other people'</i> | All groups had difficulty interpreting this item – considering that it could mean different things to different people. Two groups of younger girls interpreted 'interested in' as 'fancy' (i.e. 'be physically attracted to'). Although one of these thought the item important and recommended it needed more explanation. | Difficulty of interpretation for all groups. |
| <i>Item 5. 'I've had energy to spare'</i> | All groups had difficulty interpreting this term as it was thought too vague and broad. Groups considered it must be made more specific. Three groups across the age and gender range stressed that the item needed to differentiate between physical and mental energy. | Difficulty of interpretation for all groups. |
| <i>Item 6. 'I've been dealing with problems well'</i> | Younger boys had no difficulty with this item and thought it useful. All younger girls' groups thought the item not easily interpreted considering it to need more explanation. One group of older boys and two groups of older girls were uncertain of its meaning and suggested narrowing it down, detailing exactly <i>what</i> problems are or are not being dealt with. | Varied interpretation - understood by younger boys. Difficulty of interpretation - for younger girls and some older groups (both boys and girls). |
| <i>Item 7. 'I've been thinking clearly'</i> | Interpretation varied, younger groups having more difficulties of interpretation than older groups. Two groups of younger girls suggested it was an important scale item. Older groups less likely to have problems interpreting the item. | Varied interpretation - less well understood by younger individuals. |
| <i>Item 8. 'I've been feeling good about myself'</i> | This item understood by all discussion groups and considered to be relevant to mental wellbeing. | Understood by <i>all</i> groups and considered relevant. |

| | | |
|--|---|--|
| <i>Item 9. 'I've been feeling close to other people'</i> | One younger and one older group of girls understood this item clearly – all the other groups considered it confusing and overly broad. Response was similar to that when discussing 'I've been feeling interested in other people.' e.g. because of a possible connection to sex and relationships. A variety of interpretations was offered (e.g. as to whom, how often and in what way one is feeling close to others). | Varied interpretation - understood by one younger and one older group of girls – potential for misinterpretation for all other groups. |
| <i>Item 10. 'I've been feeling confident'</i> | All younger boys who discussed this item understood it and thought it valuable. All girls' groups understood the item and acknowledged its importance. Older boys thought the concept too broad and considered it needed refining to distinguish <i>what</i> one has been feeling confident about. | Varied interpretation - understood by all groups and considered relevant except by some older boys who thought the concept too broad. |
| <i>Item 11. 'I've been able to make up my own mind about things'</i> | This item did not present any problems of interpretation for any group. All regarded it as important and relevant to the assessment of mental wellbeing. | Understood by <i>all</i> groups and considered relevant. |
| <i>Item 12. 'I've been feeling loved'</i> | This item was considered too broad and ambiguous by all groups who discussed it. Similarly to 'I've been feeling interested in other people' and 'I've been feeling close to other people'- a sexual connotation was inferred by some. | Difficulty of interpretation for all groups. |
| <i>Item 13. 'I've been interested in new things'</i> | There was no extensive discussion of this item within the boys' groups, with the exception of one group of younger boys who did not understand the item. Younger girls expressed no problem with this item, although one group suggested it was expendable: they did not relate to it or perceive its relevance. Two older girls' groups, however, were confused by the item and said that there needs to be clarification as to what one has been interested in. | Varied interpretation – understood by almost all boys groups. Some older girls thought it needed clarification. |
| <i>Item 14. 'I've been feeling cheerful'</i> | Most groups did not discuss this item in any detail. There was discussion by some groups that 'cheerful' is a transient feeling that happy might be a better term. | Understood by <i>all</i> groups and considered relevant although some groups suggested amendments. |

In summary, items 3, 8, 11 and 14 of WEMWBS were understood by all and thought relevant. The concepts were obviously clear to all age groups. There was difficulty in interpretation for all groups for items 4, 5 and 12. Items 1, 2, 6, 7, 9, 10 and 13 were variably interpreted. Two items appeared to be more likely to be misinterpreted by younger groups (items 1 and 7) and two items by older groups (items 10 and 13). For the other items in the variable category (items 2, 6, 9, and 10), misinterpretations occurred across age groups. Girls were more confident than boys in interpretation of items 9 and 10 and boys were mostly more confident than girls in interpretation of item 13. Any items, for example, which use terms which could be construed as having a link to a sexual or romantic relationship (e.g. 'interested in other people', 'loved', 'close to other people') were likely to cause hilarity, embarrassment or misinterpretation. Items where misinterpretation or difficulty of interpretation occurred, were often those where a (more mature) more holistic, reflective and less 'concrete' approach to oneself is called for (e.g 'thinking clearly', 'dealing with problems well').

4.2.4 Content, coverage and timescale

Younger boys considered the scale to be of an appropriate length (i.e. number of items); although younger girls had no particular comments on this aspect. A couple of participants alluded to the fact that, if it were any longer, they would become bored. One younger boy, however, felt that the scale was overly short and that one or two more items could be added.

Older boys and girls generally found the scale simple, short and easy to complete. Two older boys in the same group said more could have been added and another in a second group said that it was too short.

The response options ('none of the time', 'rarely', 'some of the time', 'often', 'all of the time') were considered sufficient and appropriate by all groups. One older group considered that the scale was better than most as there were a wide range of options that 'lets you express yourself a bit clearer' (older boy). One younger female participant, however, said that she would alter the word 'often' because:

'... 'some of the time' and 'often' are not the same but... 'often' and 'all of the time' are quite different... 'Often' could be a few times a week, whereas 'most of the time' could be five times a week and 'all of the time' is obviously all of the time, whereas 'often' can be anything from... it could be 'not very much' and 'some of the time'.'

In all discussion groups at least one participant felt that there was repetition within the scale. When discussing the content and coverage of WEMWBS, it was often suggested that many of the items were too similar. In both year groups, the items 'I've been feeling interested in other people', 'I've been feeling close to other people' and 'I've been feeling loved' were considered to be overlapping and older age groups suggested that they could be amalgamated.

As discussed under individual items above, participants reflected that some items were asking about matters that were not often considered (reflected upon) and were therefore difficult to answer. One group of younger girls elaborated upon this, saying that many scale items ask things that one does not easily know how to answer. These included 'I've been dealing with problems well', 'I've been thinking clearly' and 'I've had energy to spare'.

Older girls also regarded some of the items as unimportant to mental wellbeing such as: 'I've been feeling useful', 'I've been feeling close to other people' and 'I've been feeling loved' and – for one group – 'I've been feeling optimistic about the future'. One participant in the latter group highlighted that not everyone knows what they want to do in the future: 'they're not completely sure about it' (older girl).

Two older girls pointed out that it was difficult to recall feelings during the past *two* weeks (the timescale covered by the scale) and that people should be asked about their feelings during the past week only.

4.2.5 Suggested additional items

Younger age groups

One group of younger boys highlighted that there were no items covering how happy one has felt over the previous two weeks. One participant suggested an item relating to how happy one has been with the things one has done. Another participant in the same group proposed an item asking how proud one has been of oneself in general and in one's actions over the previous two weeks: 'Are you proud of who you are

and what you do?'. Similarly, one group of younger girls suggested including an item about achievement in the previous two weeks: 'If you know that you're achieving things, then it makes you feel positive.'

One group of younger girls said that there ought to be an item covering friends and having someone to talk to. They discussed the importance of having someone to trust and to whom one can confide problems, and that this ought to be reflected in the scale:

'If you're dealing with your problems then that's all right, but you might be dealing with them on your own. And even though you might be dealing with them well, it means that, in fact, it can probably make you feel not good in dealing with them on your own...'

An item concerning school was proposed: 'Are you doing ok at school?' maybe... (younger boy).

Other specific additions suggested included:

- 'Do you think you're being pressured into anything?' (younger girl)
- 'Are you always ready to do stuff?' (younger girl)
- 'Are you always ready to learn?' (younger girl)
- 'I have time to spare' (younger girl).

Older age groups

One group of boys noted the lack of content regarding school work and exams. Whereas the younger groups tended to relate individual items on the scale to school work and achievement, older groups discussed the absence of items pertaining to school and suggested that these be directly included. Participants suggested questions such as: 'Are you worried about GCSEs?' (older boy) and 'How do you feel you're getting on at school?' (older boy).

Further suggestions made by older participants regarding the content of the scale are noted below.

- One participant noted how one needs help from others to get through problems and difficulties and suggested the following item: 'I've had help when needed' (older boy). Another participant in the same group proposed an item concerning confidence in asking others for help. One participant suggested: 'Do you have support in taking decisions in life?' (older boy)
- Another participant suggested: 'Do you enjoy life as it is going?' (older boy)
- A further participant discussed an item regarding one's overall feeling. This was not considered to be covered by 'I've been feeling cheerful' (older girl)
- One participant suggested that 'often' be changed on the scale to fit in better between 'some of the time' and 'all of the time'.

4.2.6 Emotional response

Younger boys were very positive about the scale and said that they did not feel uncomfortable filling it out. Some acknowledged that it was personal but overwhelmingly every group thought the scale was a good thing that could potentially benefit individuals. Two groups felt that the scale made them think – in a positive way – about things that they would not normally think about. Participants considered

that the scale might make people feel happier and more upbeat by helping them focus on positive aspects of their lives:

‘And like the questions really perk you up when you think about the good things and how you’ve been feeling... Just feeling kind of so much better about yourself.’ (younger boy)

One older boy, also commented that filling out the scale can make one feel positive due to the positive nature of WEMWBS: ‘...It makes you feel positive because a lot of these questions are about positivity.’

Participants also acknowledged that completing the scale could have the opposite effect, especially if the person was unhappy at the time. However, they still considered this to be a positive outcome because it could draw the individual’s - or others’ - attention to their feeling unwell:

‘And if someone is feeling negative it might need one of these...so they might be truthful and say they’re not feeling very well.’ (younger boy)

‘...When you answer the questions you just think and answer them honestly, because when you read the question it makes you actually think about how you feel.’ (younger boy)

Older boys also discussed the possibility that an unhappy person would feel worse after completing the scale:

‘For some people that feel bad about themselves and that, it would be hard for them to answer them, like.’ (older boy)

‘I just thought about the past and that. I don’t know. It just made me a bit upset because some of the questions asked me how I’ve been and that and I think...so yes, it’s been a bit shit.’ (older boy)

All said that they filled out the scale honestly but acknowledged that this may not be the case for everyone. Participants suggested that some individuals might find it embarrassing to complete. In one group, two participants said that completing the scale did stimulate an emotional response. One commented on the fact that he had to focus upon himself (but without an overwhelmingly positive or negative impact).

The younger girls also concurred that the scale makes one think and that it was unlikely to be completed dishonestly or lightly. However, there was potential for upset should one be forced to confront unhappy feelings when completing it. Individual items such as ‘I’ve been feeling loved’ (as has been highlighted) were thought to be potentially uncomfortable for some.

Older girls were less vocal around this theme but discussion was similar to that in the other groups. Although they found some of the individual items somewhat personal e.g. ‘I’ve been feeling loved’, overall, they did not find the scale intrusive and acknowledged that the items stimulated thinking and thoughts that one would not normally have. A positive view was taken of this aspect of scale completion.

4.2.7 Possible methodological limitations

There were differences in the format and administration of the focus groups in Scotland and England. In Scotland, the facilitator briefly introduced the study, then

led a short discussion to elicit understanding of the concept of mental wellbeing, following which participants were asked to complete the WEMWBS. On the other hand, the facilitator of the groups in the English schools provided somewhat more detailed information about the study and the purpose of WEMWBS, and then asked participants to complete the scale. However, we did not identify systematic location effects in our thematic analysis, and it is unlikely that these differences in the way the focus groups were run constitute a serious limitation of the study.

Occasionally in the course of groups, tape recording transcripts suggest that participants were unintentionally guided by the facilitator during points of discussion. These instances were minor and relatively infrequent so are unlikely to have biased the outcome of discussions in a systematic manner.

School proved to be a less than ideal setting for facilitating the groups. The main problem was the limitation of discussion to the time period of a single class, which varied from school to school. Where class length was short, discussion was invariably constrained and more rushed. On one occasion discussion was halted prematurely as the end of the class was signalled.

5. Discussion

5.1 Summary of findings

Previous research had suggested that WEMWBS is a user-friendly and psychometrically sound tool for measuring mental wellbeing at a population level in adults (aged 16+) in the UK (Tennant, Hiller, Fishwick *et al.*, 2007). And since WEMWBS had already been validated and is in use in Scotland for the assessment of mental wellbeing in those aged 16 and over, we undertook this study to find out whether the scale could also be used to measure mental wellbeing of children of secondary school age. Our aim was to establish the psychometric properties of WEMWBS in teenage school students aged 13-14 and 15-16 years in two cities in England and Scotland. Teenagers completed a questionnaire which included socio-demographic details, WEMWBS and comparator scales (the Strengths and Difficulties Questionnaire (SDQ), the 12-item General Health Questionnaire (GHQ12), the WHO (Five) Well-being Index (1998 version) (WHO-5) and the Mental Health Continuum-Short Form (MHC-SF) and Kidscreen-27). A test-retest was undertaken to assess reliability of WEMWBS.

5.1.1 Sample and setting

One thousand six hundred and fifty teenagers in six schools (three in each of the two cities in Scotland and England) took part in the study. The overall response rate for the survey was 81% with 51% being girls and 49% boys. Eighty nine percent of teenagers were aged between 13 and 15 years with an additional 4.7% aged 12 years and 6% aged 16 years. Seventy eight percent of respondents were white reflecting a slightly higher mix of ethnicities in the study than was suggested for the underlying population by routine data sources. Sixty nine percent of participants had a score indicating relative affluence on the Family Affluence Scale (FAS) (score 5+). Affluence was higher than measured previously in 2001/2 in an approximately equivalent age group in Scotland and England (Currie, Molcho, Boyce *et al.*, 2008). Responses to the Kidscreen-27 physical health scale also suggested that our sample had a slightly lower level of physical health than might be anticipated from European norms although the reason for this is not clear (see Table 4.4) (Ravens-Sieberer, Auquier, Erhart *et al.*, 2007).

A valid retest sample of 212 (12.8% of the original sample) from five schools answered all 14 items in WEMWBS on both occasions, separated by the requisite less than two week period. An additional 80 teenagers selected from a variety of age, gender and ability groups participated in focus/discussion groups.

5.1.2 Summary of quantitative findings

WEMWBS scores covered the full range of possible scores (14-70), with no ceiling or floor effects and with few missing items. Both convergent and discriminant measures of construct validity gave correlation values as predicted, with strong and significant positive correlations between WEMWBS and WHO-5, the psychological well-being domain of the Kidscreen-27 and the MHC-SF scale, and strong and significant negative correlations with the SDQ total difficulties score and GHQ12 scores.

WEMWBS has strong internal consistency in this population group, with a high Cronbach's alpha and strong internal positive correlations between individual items and total scores of the remaining items. Confirmatory factor analysis demonstrated that WEMWBS contains one strong underlying factor providing evidence that WEMWBS is likely to be a homogeneous measure of one underlying construct –

mental wellbeing. This finding is consistent with WEMWBS as validated in adults. (Tennant, Hiller, Fishwick, *et al.*, 2007).

Although the high Cronbach's alpha indicates good internal consistency of the scale between items, it also suggests that there may be some item redundancy and, as in adults, it may be possible to reduce the length of the scale, although we did not formally investigate this further.

The correlation between tests and retests for WEMWBS within two weeks of original administration was slightly lower than originally anticipated with an intra class correlation coefficient of 0.66 (95% CI [0.59; 0.72] $n = 212$) suggesting a moderate correlation between individual respondents' WEMWBS scores on first and second completions. Given our large numbers and response rate, it is unlikely that this finding of a moderate correlation is a chance one. This level of correlation is lower than equivalent findings in the adult study (Tennant, Fishwick, Platt *et al.*, 2006). The finding, based as it is on correlations between scores at the individual level, may mean that WEMWBS in teenagers is subject to fluctuation at this individual level, although we have no data to support this view at this stage. Importantly, however, findings are stable at the population level for which the scale is intended.

There were no strong associations between WEMWBS and either age or gender in this group of teenagers, although we found significant associations with both the FAS score and the physical health dimension of the KIDSCREEN-27. We repeated all tests of validity and internal consistency, separately among those aged 14 years and under and those aged over 14 years. However, no difference was found by age. The strong psychometric properties of WEMWBS were replicated in both age groups. There were no independent effects of school, once socio-demographic differences had been taken into account.

5.1.3 Summary of Qualitative findings

Eighty students took part in the focus/discussion group study. The overall underlying construct of WEMWBS was understood by the majority of the teenagers taking part. Most focus group participants felt that the scale was of a suitable length and that the response categories were understandable. Table 5.1 gives a summary of findings by item.

Some individuals felt that there was some redundancy which could be removed through the amalgamation of items e.g. 'I've been interested in other people', 'I've been feeling close to other people. Conversely some suggestions were also made for additions to the scale such as: 'Are you proud of who you are and what you do?'

Table 5.1 Summary of focus group interpretations of WEMWBS Items

| Item | Overview |
|--|---|
| <i>Item 1. 'I've been feeling optimistic about the future'</i> | Varied interpretation |
| <i>Item 2. 'I've been feeling useful'</i> | Varied interpretation |
| <i>Item 3. 'I've been feeling relaxed'</i> | Understood by all groups |
| <i>Item 4. 'I've been feeling interested in other people'</i> | Difficulty of interpretation for all groups |
| <i>Item 5. 'I've had energy to spare'</i> | Difficulty of interpretation for all groups |
| <i>Item 6. 'I've been dealing with problems well'</i> | Varied interpretation |
| <i>Item 7. 'I've been thinking clearly'</i> | Varied interpretation |
| <i>Item 8. 'I've been feeling good about myself'</i> | Understood by all groups |
| <i>Item 9. 'I've been feeling close to other people'</i> | Varied interpretation |
| <i>Item 10. 'I've been feeling confident'</i> | Varied interpretation |
| <i>Item 11. 'I've been able to make up my own mind about things'</i> | Understood by all groups |
| <i>Item 12. 'I've been feeling loved'</i> | Difficulty of interpretation for all groups |
| <i>Item 13. 'I've been interested in new things'</i> | Varied interpretation |
| <i>Item 14. 'I've been feeling cheerful'</i> | Understood by all groups |

In summary, items 3, 8, 11 and 14 of WEMWBS were understood by all and thought relevant. The concepts were obviously clear to all age groups. There was difficulty in interpretation for all groups for items 4, 5 and 12. Items 1, 2, 6, 7, 9, 10 and 13 were variably interpreted. Two items appeared to be more likely to be misinterpreted by younger groups (items 1 and 7) and two items by older groups (items 10 and 13). For the other items in the variable category (items 2, 6, 9, and 10), misinterpretations occurred across age groups. Girls were more confident than boys in interpretation of items 9 and 10 and boys were mostly more confident than girls in interpretation of item 13. Items where misinterpretation or difficulty of interpretation occurred were often those where a (more mature) holistic reflective approach to oneself is called for (e.g 'thinking clearly' and 'dealing with problems well').

Several focus group participants found some of the words or terms either difficult to understand or open to misinterpretation, and some items as a whole were considered vague or unclear. Items confusing to some participants were: 'I've been feeling optimistic' and 'I've had energy to spare'. Participants also raised concerns that young people who are mentally unwell might suffer particularly negative emotional/psychological reactions when completing the scale (reinforcing their vulnerability), although conversely some reported that the scale might make teenagers feel happier and more upbeat by helping them focus on positive aspects of their lives.

The school setting for administration of the scale tended to confuse some participants, who tended to relate items to the school context, thus potentially restricting the intended scope of the wellbeing construct.

5.1.4 *Strengths and weakness of the study*

Strengths of this study include:

- both the quantitative and qualitative elements of this mixed methods study have large sample sizes
- the study had high response rates and sampling was carefully undertaken so as to be representative of the relatively diverse underlying populations of the two selected cities in two countries of the UK
- in addition, for both elements of the study, extremely careful attention to data collection, data entry, data cleaning, and to harmonisation of dual data entry alongside rigorous analysis mean that the findings can be trusted.

Possible methodological limitations include:

- Minor differences in the format and administration of both the quantitative and qualitative elements of the study between the two cities occurred. For example, timing of the administration of the pre-questionnaire information sheet varied as also did the exact format of the discussion groups. However, our failure to identify systematic location effects in our analysis either in the qualitative or quantitative results by country/city/school suggests that it is unlikely that the slight differences in the implementation of the study design constitute a serious methodological limitation.
- Administration of the questionnaire was undertaken in schools during classroom time. Although schools allowed for a relatively regimented approach to completing questionnaires within a short time period, it is potentially a less than ideal setting for facilitating both individual (questionnaire-based) and group consideration of the relatively intimate and personal issues relating to mental wellbeing. This may constrain consideration of these issues to a greater than desirable focus on the school environment in general including school work and peer attitudes and pressure. A practical issue related to the school-based focus was the limitation of discussion time to a single class/period, which varied from school to school. Where class length was short (35-40 minutes), discussion was invariably constrained and more rushed. On one occasion discussion was halted prematurely as the end of the class was signalled.
- Another practical issue relating to class based administration is that participants would have had opportunities to discuss the questionnaires and items in friendship groups after completion. If students had experienced difficulty interpreting some items, these discussions may have brought clarification and resulted in them making a different response in the test-retest situation. This could have contributed to lower than expected test-retest correlations.
- Some limitations regarding the use of focus groups as opposed to individual interviews. In this study, peer pressure was evident in some of the discussions of the concepts included in WEMWBS, potentially biasing the findings towards a more stereotyped discussion of mental wellbeing and 'feelings' and limiting exploration of the concepts, for example, two groups of girls were amused by the scale, saying that it made them laugh, and so perhaps unsurprisingly, any items that might have a link to a sexual or romantic relationship were likely to cause hilarity or embarrassment in the focus group situation in this age group. Qualitative exploration in individual interviews may have yielded a somewhat different set of findings for this particular age group of school students, more relevant to its typical (individual) mode of use.

5.2 Suitability of WEMWBS for teenagers - comparing quantitative and qualitative findings

In this research WEMWBS has been subjected to a rigorous psychometric validation process to assess its function as a measure of mental wellbeing in teenagers. It has performed well in that process. WEMWBS is currently the only solely positive single scale for measuring mental wellbeing that has been fully validated for use in the UK in a teenage population. We found no significant and consistent difference in the psychometric properties of WEMWBS between younger (aged 14 years and under) and older (aged over 14 years) teenage school students.

We found, however, a slightly lower than ideal test-retest result. This may reflect natural fluctuation in teenage mental wellbeing at a level that is greater than that seen in adults. Or it may reflect methodological issues. Whatever the cause, fluctuation in levels of teenage mental wellbeing needs to be better understood in order to assess change in mental wellbeing e.g. in response to intervention or change in circumstances. The data also tell us that there is potentially some item redundancy or overlap. Further research and analysis could therefore usefully be directed towards shortening the scale.

Perhaps surprisingly, the qualitative results from this study paint a less positive picture of the way in which WEMWBS is perceived by teenage school students than the quantitative results would suggest.

We used qualitative methods to assess face validity, one of several kinds of validity assessed in this study. Whilst the quantitative validity testing uses a process of comparing and contrasting findings from WEMWBS with findings for other similar scales using the same statistical analyses, the qualitative testing does not use this kind of direct comparison. Qualitative data provide an understanding of the range of possible responses, interpretations and problems in understanding for each item, often focusing on outliers; they do not offer insight in the representativeness or frequency of the issues raised. The results of the qualitative study suggest that whilst many participants understood most of the items, their responses to many items could be open to misinterpretation. They also highlighted some issues of comprehensibility, vocabulary, and discomfort in answering some of the questions. This aspect of our evaluation suggests that the face validity of WEMWBS in 13-15 year olds has the potential to be improved.

However, in defence of WEMWBS, it should be noted that most assessments of scales or measures do not include an in-depth, concurrent qualitative investigation and it is possible that many other scales in common use with children and young people, if assessed in this rigorous way, will reveal similar issues with face validity.

Two methodological issues need to be taken into account when interpreting our qualitative data. The first is the effect of peer pressure in this age group. It may have been better to have conducted individual interviews because of the interaction between peers as focus group participants (which can influence or override individual's reactions or views) and which may be a particular issue for teenagers in focus groups discussing sensitive issues such as those contained in WEMWBS.

The second related methodological issue is that the focus groups were conducted in schools. This gave some (especially younger) participants an erroneous impression that we were interested in mental wellbeing not holistically (as is the intention of WEMWBS) but *in relation to life at school* and this may have affected the ways in which our focus group participants responded.

In order to improve the face validity of WEMWBS, suggestions provided in the focus groups, coupled with additional analysis of the quantitative findings could be used to develop a slightly shorter scale with items phrased in a way young people find easier to relate to. The four items that performed best in the qualitative investigation would be a good starting point. This would require in the first instance more qualitative work - more focus groups and more interviewing - to develop a scale which could then be tested quantitatively against WEMWBS (and other comparators). Such a scale would be likely to be highly correlated with the original WEMWBS and give similar quantitative results.

In summary, qualitative findings suggest that care should be taken in administration of the scale in the school setting as this may confuse some participants restricting the intended more global scope of the mental wellbeing construct to a more school-based focus. The more moderate test-retest findings coupled with the qualitative results suggest to us that it would not be suitable to use WEMWBS in populations of less than 100. And our findings suggest that i) face validity could be improved, ii) that there may be some redundancy in the scale which could potentially be shortened and iii) test-retest results suggest that individual levels of mental wellbeing may fluctuate in teenagers. Taken together, these findings indicate that further research would be valuable to improve our understanding of mental wellbeing in this age group and of how best to adapt WEMWBS to measure it.

However, this study has shown that WEMWBS has very good psychometric properties compared to other scales available for measuring mental wellbeing in teenagers aged 13 years and over. It is currently the only solely positive single scale for measuring mental wellbeing which has been fully validated for use in the UK in a teenage population and is suitable for use at a population level for those aged from 13 years to adulthood.

6 Conclusions and Recommendations

WEMWBS has very good psychometric properties compared to other scales available for measuring mental wellbeing in teenagers aged 13 years and over. It is currently the only solely positive single scale for measuring mental wellbeing which has been fully validated for use in the UK in a teenage population and is suitable for use at a population level for those aged from 13 years to adulthood. Because of the more moderate test-retest findings and the qualitative results we recommend that it should not be used in small scale studies of teenagers aged 13-15 with samples less than 100.

Recommendation 1: WEMWBS is suitable for use at a population level to measure mental wellbeing in teenagers amongst those aged 13 years and over. It is safe to use in samples of over 100 people.

Our study shows that WEMWBS performs well psychometrically for teenagers aged 13-16 years. However, our qualitative findings suggest that face validity could be improved.¹¹ In addition, our findings suggest that individual levels of mental wellbeing may fluctuate in teenagers. An improved understanding of fluctuation in levels of both eudaimonic and hedonic constructs of mental wellbeing in this age group is needed. Whilst the length of the scale was acceptable, it may be possible to shorten it.

Recommendation 2: Measurement of mental wellbeing in teenagers would benefit from research to improve our understanding of this issue and to adapt WEMWBS to improve its face validity in this age group. Development of an adapted version should build on the quantitative and qualitative findings of the WAVES study as well as on other published research. Research should be undertaken simultaneously to identify and if necessary remove redundancy from WEMWBS for use with teenagers.

Qualitative findings suggested that the school setting for administration of the scale might confuse some participants who may be more likely to relate items concretely to the school context, thus restricting the intended more global scope of the mental wellbeing construct.

Recommendation 3: When WEMWBS is introduced to teenagers in a school environment, it is important to emphasise its holistic nature.

¹¹ Most assessments of scales and measures do not include an in-depth, concurrent qualitative investigation and it is possible that many other scales in common use with children and young people, if assessed in the same rigorous qualitative way might reveal similar issues with face validity.

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Appendices

Appendix 1. Ethics Committee Approval Form

Thursday, 29 May 2008

Warwick
Medical School

Dr Aileen Clarke
Associate Clinical Professor
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Warwick Medical School
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CV4 7AL

Dear *Dr Adli & Dr Clarke*

Ref: The WAVES Project - Warwick Edinburgh Mental Wellbeing Scale
(WEMWBS14) Acceptability and Validation in English and Scottish Secondary
School Students

Thank you for submitting your revisions for the above-named project to the University of Warwick Biomedical Research Ethics Sub-Committee for Chair's Approval.

The Chair is pleased to confirm that full approval has been granted and your study may commence. May I remind you that the Committee would like to receive an End of Project Report once your study is completed and be advised of any substantial amendments.

Yours sincerely,

Jane Barlow

Jane Barlow
Chair
Biomedical Research
Ethics Sub-Committee

Copy:
Lynn Green, Research Governance Facilitator

Biomedical Research Ethics Subcommittee
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THE UNIVERSITY OF
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Appendix 2. Report of the WAVES Pilot Study

Warwick-Edinburgh Mental Well-being Scale (WEMWBS): Acceptability and Validation in English and Scottish teenage school students: Report of a Pilot Study

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Abstract

Background

The promotion of positive mental health and wellbeing is a national priority in the UK. The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) is a short (14-item) positively worded scale, validated for use in large scale surveys for the assessment of mental wellbeing in those aged 16 years and over. We report here the findings of a pilot undertaken in July 2008 in which we generate hypotheses for validity testing of WEMWBS in a larger population of teenage school students in the UK.

Methods

WEMWBS and comparator scales, together with socio-demographic details, measures of affluence and self reported health, were incorporated into a questionnaire and administered to pupils in two schools in England in two year groups aged 12/13 and 14/15. Psychometric properties of the WEMWBS were investigated including Cronbach's alpha and correlations between the WEMWBS and components of the WHO-5, GHQ12, SDQ, the Mental Health Continuum-Short Form (MHC-SF) and Kidscreen-27. Individual interviews were held with eleven different students who completed the WEMWBS whilst taking part in 'think aloud' interviews.

Results

Ninety-five school students (50 boys and 45 girls) participated in the study, of whom 89 (94 %) completed all questions (49 boys and 40 girls). Mean WEMWBS score was 49.0 (SD 7.5; median 50) and range 31-65, indicating no floor or ceiling effects. Cronbach's alpha was 0.83 (95% CI (0.76; 0.88), n=89), demonstrating a satisfactory level of internal consistency. There were moderate statistically significant correlations in expected directions between WEMWBS score and comparator scales measuring mental wellbeing: WHO-5 (0.68, 95% CI [0.53; 0.79]), Psychological Wellbeing domain of the Kidscreen-27 (0.61, 95% CI [0.44; 0.75]), MHC-SF scale (total score 0.58, 95% CI [0.40; 0.72]); and SDQ total difficulties score (-0.57, 95% [-0.71; -0.39]). A slightly smaller negative correlation was observed for GHQ12 scores (scores -0.42, 95% CI [-0.59; -0.21]; Likert -0.53, 95% CI [-0.68; -0.34]). Internal correlation was high for all but one item. Completion took less than 10 minutes.

Conclusions

This pilot has shown that WEMWBS is easy to use and promising as a measure of mental wellbeing in teenagers. In general the scale is well understood and shows an appropriate range of values, with no ceiling or floor effects. Although based on a small sample, the WEMWBS appears to perform well psychometrically in teenagers in terms of both internal consistency and construct validity.

Background

The promotion of emotional, social and mental wellbeing in adolescence is a national priority in the UK, related to outcomes set out in “Every Child Matters” (Department for Children, Schools and Families, 2003) and the National Service Framework for Children (Department of Health, 2004). The National Institute for Health and Clinical Excellence in the UK has recently issued guidance recommending programmes to promote positive mental health in schools (National Institute for Health and Clinical Excellence, 2008) and the Office for Standards in Education (Ofsted) is considering a number of indicators to assess school performance in this area, including pupil self-report (Ofsted, 2008).

Mental wellbeing has been defined as a *positive and sustainable* mental state that allows individuals, groups and nations to *thrive and flourish*; it is more than the absence of mental illness. In adults mental wellbeing appears to be protective for a range of health outcomes including health related lifestyles and predictors of cardiovascular disease (Huppert and Whittington, 2003).

Mental wellbeing is associated with greater educational attainment in childhood and adolescence, and with better health and occupational functioning in adulthood (National Institute for Health and Clinical Excellence, 2008; Department of Health, 2004; Department for Children, Schools and Families, 2003). Emotional and behavioural problems are rapidly taking precedence over physical complaints as the major cause of ill health in adolescents of industrialised nations (Stewart Brown, 2005; Huppert and Whittington, 1995). Higher levels of negative emotions in early life are associated with a higher incidence of adult risk-taking, depression, and impaired social relationships (Barlow and Underdown, 2005). A systematic review demonstrated that the promotion of positive mental health during adolescence was more effective in sustaining positive wellbeing than interventions which concentrated on mental illness (Keyes, 2004).

The Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS) is a short (14-item), positively worded scale which may prove useful in determining levels of wellbeing among in order to establish the effectiveness of interventions. Validated in England and Scotland and in use in large-scale surveys in the UK and further afield for the assessment of positive mental health in over-16s, the scale has proved popular in both adult and university student focus groups, with participants reporting it easy to complete, clear and unambiguous (Tennant, Hiller, Fishwick *et al.*, 2007; Tennant, Fishwick, Platt *et al.*, 2006).

In the WAVES study (Warwick-Edinburgh Mental Well-being Scale (WEMWBS) Acceptability and Validation in English and Scottish Secondary School Students); we aim to assess the validity and reliability of the WEMWBS in a population sample of teenage school students. We report here the findings of a pilot undertaken in two schools in England in two year groups aged 12/13 and 14/15 in July 2008. Hypotheses were generated for testing in a larger survey of teenage school students in Scotland and England.

Methods

Questionnaire design and scales

A questionnaire was designed which included the WEMWBS, socio-demographic variables (age; ethnicity as recorded in the UK Census, family affluence), and comparator scales validated for use in adolescents, including the:

- World Health Organization (WHO-5) Scale (2009) (scores in the range of 0 (worst outcome) to 100 (best outcome));
- Kidscreen-27 scale (Ravens-Sieberer, Auquier, Erhart *et al.*, 2007) with five standardised domain scores with mean 50 (higher scores indicate better health states) 50 and standard deviation 10 (higher scores indicate better health states);
- Mental Health Continuum-Short Form (MHC-SF) (Keyes and Corey, 2006) summarised as total sum ranging from 0 to 70 (higher scores indicate greater flourishing) and categories “Languishing” / “Moderately mentally healthy” / “Flourishing”;
- General Health Questionnaire (GHQ)-12 (GL Assessment, 2009) (used as a score (range 0-12) and total sum (range 0-36)) using scoring and simple Likert scales respectively (higher scores indicate poorer mental health);
- Strengths and Difficulties Questionnaire (SDQ) (2009; Goodman, Meltzer and Bailey, 1998) summarised as total difficulties score which can range from 0 to 40 and four subscales (lower scores indicate fewer difficulties).
- Family Affluence Scale (FAS) (Boyce, Torsheim, Currie *et al.*, 2006) ranging from 0 to 7 (higher scores indicate more affluence) was used to measure individual socioeconomic status.

The theoretical range of scores on the WEMWBS is 14-70 (with higher scores indicating a higher level of wellbeing).

Individual “think aloud” interviews

Questionnaires including the WEMWBS scale were pre-piloted in individual “think aloud” (cognitive) interviews with six boys aged 12/13 years and five girls aged 14/15 years. The main purpose was to explore understandability and readability, and to measure time for self-completion. Questionnaires were annotated by researchers as students discussed them and their comments were noted.

Study conduct

After ethics committee approval was obtained, head teachers at two secondary schools in the West Midlands (one boys’ school and one girls’ school) were approached to participate in the study. Once consent from Head teachers was obtained, letters explaining the purpose and procedures of the study were sent to parents/carers, teachers and students two weeks prior to planned questionnaire administration. Parent/carer letters included opt-out response slips for return to the school if the parent/carer did not wish their child to take part. Students completed questionnaires during lesson times. The number of opt outs was recorded. Data were double entered into a database and harmonised.

Statistical analyses

Descriptive statistics, such as means and standard deviations, were calculated for all scales and subscales. Frequencies and percentages were computed for categorical scores. Associations between WEMWBS and socio-demographic variables were investigated in linear regression models with WEMWBS as dependent variable and the socio-demographic variables as independent variables. Factors statistically significant at the 10% level in univariate analyses were included simultaneously in a multiple linear regression model. The Kidscreen-27 physical wellbeing score and the FAS were used to investigate effects of physical health and socioeconomic status, respectively, on WEMWBS score.

Internal consistency was assessed using Cronbach's alpha (Cronbach, 1951) and calculation of Spearman's rank correlation coefficients for each item with the total of the remaining items. Confidence intervals were obtained by nonparametric bootstrap with 9,999 bootstrap replications (Davison and Hinkley, 1997). For the correlations p-values of approximate significance tests, testing the null hypothesis of "no correlation", were calculated.

Spearman's rank correlation coefficients were calculated for correlations of the WEMWBS scale, with the Kidscreen-27; the GHQ12, the WHO-5 scale, MHC-SF and the SDQ for assessment of construct validity. Again, Spearman's rank correlation coefficients were calculated with nonparametric bootstrap confidence intervals with 9,999 bootstrap replications and p-values of approximate significance tests, testing the null hypothesis of "no correlation."

Results

Sample

Questionnaires were completed by 95 out of 100 (50 boys and 45 girls) eligible school students. Five students were unavailable on the day. There were no opt outs. Table 1 gives frequencies for demographic characteristics of those participating. Ages ranged from 12 to 15 years, and participants were predominantly white (83 (87%)). Seventy-one (75%) participants scored 5 or higher on the Family Affluence Scale, indicating relative affluence.

Table 1: Socio-demographic variables: Number (percentages) (n=95)

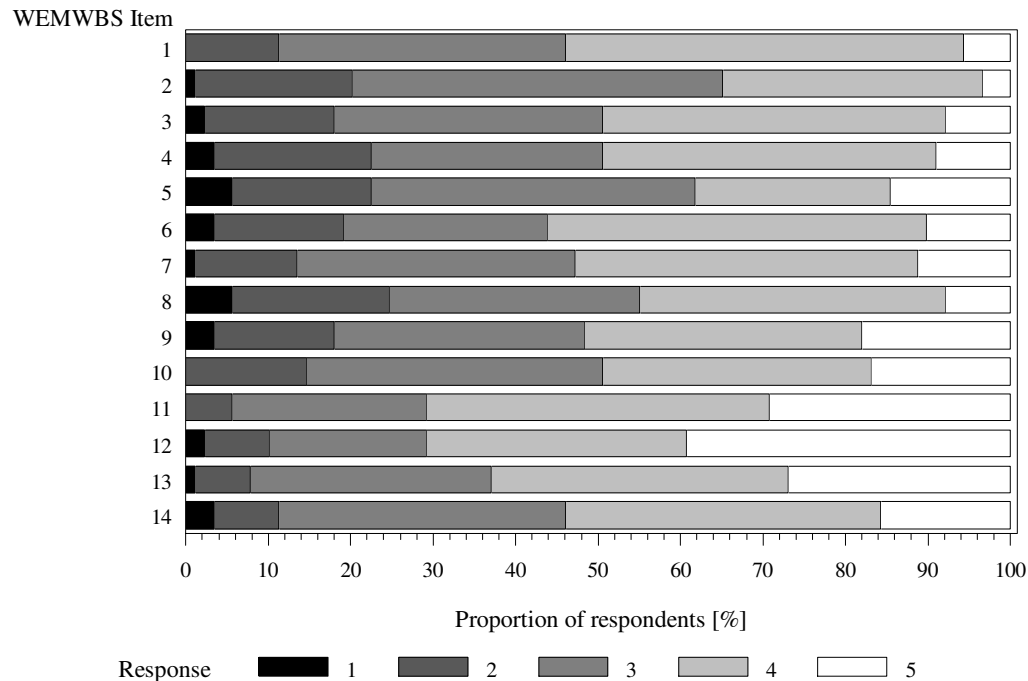
| | | N (%) |
|-------------------------------|-------------------------|--------------|
| Gender | Male | 50 (52.6) |
| | Female | 45 (47.4) |
| Age | 12 years | 7 (7.4) |
| | 13 years | 47 (49.5) |
| | 14 years | 5 (5.3) |
| | 15 years | 36 (37.9) |
| Ethnicity | White | 83 (87.4) |
| | Mixed | 5 (5.3) |
| | Asian or Asian British | 3 (3.2) |
| | Black and Black British | 4 (4.2) |
| Family Affluence Scale | 0 | 0 (0) |
| | 1 | 1 (1.1) |
| | 2 | 5 (5.3) |
| | 3 | 4 (4.2) |
| | 4 | 14 (14.7) |
| | 5 | 25 (26.3) |
| | 6 | 26 (27.4) |
| | 7 | 20 (21.1) |

Responses

89 of the 95 eligible participants (94%) completed all questions in the WEMWBS questionnaire. Five participants (5%) did not answer one of the 14 items. Three participants did not answer the item "I've been feeling good about myself." One

participant (1%) did not answer 10 of the 14 items. Figure 1 shows WEMWBS item responses. None of the participants ticked the lowest response category for item 1 (“I’ve been feeling optimistic about the future”); item 10 (“I’ve been feeling confident”) and item 11 (“I’ve been able to make up my own mind about things”).

Figure 1: WEMWBS question responses (n=89)



Findings

Descriptive statistics

Descriptive statistics for WEMWBS, GHQ12, WHO-5, SDQ, MHC-SF scale and Kidscreen-27 are given in Table 2. The mean WEMWBS score was 49.0 (SD 7.5) and the median was 50. WEMWBS scores ranged from 31 to 65 (see figure 2) indicating no floor or ceiling effects. Kidscreen-27 domain scores are standardised to give means of 50 and standard deviations of 10 in a population of European children. The means for the five Kidscreen-27 domains observed in this pilot study were lower ranging from 43.7 (95% CI [41.9; 45.6]) for the Psychological Wellbeing domain to 48.0 (95% CI [46.0; 49.9]) for the Social Support & Peers domain (Ravens-Sieberger, Auquier, Erhart *et al.*, 2007). All domain means are statistically significantly below the standard mean of 50 expected in European children. Standard deviations for the five domains are within 9 points slightly lower than expected, which means that the investigated population appears to be slightly more homogeneous than expected. Using the MHC-SF scale 8/94 (9.5%) students belonged to the “languishing” category, 54/94 (64.3%) to the “moderately mentally healthy” and 22/94 (26.2%) to the “flourishing” category.

Table 2: Scales included in the questionnaire: descriptive statistics

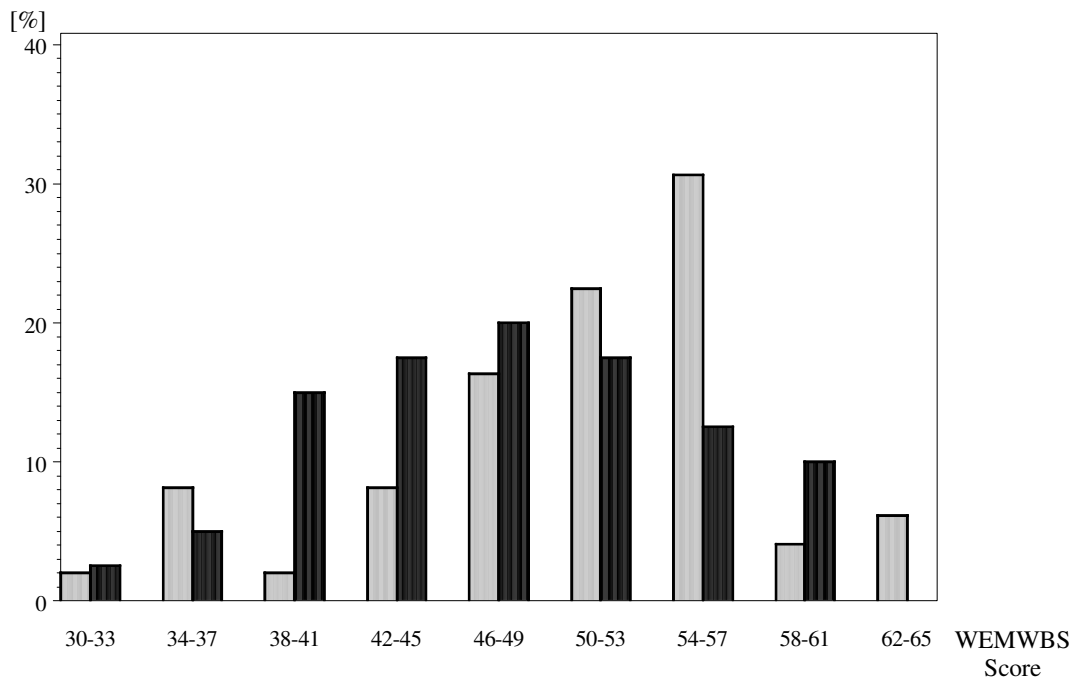
| Scale | N | Mean | Std Dev | Median | Min | Max |
|----------------------|----|------|---------|--------|------|------|
| WEMWBS | 89 | 49.0 | 7.5 | 50.0 | 31.0 | 65.0 |
| GHQ12 | 92 | 2.2 | 2.9 | 1.0 | 0.0 | 11.0 |
| GHQ12 Likert | 92 | 11.0 | 6.0 | 9.0 | 1.0 | 31.0 |
| WHO-5 | 94 | 60.0 | 18.9 | 64.0 | 8.0 | 96.0 |
| SDQ total | 92 | 12.3 | 6.1 | 12.5 | 1.0 | 26.0 |
| MHC-SF: total sum | 84 | 40.1 | 12.2 | 40.5 | 12.0 | 64.0 |
| KS27 physical | 91 | 45.2 | 10.5 | 44.7 | 14.2 | 73.2 |
| KS27 psychological | 91 | 43.7 | 8.7 | 44.8 | 20.6 | 73.5 |
| KS27 parent relation | 91 | 44.7 | 9.3 | 44.0 | 26.6 | 74.4 |
| KS27 peers | 91 | 48.0 | 9.3 | 46.9 | 31.6 | 66.3 |
| KS27 school | 92 | 43.8 | 8.7 | 42.9 | 16.3 | 62.8 |

Associations with socio-demographic variables

We investigated associations between WEMWBS total score, on the one hand, and age, gender, family affluence and physical wellbeing, on the other, initially in univariate analyses. We then included gender, family affluence and physical wellbeing in a multiple regression analyses. Mean (median) scores for boys and girls were 50.4 (52) and 47.4 (47), respectively. No statistically significant correlations of age, gender or affluence were found with WEMWBS scores in either univariate or multivariate analyses.

WEMWBS scores were on average 0.26 points higher for every point on the Kidscreen-27 Physical Wellbeing domain in univariate analysis (95% CI [0.11, 0.41], $p=0.0011$). After adjustment for gender and family affluence, the statistically significant association remained (an increase of 0.24 95% CI [0.09, 0.39] points, $p=0.0025$) in WEMWBS scores for every point on the Kidscreen-27 Physical Wellbeing domain).

Figure 2: WEMWBS scores by gender (boys: grey; girls: black).



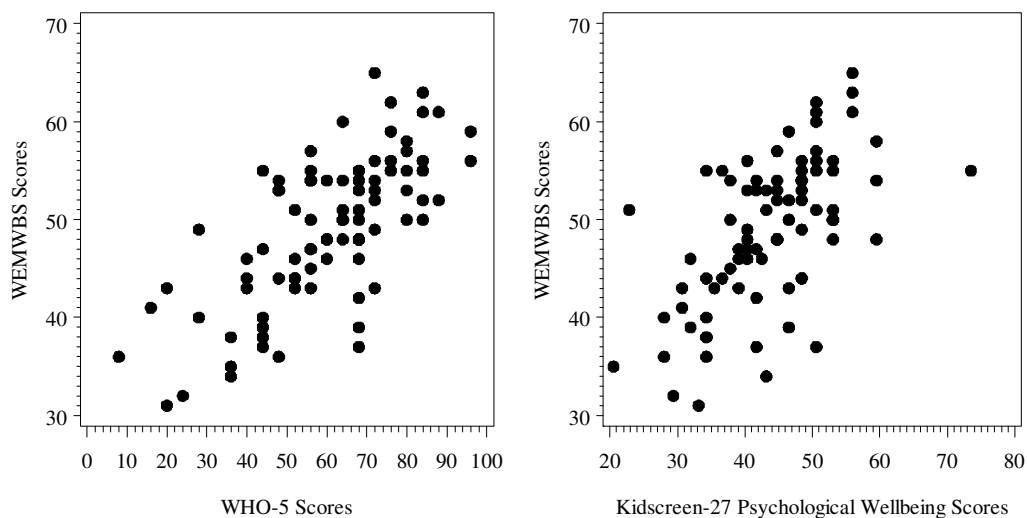
Construct Validity

Table 3 gives Spearman's rank correlation coefficients for WEMWBS with GHQ12, WHO-5, SDQ, the MHC-SF scale and the Kidscreen-27. Strong positive correlations were observed for scales measuring mental wellbeing, including WHO-5 (correlation coefficient 0.68, 95% CI [0.53; 0.79]), the Psychological Wellbeing domain of the Kidscreen-27 (0.61, 95% CI [0.44; 0.75]), and the MHC-SF scale (0.58, 95% CI [0.40; 0.72]) categories "Languishing" to "Flourishing" CC 0.55, 95% CI [0.38; 0.68]). The highest negative correlations were found for the SDQ total difficulties score (-0.57, 95% [-0.71; -0.39]) and a smaller correlation was observed for GHQ12 (Scores -0.42, 95% CI [-0.59; -0.21]; Likert -0.53, 95% CI [-0.68; -0.34]). Figure 3 illustrates scatter plots of WEMWBS versus WHO-5 and the Psychological Wellbeing domain of the Kidscreen-27.

Table 3: Association between WEMWBS and GHQ12, WHO-5, SDQ and Kidscreen-27: Spearman's rank correlation coefficients (95% confidence intervals (CI)) and p values.

| Scale | | N | Correlation | 95% CI | | p-value |
|---------------------|----------------------------|----|-------------|--------|------|---------|
| GHQ12 | Scores | 87 | -.42 | -.59 | -.21 | <0.001 |
| | Likert | 87 | -.53 | -.68 | -.34 | <0.001 |
| WHO-5 | | 88 | 0.68 | 0.53 | 0.79 | <0.001 |
| SDQ | Total | 86 | -.57 | -.71 | -.39 | <0.001 |
| MHC-SF | Total | 80 | 0.58 | 0.40 | 0.72 | <0.001 |
| | Categories | 80 | 0.55 | 0.38 | 0.68 | <0.001 |
| Kidscreen-27 | Physical Wellbeing | 85 | 0.38 | 0.16 | 0.57 | <0.001 |
| | Psychological Wellbeing | 85 | 0.61 | 0.44 | 0.75 | <0.001 |
| | Autonomy & Parent Relation | 85 | 0.52 | 0.35 | 0.66 | <0.001 |
| | Social Support & Peers | 85 | 0.43 | 0.25 | 0.58 | <0.001 |
| | School Environment | 85 | 0.46 | 0.26 | 0.63 | <0.001 |

Figure 3: WEMWBS vs. WHO5 (n=88) and Psychological Wellbeing domain of Kidscreen-27 (n=85).



Internal consistency

Cronbach's alpha for WEMWBS was 0.83 (95% CI [0.76; 0.88], n=89). The lower limit of the confidence interval lies above 0.7, demonstrating satisfactory internal consistency (Cronbach, 1951). Table 4 gives Spearman's rank correlation coefficients with 95% confidence intervals for each item with the total of the remaining items. Substantial but not excessive correlations (in the range 0.2 to 0.8) are desirable (Streiner and Norman, 2008). All correlations fall within this range with the exception of the item "I've been feeling interested in other people", which has a correlation of 0.14 with the total of the remaining items. The item "I've been feeling good about myself" has the highest correlation with the total of the remaining (CC

0.62, 95% CI [0.45; 0.76]), followed by the item “I’ve been feeling cheerful” (CC 0.58, 95% CI [0.40; 0.73]).

Table 4: Association between each WEMWBS item and the total of the remaining items: Spearman’s rank correlation coefficients (95% confidence intervals (CI)) and p-values (n=89).

| Item | Correlation | 95% CI | | p-value |
|--|-------------|--------|------|---------|
| I’ve been feeling optimistic about the future | 0.30 | 0.10 | 0.48 | 0.003 |
| I’ve been feeling useful | 0.48 | 0.31 | 0.63 | <0.001 |
| I’ve been feeling relaxed | 0.35 | 0.14 | 0.54 | <0.001 |
| I’ve been feeling interested in other people | 0.14 | -0.8 | 0.34 | 0.192 |
| I’ve had energy to spare | 0.46 | 0.26 | 0.63 | <0.001 |
| I’ve been dealing with problems well | 0.50 | 0.33 | 0.64 | <0.001 |
| I’ve been thinking clearly | 0.44 | 0.23 | 0.62 | <0.001 |
| I’ve been feeling good about myself | 0.62 | 0.45 | 0.76 | <0.001 |
| I’ve been feeling close to other people | 0.51 | 0.31 | 0.67 | <0.001 |
| I’ve been feeling confident | 0.55 | 0.39 | 0.69 | <0.001 |
| I’ve been able to make up my own mind about things | 0.55 | 0.37 | 0.70 | <0.001 |
| I’ve been feeling loved | 0.47 | 0.28 | 0.63 | <0.001 |
| I’ve been interested in new things | 0.47 | 0.28 | 0.63 | <0.001 |
| I’ve been feeling cheerful | 0.58 | 0.40 | 0.73 | <0.001 |

Individual “think aloud” interviews

Individual “think aloud” interviews were held with eleven different students (six boys aged 12/13 years and five girls aged 14/15 years). The focus of the interviews was on the vocabulary and language of the WEMWBS questionnaire and on ease of completion.

- **Vocabulary and understanding:** “Optimistic” (question 1: “I’ve been feeling optimistic about the future”) had to be defined for some students. Some took “interested in” (question 4: “I’ve been feeling interested in other people”) to mean attraction to a prospective girlfriend/boyfriend. No problems were noted with respect to understanding the meaning of other questions.
- **Validity:** Students selected for interviews indicated that they felt able to complete the WEMWBS rapidly but with balanced consideration.

Discussion

The purpose of this pilot study was to assess the validity and reliability of the WEMWBS in a population sample of school students and to generate hypotheses about the performance of the WEMWBS which would be tested in a larger sample of teenage school students in Scotland and England.

We found that WEMWBS is promising as a measure of mental wellbeing in teenagers. The scale shows an appropriate range of values, with no ceiling or floor effects. There were very few missing items. Both convergent and discriminant

measures of construct validity show values as predicted, with strong and significant positive correlations between WEMWBS and WHO-5, the psychological wellbeing domain of the Kidscreen-27 and the MHC-SF scale, and strong and significant negative correlations with the SDQ total difficulties score and GHQ12 scores.

We have shown that WEMWBS has strong internal consistency with this population group, with a high Cronbach's alpha and strong internal positive correlations between individual items and total scores except for one item ("I've been feeling interested in other people"). (This was also an item which appeared to be misinterpreted in pre-piloting interviews).

If these results are replicated in a larger study, it may prove appropriate to make minor adjustments to the wording. Whilst there was a high response rate, the study sample was relatively small and was undertaken in two single sex schools (resulting in the possible confounding of gender and school). Therefore, we are not able to draw definitive conclusions about socio- demographic factors associated with wellbeing in teenagers.

Conclusions

The pilot study has provided invaluable information and insight regarding the methods and analyses for the larger study, which is underway, and which includes mixed secondary schools. The following hypotheses should be tested in the larger study:

- All items are comprehensible and unambiguous in this population
- The scale measures a single underlying construct
- There is no association of WEMWBS with age, gender or Family Affluence when adjusted for other relevant socio-demographic variables
- WEMWBS scores are positively associated with physical wellbeing measured using the Kidscreen-27 Physical Wellbeing domain.

In the larger study, we anticipate substantial and statistically significant positive correlations between the WEMWBS and WHO-5, the psychological wellbeing domain of the Kidscreen-27 and the MHC-SF scale and substantial and statistically significant negative correlations with the SDQ total difficulties score and GHQ12 scores. We, also, anticipate a high Cronbach's alpha and strong internal positive correlations between individual items and total scores.

For the item "I've been feeling interested in other people" we hope to identify whether misinterpretation, as found in the pilot, is reflected in a wider population group of teenagers. Both criterion validity and reliability testing are also needed.

Previous psychometric testing in university students has shown WEMWBS to be a valid and reliable measure of wellbeing (Tennant, Hiller, Fishwick *et al.*, 2007; Tennant, Fishwick, Platt *et al.*, 2006). Given our findings so far, WEMWBS, a short and easy to use 14-item positively worded scale of mental wellbeing, appears to show promise for use among teenage school students also.

Competing interests

None

Authors' contributions

AC: design, data collection and analyses, critical revisions

YA: design, data collection

TF: statistical analyses

JA: design, data collection and critical revisions

SM: data collection, management and analyses

SP: design, analyses and critical revisions

SSB: design and critical revisions

AB: data collection

RP: data collection and analyses

JP:

All authors contributed to, read and approved the manuscript.

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The opinions expressed in this publication are those of the authors and are not necessarily those of NHS Health Scotland

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Additional files

Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

Below are some statements about feelings and thoughts. Please tick the box that best describes your experience of each over the **last 2 weeks**.

| STATEMENTS | None of the time | Rarely | Some of the time | Often | All of the time |
|--|------------------|--------|------------------|-------|-----------------|
| I've been feeling optimistic about the future | 1 | 2 | 3 | 4 | 5 |
| I've been feeling useful | 1 | 2 | 3 | 4 | 5 |
| I've been feeling relaxed | 1 | 2 | 3 | 4 | 5 |
| I've been feeling interested in other people | 1 | 2 | 3 | 4 | 5 |
| I've had energy to spare | 1 | 2 | 3 | 4 | 5 |
| I've been dealing with problems well | 1 | 2 | 3 | 4 | 5 |
| I've been thinking clearly | 1 | 2 | 3 | 4 | 5 |
| I've been feeling good about myself | 1 | 2 | 3 | 4 | 5 |
| I've been feeling close to other people | 1 | 2 | 3 | 4 | 5 |
| I've been feeling confident | 1 | 2 | 3 | 4 | 5 |
| I've been able to make up my own mind about things | 1 | 2 | 3 | 4 | 5 |
| I've been feeling loved | 1 | 2 | 3 | 4 | 5 |
| I've been interested in new things | 1 | 2 | 3 | 4 | 5 |
| I've been feeling cheerful | 1 | 2 | 3 | 4 | 5 |

“Warwick-Edinburgh Mental Well-being Scale (WEMWBS). ©NHS Health Scotland, University of Warwick and University of Edinburgh, 2006, all rights reserved.”

Appendix 3. Questionnaire

WAVES

Questionnaire consent form

Please
Tick ✓
these
boxes

| | |
|--|--|
| 1. I have read and understood the information sheet for the WAVES study and have been able to ask questions. | |
| 2. I understand that I can choose whether I take part or not. If I don't want to take part any more I can stop at any time, without giving any reasons. This will not affect the way I am treated at school. | |
| 3. I understand that my answers will be made anonymous and that the study team will not allow anyone - including my teachers and parents/carers - to know what my answers are. | |
| 4. I understand that in the summer, after I have completed the questionnaire, the study team will use my SATs or GCSEs results anonymously to look at links between test results and wellbeing. | |
| 5. I understand that anonymous information will be used in reports by researchers but it will not be possible to identify me in these reports. | |
| 6. I agree to take part in this study | |

Print Your Name Here _____ Date _____

Signature _____

Print the name of your school here _____

Print the name of form/class/tutor group here _____

WAVES

This questionnaire is about mental wellbeing in young people – we hope you enjoy filling it in.

It is strictly confidential

- The questions inside are for you to answer on your own.
- Although some questions may sometimes seem to repeat each other, please ***try to answer every question.***
- At the back of the questionnaire, you will find **meanings of some of the words** used in the different questions.
- Some of the questions refer to different time periods, ***e.g. in the past two weeks.***
- Please ***read the instructions*** at the beginning of each set of questions.
- We are ***really interested*** in your ***honest*** answers.
- We will **NOT** tell anyone what your answers are.
- The information will **NOT** be seen by your parents/carers or teachers.

Thank you for taking part

How to answer the questions

- Please read each question carefully
- Most of the questions can be answered by putting a tick ✓ in the box that applies to you like this:

Yes ☒ 1

No ☐ 1

- If it is difficult to choose, put a tick in the box that is most true for you at the time.
- Sometimes you should write an answer
- Please write clearly and in big letters on the line (see below).

Q. How many rooms other than the kitchen, bathroom and hall does your home have? Three

- If you want to change an answer just cross it out and put in the new answer as clearly as you can.

1

Some questions about you

Remember all the questions are confidential:

Q.1 Are you a boy or a girl
Tick ONE box

Boy

☐
1

Girl

☐
2

Q.2 How old are you in **years**?
Tick ONE box

12 years

☐
1

13 Years

☐
2

14 years

☐
3

15 years

☐
4

16 Years

☐
5

**More than
16**

☐
6

Q.3 Your Full Post Code

If you know your post code please fill it in here – if you only know part of it e.g. CV4 or EH8, please fill in as much as you can

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

Q.4 Choose ONE section then tick the appropriate box to indicate your ethnic background

Tick(✓) ONE box only

| | | | | |
|--|-------------------------------|--|---|--|
| | White | British <input type="checkbox"/> 01 | Irish <input type="checkbox"/> 02 | Any other White background <input type="checkbox"/> 03 |
| | Mixed | White and Black Caribbean <input type="checkbox"/> 04 | White and Black African <input type="checkbox"/> 05 | White and Asian <input type="checkbox"/> 06 |
| | Asian or Asian British | Any other Mixed background <input type="checkbox"/> 07 | Indian <input type="checkbox"/> 08 | Pakistani <input type="checkbox"/> 09 |
| | Black or Black British | Bangladeshi <input type="checkbox"/> 10 | Other Asian <input type="checkbox"/> 11 | |
| | Chinese | Caribbean <input type="checkbox"/> 12 | African <input type="checkbox"/> 13 | Black Other <input type="checkbox"/> 14 |
| | Other | <input type="checkbox"/> 15 | | |
| | | <input type="checkbox"/> 16 | | |

Q.5 Does your family own a car, van or truck?
Tick ONE box

| | | |
|-------------------------------------|---|---|
| No <input type="checkbox"/> 1 | Yes, One <input type="checkbox"/> 2 | Yes, two or more <input type="checkbox"/> 3 |
|-------------------------------------|---|---|

Q.6 Do you have your own bedroom for yourself?
Tick ONE box

| | |
|-------------------------------------|--------------------------------------|
| No <input type="checkbox"/> 1 | Yes <input type="checkbox"/> 2 |
|-------------------------------------|--------------------------------------|

Q.7 During the past 12 months, how many times did you travel away on holiday with your family?

| | | | |
|---|---------------------------------------|--|--|
| Not at all <input type="checkbox"/> 1 | Once <input type="checkbox"/> 2 | Twice <input type="checkbox"/> 3 | More than twice <input type="checkbox"/> 4 |
|---|---------------------------------------|--|--|

Q.8 How many computers does your family own?
Tick ONE box

| | | | |
|---------------------------------------|--------------------------------------|--------------------------------------|--|
| None <input type="checkbox"/> 1 | One <input type="checkbox"/> 2 | Two <input type="checkbox"/> 3 | More than two <input type="checkbox"/> 4 |
|---------------------------------------|--------------------------------------|--------------------------------------|--|

Q.9 Do you have any long-standing illness or disability? This means a health problem that has troubled you over a period of time.
Tick ONE box

| | |
|--|---|
| No <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> | Yes <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">2</div> |
|--|---|

If Yes, complete below

Do you have any of these health problems?

* ☒ ALL that you have*

| | |
|-------------------------------|---|
| Asthma | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Eczema | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Epilepsy | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Diabetes | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Hearing problems | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Eyesight problems | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Hay fever | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Chronic Fatigue Syndrome / ME | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Back pain | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Sickle Cell Disease | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |
| Thalassaemia | <input style="width: 40px; height: 30px; border: 1px solid black;" type="checkbox"/> <div style="text-align: right; font-size: small;">1</div> |

Other health problem/s (please write)



2

Below are some statements about feelings and thoughts.

Please tick (✓) the box that best describes your experience of each over the **last 2 weeks**

| STATEMENTS | None of the time | Rarely | Some of the time | Often | All of the time |
|--|---------------------------|--------|---------------------------|-------|--------------------------|
| I've been feeling optimistic about the future | 1 | 2 | 3 | 4 | 5 |
| I've been feeling useful | 1 | 2 | 3 | 4 | 5 |
| I've been feeling relaxed | 1 | 2 | 3 | 4 | 5 |
| I've been feeling interested in other people | 1 | 2 | 3 | 4 | 5 |
| I've had energy to spare | 1 | 2 | 3 | 4 | 5 |
| I've been dealing with problems well | 1 | 2 | 3 | 4 | 5 |
| I've been thinking clearly | 1 | 2 | 3 | 4 | 5 |
| I've been feeling good about myself | 1 | 2 | 3 | 4 | 5 |
| I've been feeling close to other people | 1 | 2 | 3 | 4 | 5 |
| I've been feeling confident | 1 | 2 | 3 | 4 | 5 |
| I've been able to make up my own mind about things | 1 | 2 | 3 | 4 | 5 |
| I've been feeling loved | 1 | 2 | 3 | 4 | 5 |
| I've been interested in new things | 1 | 2 | 3 | 4 | 5 |
| I've been feeling cheerful | 1 | 2 | 3 | 4 | 5 |

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3

Please read this carefully:

We should like to know how your health has been in general over **the past few weeks**. Please answer ALL the questions by ticking the box (✓) which you think it applies to you most.

Tick ONE box

| | Better than usual | Same as usual | Less than usual | Much less than usual |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Q.1 Been able to concentrate on whatever you're doing? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

Tick ONE box

| | Not at all | No more than usual | Rather more than usual | Much more than usual |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Q.2 Lost much sleep over worry? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

Tick ONE box

| | More so than usual | Same as usual | Less useful than usual | Much less useful |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Q.3 Felt you were playing a useful part in things? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

Tick ONE box

| | More so than usual | Same as usual | Less so than usual | Much less capable |
|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Q.4 Felt capable of making decisions about things? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

Tick ONE box

| | Not at all | No more than usual | Rather more than usual | Much more than usual |
|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Q.5 Felt constantly under strain? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

| | | | | | |
|------------|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | | Tick ONE box | | | |
| | | Not at all | No more than usual | Rather more than usual | Much more than usual |
| Q.6 | Felt you couldn't overcome your difficulties? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

| | | | | | |
|------------|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | | Tick ONE box | | | |
| | | More so than usual | Same as usual | Less so than usual | Much less than usual |
| Q.7 | Been able to enjoy your normal day-to-day activities? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

| | | | | | |
|------------|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | | Tick ONE box | | | |
| | | More so than usual | Same as usual | Less able than usual | Much less Able |
| Q.8 | Been able to face up to your problems? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

| | | | | | |
|------------|-------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | | Tick ONE box | | | |
| | | Not at all | No more than usual | Rather more than usual | Much more than usual |
| Q.9 | Been feeling unhappy and depressed? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

| | | | | | |
|-------------|-------------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | | Tick ONE box | | | |
| | | Not at all | No more than usual | Rather more than usual | Much more than usual |
| Q.10 | Been losing confidence in yourself? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

| | | | | | |
|-------------|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | | Tick ONE box | | | |
| | | Not at all | No more than usual | Rather more than usual | Much more than usual |
| Q.11 | Been thinking of yourself as a worthless person? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

| | | | | | |
|-------------|---|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| | | Tick ONE box | | | |
| | | More so than usual | About same as usual | Less so than usual | Much less than usual |
| Q.12 | Been feeling reasonably happy, all things considered? | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 |

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4

Please indicate for each of the five statements which is closest to how you have been feeling over the **last two weeks**. Notice that higher numbers mean better well-being.

Example: If you have felt cheerful and in good spirits more than half of the time during the last two weeks, put a tick in the box with the number 3.

| | <i>Over the last two weeks</i> | All of the time | Most of the time | More than half of the time | Less than half of the time | Some of the time | At no time |
|---|---|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|---------------------------------------|
| 1 | I have felt cheerful and in good spirits | <input type="checkbox"/> ₅ | <input type="checkbox"/> ₄ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₀ |
| 2 | I have felt calm and relaxed | <input type="checkbox"/> ₅ | <input type="checkbox"/> ₄ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₀ |
| 3 | I have felt active and vigorous | <input type="checkbox"/> ₅ | <input type="checkbox"/> ₄ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₀ |
| 4 | I woke up feeling fresh and rested | <input type="checkbox"/> ₅ | <input type="checkbox"/> ₄ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₀ |
| 5 | My daily life has been filled with things that interest me | <input type="checkbox"/> ₅ | <input type="checkbox"/> ₄ | <input type="checkbox"/> ₃ | <input type="checkbox"/> ₂ | <input type="checkbox"/> ₁ | <input type="checkbox"/> ₀ |

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5

For the next few questions:

for each item, please mark the box for Not True, Somewhat True or Certainly True. It would help us if you answered all items as best you can even if you are not absolutely certain or the item seems daft! Please give your answers on the basis of how things have been for you **over the last six months**

| | Not True | Somewhat True | Certainly True |
|--|----------------------------|----------------------------|----------------------------|
| I try to be nice to other people. I care about their feelings | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I am restless, I cannot stay still for long | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I get a lot of headaches, stomach-aches or sickness | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I usually share with others (food, games, pens etc.) | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I get very angry and often lose my temper | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I am usually on my own. I generally play alone or keep to myself | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I usually do as I am told | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I worry a lot | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I am helpful if someone is hurt, upset or feeling ill | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I am constantly fidgeting or squirming | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I have one good friend or more | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I fight a lot. I can make other people do what I want | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I am often unhappy, down-hearted or tearful | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Other people my age generally like me | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I am easily distracted, I find it difficult to concentrate | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I am nervous in new situations. I easily lose confidence | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I am kind to young children | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I am often accused of lying or cheating | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Other children or young people pick on me or bully me | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I often volunteer to help others (parents, teachers, children) | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I think before I do things | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I take things that are not mine from home, school or elsewhere | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I get on better with adults than with people my own age | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I have many fears, I am easily scared | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| I finish the work I'm doing. My attention is good | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 |
| Do you have any other comments or concerns? | | | |

Overall, do you think that you have difficulties in one or more of the following areas:

- Emotions, concentration, behaviour or being able to get on with other people

| No | Yes – minor difficulties | Yes – definite difficulties | Yes – severe difficulties |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> |

If you have answered “Yes”, please answer the following questions about these difficulties:

- How long have these difficulties been present?

| Less than a month | 1-5 months | 6-12 months | Over a year |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> |

- Do these difficulties distress you?

| Not at all | Only a little | Quite a lot | A great deal |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> |

- Do the difficulties interfere with your everyday life in the following areas?

| | Not at all | Only a little | Quite a lot | A great deal |
|--------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| HOME LIFE | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> |
| FRIENDSHIPS | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> |
| CLASSROOM LEARNING | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> |
| LEISURE ACTIVITIES | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> |

- Do these difficulties make it harder for those around you (family, friends, teachers, etc.)?

| Not at all | Only a little | Quite a lot | A great deal |
|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> |

6

Please answer the following questions about how you have been feeling **in the past month**. Place a tick in the box that best represents how often you have experienced or felt the following:

| In the past month, how often did you feel | NEVER | ONCE OR TWICE | ABOUT ONCE A WEEK | 2 OR 3 TIMES A WEEK | ALMOST EVERY DAY | EVERY DAY |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. happy | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. interested in life | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. satisfied | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. that you had something important to contribute to society | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. that you belonged to a community (like a social group, your school, or your neighbourhood) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. that our society is becoming a better place | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. that people are basically good | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. that the way our society works made sense to you | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. that you liked most parts of your personality | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 10. good at managing the responsibilities of your daily life | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 11. that you had warm and trusting relationships with other children | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 12. that you had experiences that challenged you to grow and become a better person | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13. confident to think or express your own ideas and opinions | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 14. that your life has a sense of direction or meaning to it | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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7

1. Physical Activities and Health

In general, how would you say your health is?

- | | |
|--------------|--------------------------------|
| 1. excellent | <input type="text" value="1"/> |
| very good | <input type="text" value="2"/> |
| good | <input type="text" value="3"/> |
| fair | <input type="text" value="4"/> |
| poor | <input type="text" value="5"/> |

Thinking about the last week...

- | | | | | | |
|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| | not at all | slightly | moderately | very | extremely |
| 2. Have you felt fit and well? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 3. Have you been physically active (e.g. running, climbing) | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 4. Have you been able to run well? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |

Thinking about the last week...

- | | | | | | |
|----------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| | Never | seldom | quite often | very often | always |
| 5. Have you felt full of energy? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |

2. General Mood and Feelings about Yourself

Thinking about the last week...

- | | not at all | slightly | moderately | very | extremely |
|----------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 1. Has your life been enjoyable? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |

Thinking about the last week...

- | | never | seldom | quite often | very often | always |
|----------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 2. Have you been in a good mood? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 3. Have you had fun? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |

Thinking about the last week...

- | | never | seldom | quite often | very often | always |
|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 4. Have you felt sad? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 5. Have you felt so bad you didn't want to do anything? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 6. Have you felt lonely? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 7. Have you been happy with the way you are? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |

3. Family and Free Time

Thinking about the last week...

| | never | seldom | quite often | very often | always |
|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 1. Have you had enough time for yourself? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 2. Have you been able to do the things that you want to do in your free time? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 3. Have your parent(s) had enough time for you? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 4. Have your parent(s) treated you fairly? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 5. Have you been able to talk to your parent(s) when you wanted to? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 6. Have you had enough money to do the same things as your friends? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 7. Have you had enough money for your expenses? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |

4. Friends

Thinking about the last week...

| | never | seldom | quite often | very often | always |
|---|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 1. Have you spent time with your friends? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 2. Have you had fun with your friends? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 3. Have you and your friends helped each other? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 4. Have you been able to rely on your friends? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |

5. School and Learning

Thinking about the last week...

| | not at all | slightly | moderately | very | extremely |
|------------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 1. Have you been happy at school? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 2. Have you got on well at school? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |

Thinking about the last week...

| | never | seldom | quite often | very often | always |
|--|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| 3. Have you been able to pay attention? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |
| 4. Have you got along well with your teachers? | <input type="text" value="1"/> | <input type="text" value="2"/> | <input type="text" value="3"/> | <input type="text" value="4"/> | <input type="text" value="5"/> |

Meanings of some words

| Where is it | What's the word | What it means |
|---------------------|-----------------------------------|--|
| Information section | Anonymous | Unnamed. Not traceable to a person's own name |
| | Confidential | Kept carefully. Confidential information is only released to specified individuals |
| Section 1. | | |
| Q.4 | Ethnic background | Race or ethnicity |
| Q.7 | On holiday | Means away from home – staying in a hotel, tent, cottage, B&B or with family or friends |
| Q.9 | Thalassaemia | An inherited blood disorder that people from the Mediterranean (e.g. Cyprus) can suffer from |
| Section 2. | Feeling optimistic | Expecting the best |
| | Interested in other people | Wondering how other people (e.g. family, friends) are; how they're getting on |
| Section 4. | Vigorous | Full of energy |
| Section 5. | Squirming | Wriggling, feeling restless |
| Section 6. | Society | School, community, family, friends, neighbourhood |
| Section 7. | Seldom | Not very often |
| | Your own expenses | Your own necessities, food, clothes etc. |

Thank you

That's it!

Thank you for taking part!

Thinking about well-being can be a positive experience but it may make you feel upset or uncomfortable. If you would like to discuss these feelings, you could talk to:

- your parent(s), carer(s) or guardian(s)
- or the researcher Yaser Adi 024761 50507 or email y.adi@warwick.ac.uk
- or your school counsellor

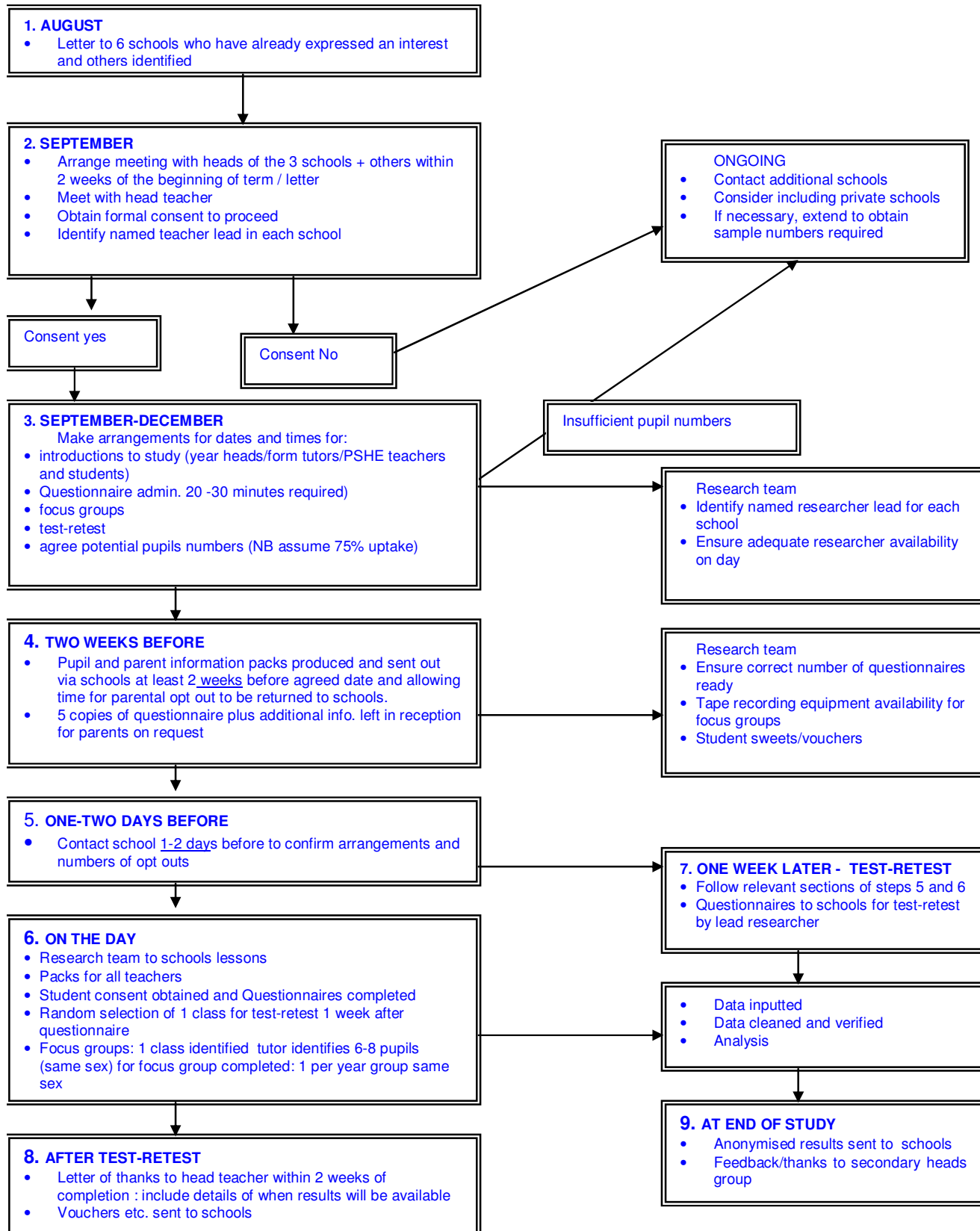
Or if you prefer you can

- call ChildLine on 0800 1111
- or you can visit www.there4me.com/ or email jo@samaritans.org

Thank you very much for helping us. We will let you know the results for your class and your school as soon as we can.

For more information about this study please contact:
Yaser Adi on 024761 50507 or email y.adi@warwick.ac.uk

Appendix 4. Flow chart for WAVES Study in schools



Arrangement prior to the day of collecting the data and on the day

1. PRIOR TO THE DAY

- Agreement of process with head teacher/ named lead
- Raise awareness amongst students
- Briefing session for teachers prior to questionnaires
- Clear agreement re arrangements for discussion groups; test and re- test randomly identified
- Ensure all information to parents/ pupils sent 2 weeks before
- Ensure quiet room for discussion groups
- Identify class for selection for discussion gp same sex same age group; ask class teacher to select mixed ability/ ethnic gps/ ages
- Check with the school 2 days before that arrangements are in place
- Approx numbers per class for questionnaire distribution

2. ON THE DAY

- One class for each year group randomly identified fro test- re –test done prior to commencement of questionnaires
- Complete template inc. opt outs received, refusals/ absent and total no of pupils (male and female) for each class and names?
- Questionnaires and briefing notes to all class teachers inc. 2 sealable envelopes to place completed consent (torn off before commencing questionnaire) in one sealed envelope
- completed questionnaire (NB if 1st lesson meet with teachers 5 mins before lesson starts) in sealed envelope
- 6-8 pupils, identified by class teacher, removed for discussion groups at the same time: same sex same age group
- Sealed envelopes for consent and separate ones for completed questionnaire collected
- Templates per class collected in.

Arrangements for test retest

ON THE DAY

- Obtain consent of students
- Collect consents
- Ensure that those who complete test re test have
- Previously completed the questionnaire
- Not participated in discussion group
- NOT opted out of the research
- Collect completed questionnaires
- Seal in envelope

Appendix 5. Parents information and opt out



The WAVES Study Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) - Measuring Mental Wellbeing of English and Scottish Secondary School Students Parent/Carers information sheet

Dear Parent/Carer

We are inviting pupils from Years 9 (aged 13/14) and Year 11 (aged 15/16) at your child's school to take part in a research study being conducted by Warwick & Edinburgh Universities. The purpose of our research is to improve understanding of feelings about mental wellbeing, and find better ways to measure it. This information sheet explains what will happen in the study. All information will be treated in the strictest confidence and no child taking part in the study will be identified.

Before you decide whether your child should take part, it is important that you understand why the research is being done and what it will involve. Please take time to read this information carefully and discuss it with others, if you wish.

Why are we doing this study?

Health researchers use scales to measure things. WEMWBS, which measures mental wellbeing, has been tested for people over 16. In this study we want to see if WEMWBS can work in younger teenagers. We are testing WEMWBS to see whether it can be used in national surveys of teenagers in Scotland and England.

Why has my child been chosen to take part?

We are conducting this study in Birmingham, Coventry and Edinburgh secondary schools and your child's school has agreed to take part.

What does the research involve?

One of our researchers Aileen Clarke, Yaser Adi, Jacquie Ashdown, or Steve Martin will attend one of your child's lessons in the next 2 weeks. Your child will have been given information about the study and if he or she is happy to take part, the researcher will ask them to sign a consent form. Then students will either be given a questionnaire to complete (which takes about 30 minutes) or a small number (6-8 per year group) will be invited to attend a group

discussion (about 45 minutes) to tell us what they think about the WEMWBS scale.

About a week after completion of the questionnaire we will ask a small number of children to repeat the questionnaire to check its reliability. Both the questionnaire and the group discussion will be about mental wellbeing.

After the questionnaire/group discussion

In the summer, after your child has completed the questionnaire, and at the end of the school year, we will use a code to look anonymously at their results for either SATs or GCSEs. No individual person's results will be given to us - but this will help us to look at the links between wellbeing and how people do in tests and exams.

Does your child have to take part?

We very much hope you will encourage your child to take part in the study but taking part in the research is entirely up to you and your child. Both you and your child are free to opt out at any time.

What happens if I do not want my child to take part?

If you do not want your child to take part, please fill in the form at the end of this letter and return to the school office. The school will arrange an alternative lesson/activity for the session. There is no pressure to take part in this study.

Who is paying for this research?

This study is funded by NHS Health Scotland.

Can I see my child's answers?

No, but you can request a blank copy of the questionnaire if you wish.

What will happen to the results of the study?

All the results of this research will be kept completely anonymous at all times. None of the other pupils, staff or headteachers will know your child's answers to the questionnaire.

The overall findings of the study will be written in an anonymised report for NHS Health Scotland. They will use this information to decide whether to use WEMWBS in national surveys in teenagers in Scotland and England in the future. The anonymous results will also be published in journals and presented at conferences. We will send an overall summary of the results to the school including a comparison with the schools in Birmingham, Coventry and Edinburgh which are also taking part.

Will what your child says affect how he or she is treated at school?

The head teacher has agreed to your child's school being involved in the study. Whatever your child says will not be reported back to any of their teachers or to anyone at the school. Your child will not be treated any differently at school if you or they decide that they do not want to participate.

Does the research have ethics committee approval?

This research has been fully approved by Warwick Biomedical Research Ethics Committee and all the researchers have full Criminal Records Bureau (CRB) clearance for the project.

Does my child know about the study?

Yes, they will be given an information sheet like this one at school.

Can I change my mind about my child taking part?

You can change your mind about your child taking part in the study at any time. You can telephone Yaser Adi on 02476150507 or let the school know.

What do I do next?

If you are happy for your child to take part in this research you do not need to do anything.

If you would **NOT** like your child to take part, then please complete the OPT-OUT form attached to this sheet and return it to the school within ten days of receiving this letter.

Please feel free to discuss the study with school staff, your child or with the researcher - Yaser Adi on 02476150507.

Where can I get more information from?

If you would like to know more about this study or if you have any other questions, you can telephone Yaser Adi on 02476150507 or email y.adi@warwick.ac.uk

Thank you for taking the time to read this information

OPT OUT Form

Title of Project: The WAVES Study - Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) - Measuring Mental Wellbeing of English and Scottish Secondary School Students

If you would prefer your child NOT to take part in the study, please sign the form below and return it to your child's form teacher at school within ten days.

- I confirm that I have read and understood the attached information sheets relating to my child filling in a questionnaire or taking part in a discussion group as part of the WAVES Study
- I understand that the information from this project will be kept completely anonymous and confidential at all times and that any reports from this project will NOT reveal the identity of my child.
- I understand that taking part in this study is a choice and that my child can withdraw at any time without giving a reason and without being treated differently at school or disadvantaged in any way.

.....

.....

I would like to opt my child out of this study.

I **do not** consent to my child taking part in the WAVES Study

Name of Parent/Guardian/Carer _____ Date _____

Signature _____

Name of child _____

Form/ tutor group _____

Appendix 6. Students information and consent



The WAVES Study

Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) - Measuring Mental Wellbeing of English and Scottish Secondary School Students Student Information Sheet

Hello!

You are invited to take part in a research study being conducted by Warwick & Edinburgh Universities. Its purpose is to improve our understanding of mental wellbeing, and find better ways to measure it. This information sheet explains what will happen in the study. All information will be treated in the strictest confidence. It will not be possible to identify you or any other student taking part in the study in published results.

Before you decide whether to take part it is important that you understand why the research is being done and what it will involve.

Please take time to read this information carefully to decide whether or not you would like to take part. You might want to discuss it with others (e.g. teacher, friend, parent/guardian/carer).

Why are we doing this study?

Health researchers use scales to measure things. WEMWBS, which measures mental wellbeing, has been successfully used with people over 16 years old. In this study we want to see if WEMWBS can work equally well in younger teenagers. If this study is successful WEMWBS will be used in national surveys of young people in Scotland and England.

Why have I been chosen for this study?

We are conducting this study in Birmingham, Coventry and Edinburgh secondary schools and your school has agreed to take part.

We are inviting you because you are the right age to take part in this research.

What does the research involve?

One of our researchers Aileen Clarke, Yaser Adi, Jacquie Ashdown, or Steve Martin will attend a teaching session very soon. If you decide to take part, the researcher will ask you to sign a consent form and either complete a questionnaire or take part in a group discussion.

What does the questionnaire involve?

The questionnaire contains questions about you (e.g. your age) and about your health and mental wellbeing. There are no right or wrong answers. We just want to find out

what you think. If you are happy to take part, you should complete the consent form and then the rest of the questionnaire. Once completed, the consent form and questionnaire should be given back to the researcher (or teacher) who will put it in a sealed envelope. A very small number of students will be asked to complete one small section of the questionnaire (the WEMWBS itself) the following week, to see if there has been any change.

What does a group discussion involve?

We will also invite a few students (about 16 per school) to take part in a discussion group with a member of the research team to tell us what they think of the WEMWBS. The group lasts for 30-40 minutes and will be about mental wellbeing. The discussion will be recorded. We need to do this so that we have a record of what people said, but recordings will be anonymised and destroyed after we have used them.

After the questionnaire/group discussion

In the summer, after you have completed the questionnaire, and at the end of the school year, we will use a code to look anonymously at your results for either SATs or GCSEs.

No individual person's results will be given to us - but this will help us to look at the links between wellbeing and how people do in tests and exams.

Do I have to take part?

Although we very much hope you will take part in the study, it is completely your choice whether you take part or not.

What happens if I don't want to take part?

If you do not want to take part, the school will arrange another activity for you during that teaching session.

What will happen to the results of the research study?

The results will be written up by the researchers and a report will be produced for NHS Health Scotland. Results will also be published in journals and presented at conferences.

Your school will be given a summary of the overall results, together with information about results from other schools in Birmingham, Coventry and Edinburgh that have taken part in the project.

Will my answers to the questionnaire or the group discussion affect how I am treated at school?

Not at all. Your headteacher has agreed to you and your school being involved in the study. Neither your headteacher nor your teachers nor your parents can find out what answers you gave. You will not be treated any differently if you decide not to take part in the study.

Will we pay you for taking part?

No - but we will be giving some money to the school for library books.

Who is paying for this research?

This research is funded by NHS Health Scotland

Could taking part in this study upset me?

Thinking about mental well-being can be a positive experience but it may also make you feel upset or uncomfortable. If you are affected you could talk to the researcher or to your parents/carers, contact your school counsellor, or, if you prefer, you could call: ChildLine on 0800 1111. You could also visit www.there4me.com/or email jo@samaritans.org

Can I change my mind if I volunteer now but have second thoughts?

You can change your mind about taking part in the study at any time. You can call Yaser Adi on 02476150507 or email y.adi@warwick.ac.uk or let the school know.

What do I do next?

Please keep this information sheet. If you decide to take part, you will soon be asked to sign a consent form and then either given a questionnaire to complete or be invited to take part in a group discussion.

Do my parents/carers know about this study?

Yes, we have written to your parents/carers about this study. We have given them information and a form to complete if they do not wish you to take part in the study.

Where can I get more information from?

We very much hope you will take part in our study. If you would like to know more about it or you have any other questions, you can telephone Yaser Adi on 02476150507

Thank you for taking the time to read this information

Appendix 7. Head teacher information and consent



Health Sciences Research
Institute
Warwick Medical School
University of Warwick
Coventry
CV4 7AL

5th November 2008

Dear Head teacher

Re Waves Study: Invitation to participate

Overview and background

We would like to invite you and your school to participate in this exciting research study – the Waves study - which focuses on assessing a new scale of positive mental wellbeing in teenagers. As you know, mental wellbeing is one of the key themes of the National Healthy Schools programme. This study particularly relates to Section 4.3 *“Children and young people can describe how they learn to explore, express and manage their feelings and are able to empathise with others.”* The research is being conducted by Warwick and Edinburgh Universities and funded by NHS Health Scotland.

What is required?

In this research we will be assessing a newly designed scale called the Warwick-Edinburgh Mental Well-Being Scale (WEMWBS) for use with adolescents. The research is taking place in the Autumn Term, 2008 on pupils in years 9 and 11 (aged ~13 and ~15 years). WEMWBS has been assessed to measure mental wellbeing for adults and those aged 16+ and it is currently being used widely e.g. in national surveys in Scotland.

The aim is to identify if this scale is valid for use with younger age groups, as there is currently no other good means of assessment of mental wellbeing for them. If WEMWBS proves acceptable, it can be used to monitor students of this age group more widely in population surveys. Assessment of the WEMWBS scale requires that we compare it with pupils' answers to other similar scales. We have combined all these scales into one questionnaire.

Ethics approval has been obtained from the Warwick Medical School Biomedical Research Ethics Committee, and all researchers have undergone Criminal Records Bureau (CRB) checks.

The proposal is that we give pupils the questionnaire at a time convenient to the school either during morning or afternoon lessons e.g during a PSHE lesson. The questionnaire takes about 20-30 minutes to complete.

We will provide an information sheet for the selected pupils to read 2 weeks beforehand, and with your approval, we will send out a letter to their parents/carers. The letter will include information about the project and include an opt-out clause for those who do not want their child/children to participate. Consent will be obtained directly from pupils on the day of the questionnaire. We would also like to ask a few pupils (6-8 per year) in the relevant age groups to take part in focus/discussion groups. The focus/discussion groups will be taped and transcribed.

A random selection of pupils who have completed the questionnaire will be asked to repeat the questionnaire a week later. This is to test the reliability of the questionnaire. It is proposed that this could be done over a lunch time.

Feedback of the results

Individual results will be kept completely anonymised and confidential and no individual feedback on pupils will be given to teachers, parents, or schools.

However, all schools will receive anonymised feedback by age group and sex, and this may help “*identify areas for development and provide evidence of feedback from pupils*” in line with the Healthy Schools theme of emotional health and wellbeing.

When we meet with you we would also like to discuss the possibility of assessing responses to the questionnaire in the light of pupils’ previous and subsequent educational attainment¹². For this we would need to access pupils’ unique school identification number. Again we will ensure that all individual information will be anonymised and kept completely confidential at all times.

Next steps

A member of our research team will contact you at the beginning of the Autumn Term to discuss the project. If you would like to contact us, please email our researcher, Dr Yaser Adi: y.adi@warwick.ac.uk telephone on 024 761 50507. Caroline Conneely is also able to take telephone messages on 024 765 28204.

We look forward to working with you. Please do not hesitate to contact us if you would like any further information or further details.

With best wishes
Yours sincerely

Dr Aileen Clarke
Associate Professor of Public Health and Health Services Research
Telephone: 024 761 50507 Email: aileen.clarke@warwick.ac.uk

¹² Whilst these consent forms included reference to attainment data at the time – these findings have not been analysed and are not included in this report.

Headteacher information sheet

Why are we doing this study?

This study is assessing a scale called the WEMWBS, which measures mental wellbeing. The scale has so far only been tested in adults and those aged 16+.

The purpose of the study is to assess whether the WEMWBS can be used in national surveys of teenagers in Scotland and England. We are comparing WEMWBS to similar scales used in teenagers. We want to be able to measure mental well being quickly and accurately so that we can work towards improving it.

What does the research involve?

The research involves your pupils aged ~13 and ~15 in Years 9 and 11. All students will be involved. We would like most of the students to complete the questionnaire with some invited to do a retest and two small groups to be involved in a discussion group. We would also like to match up our wellbeing findings with attainment data.

Questionnaires: We are asking all pupils in Years 9 and 11 to complete a 20-30 minute questionnaire on mental wellbeing in school time e.g during a PSHE lesson.

Discussion Group: At the school's and pupils' convenience we would like to invite two small groups of 6-8 pupils (one Year 9; one Year 11) to take part in discussion groups instead of completing the whole questionnaire to obtain verbal feedback. We anticipate that this group will take just under $\frac{3}{4}$ of an hour. The group will be taped recorded and would need a small quiet room.

Test –retest: We would like to randomly select one class/form tutor group of about 30 students to do a short (15minutes) re-test of part of the WEMWBS to check reliability of our scale.

Attainment: We would like to use students' unique code to look anonymously at results for either SATs or GCSEs in the summer of 2009, after the students have completed the questionnaires. This will help us to test links between wellbeing and attainment.

We will provide full information sheets for pupils and teachers to read 2 weeks beforehand and, with your approval, we will send out a letter to all parents/ carers of pupils. The letter will include information about the study and include an opt-out clause for those who do not want their child/ children to participate. Consent to participate will be obtained directly from pupils on the day of the questionnaire or interview.

Does my school have to take part?

Taking part in the research is entirely voluntary.

What happens if I don't want my school to take part?

There is no pressure to take part. If you do not want the school to take part, you should just indicate that to us.

Who is paying for this research?

This research is being run by Warwick and Edinburgh Universities and funded by NHS Health Scotland.

Does the research have ethics committee approval?

This research has been fully approved by Warwick Biomedical Research ethics Committee and all the researchers have full CRB clearance for the project.

Will we pay you or the pupils for taking part?

Our ethics committee does not allow us to offer the pupils incentives to take part. But, with your permission we would like to recognise the school's and pupils' time by i) giving a small chocolate bar/biscuit or equivalent to all pupils in classes completing questionnaires. ii) giving a £50 voucher to the school library.

What will happen to the results of the research study?

The finding of the study will be written up in a report to NHS Health Scotland. The report will be used to assess whether to use the WEMWBS scale in national surveys in this age group in the future. The anonymised results will also be published in journals and presented at conferences.

When we have finished our study, we will send a summary of the results to the school and a comparison with the other schools taking part. Everything will be fully anonymised: no individual person or their responses to the questionnaire will be shown to anyone - only average scores will be reported.

Could taking part in this study do my pupils any harm?

Thinking about mental wellbeing can be a positive experience but it may also lead to feeling of distress if your pupils are affected we recommend that they can contact their parents/carers, the researchers, their teacher, the school counsellor or nurse if available, or call: ChildLine on 0800 1111 or email www.getconnected.org.uk or jo@samaritans.org

Can your pupils change their mind after they agree taking part ?

Pupils can change their mind at any time about taking part in the study. They can ring me, the researcher Dr Yaser Adi on 024 761 50507 or let the school know.

Where can I get more information from?

If you would like to know more about this study or have any other questions, you can telephone me: Yaser Adi or email y.adi@warwick.ac.uk or contact me on 024 761 50507

Thank you for taking the time to read this information

Headteacher Consent Form

Project Title: The WAVES Study - Warwick-Edinburgh Mental Well-being Scale (WEMWBS14) Acceptability and validation in English and Scottish Secondary School Pupils.

| | |
|---|--|
| I confirm that I have read and understood the attached information sheet relating to my pupils participating as part of the WAVES Study and I have had the opportunity to ask questions about the project. | |
| I agree that my school can take part in the above study and I am willing to: Facilitate the researchers of this project to administer individual questionnaires to pupils in years 9 and 11 and to undertake re-tests in one class. Facilitate focus/discussion groups. | |
| I agree to provide students' unique reference numbers to allow the WAVES researchers to access GCSE/ SATs results and to match these with wellbeing findings. | |
| I understand that all information from this project will be kept completely anonymous at all times The anonymised findings will be: <ul style="list-style-type: none"> ▪ returned to me for comparison with the results for other schools and students in these age groups ▪ disseminated at conferences and meetings, specifically in Scotland, England and at national and international conferences. ▪ written up for peer-reviewed journal publications. No publications from this project will reveal the identity of any participant individual or school | |
| I understand that the participation of my school is voluntary and that we are free to withdraw at any time without giving any reason and without being penalised or disadvantaged in any way. | |
| I understand that the names of participating pupils will not be revealed. The information they provide will be treated in the STRICTEST CONFIDENCE. The completed forms will not be seen by me or any of the school staff or parents. | |

Name of Head Teacher and Signature

Date

Name of Researcher and Signature

Date

Appendix 8. Project attendance form

School _____

Class _____

Date _____

| | Boys | Girls | Total |
|--|------|-------|-------|
| Total in class | | | |
| | | | |
| Parental opt-out | | | |
| | | | |
| Absent from class | | | |
| | | | |
| Pupil does not wish to participate | | | |
| | | | |
| Pupil not completing questionnaire for other reasons (specify) | | | |
| Total completing questionnaire | | | |

Appendix 9. Focus group protocol

Focus/Discussion group protocol

- Introduce the researchers who are present and briefly introduce the study (not in too much detail)
- Remind participants that taking part is optional and that all information will be treated in strictest confidence
- Ensure all participants have received and read the information sheet. If not, hand out information sheet and give them time to read it.
- Ensure participants have read and understood the information sheet and then give them the opportunity to ask any questions.
- Give each participant a consent form to complete.
- Gather the consent forms and ensure that every box on each form has been ticked and that each form has been signed and dated.
- Introduce the digital recorder. Remind participants again that anything they say will be treated in confidence and that they will not be identified (anonymity).
- Begin recording.
- Start with a discussion about mental well-being and what this concept means to the participants. What comes to mind when they think of mental well-being, mental illness, physical and mental health, etc? (see topic guide below).
- Probe for more detailed information on any relevant topics but try not to guide them too much. If necessary, ask structured, direct questions relevant to the topic.
- Following the short discussion on mental well-being, introduce participants to the WEMBWS. Hand out the questionnaire and pens for them to complete it. Remind them that there are no right or wrong answers and that the questionnaire will be destroyed following the discussion group. Ensure them that no one – including parents/carers and teachers – will have access to their questionnaire. Ask them to complete the questionnaire.
- Once everyone has completed the questionnaire, begin discussion about the questionnaire directed roughly by the topic guide (below).
- Where possible, try to stimulate discussion between participants (rather than between facilitator and participant). The facilitator should provide opening questions and prompts, but thereafter remain in the background as much as possible. This may not always work in practice and more structured questioning of participants may be necessary.
- At some point (variable, depending on the flow and content of discussion), ask participants to comment on each WEMBWS item in turn. See topic guide (below) for issues that should be covered (e.g. difficulty of language, understandability, items that don't belong, items that are 'missing', etc).
- Be careful not to single individuals out in the discussion at any point or ask for individual responses. This may cause participants to 'close up' and result in reduced rapport and flow/ease of discussion.
- When time is up or when you feel discussion has concluded and all topics have been covered, end the discussion. Cease recording and thank participants for their time and contribution.

Discussion group topic guide

| |
|---|
| 1. introduce self and spend a few minutes for social talk i.e. to ask about the topic they enjoy at school or the topics taken for the GCSE or the equivalent in Scotland). |
| 2. have some information sheet if any question students wanted to ask? |
| 3. take the consent |
| 4. what does the terms [mental health , mental wellbeing mean to you?] |
| 5. complete the questionnaire |
| 6. what is your initial reaction/ feeling when you went through the 14 items? |
| 7. do you understand all the words/phrases? Easy/difficult to understand? Any that you would like to comment on? |
| 8. what do think about the length of the questionnaire? |
| 9. is there any item that you think it is unnecessary? |
| 10 any Item that you think should be added to the list of questions related to mental health. |
| 11. how acceptable do you thing these items to you? |
| - Intrusive ? |
| - does it stimulate any + feeling / or – feeling? |
| 12. was the scale completed honestly? |
| 13. did you feel that you wanted to complete the questionnaire to get a better score? |
| 14. overall what can you describe the purpose of the questionnaire? |
| 15. at the end, thank the group and offer biscuit (Coventry schools) |

Appendix 10. Glossary

Bootstrapping

Bootstrapping is a computer-intensive method for statistical inference. The basic idea of bootstrapping is resampling - drawing repeated samples from the original data set with replacement. Usually the bootstrap samples have the same size as the original data set. The analysis is repeated on all bootstrap samples resulting in an empirical distribution of the statistic of interest. This can be used for inference, e.g. in construction of confidence intervals as in the present report.

Confirmatory factor analysis

Factor analysis is a data reduction technique which takes a large set of variables and looks for ways that the data may be reduced or summarised using a smaller set of factors or components. It does this by looking for groups among the inter-correlations of a set of variables. Confirmatory factor analysis is a particular kind of factor analysis that aims to confirm specific hypotheses or theories underlying a set of variables.

Construct validity

Testing for construct validity involves testing a scale against similar constructs - similar measures of the underlying meaning or variable. Two types of construct validity are recognised: *convergent validity* where the scale or measure of interest is positively correlated with scales which measures a similar construct and *discriminant validity* where the scale is negatively correlated with a scale measuring the converse construct.

Correlation

Analysis used to describe the strength and direction of the linear relationship between two variables. The nonparametric Spearman's rank correlation coefficient measures the strength and direction of the relationship for non-parametric variables.

Criterion validity

Criterion validity is a more global measure of how well a scale performs compared to other measures which might be expected to vary in a similar direction. An example in the WAVES study would be if we investigated how well WEMWBS scores correlated with education attainment.

Cronbach's alpha

A statistic (known as α) calculated from pairwise correlations between items. This is a measure of the internal consistency of a scale. Internal consistency ranges between zero and one. A commonly-accepted rule of thumb is that an α of 0.6-0.7 indicates acceptable reliability, and 0.8 or higher indicates good reliability. Higher reliabilities are not necessarily more desirable, as this may indicate that some items may be redundant. The goal in designing an instrument is for scores on similar items to be related (internally consistent), but for each to contribute some unique information as well.

Face validity

Describes the extent to which a test/ questionnaire appears to be measuring what it purports to measure on inspection.

Family affluence scale

The Family Affluence Scale (FAS), a four-item measure of family wealth based on self reported factors including number of computers in the house, number of holidays taken.

Internal consistency

Internal consistency is a measure based on the correlations between different items in the same scale and is usually measured with Cronbach's alpha (See Cronbach's alpha).

Intra class correlation coefficient (ICC)

In statistics, the intra class correlation (or the intra class correlation coefficient, (ICC)) is a descriptive statistic that can be used when quantitative measurements are made repeatedly on the same subjects. The ICC is the proportion of between-subject variation compared to the total variation between measurements. ICCs are used to assess test-retest reliability.

Multiple regression

A statistical technique to explore the relationship between one continuous dependent variable and a number of independent variables.

Psychometric properties

Psychometrics is concerned with the theory and technique of educational and psychological measurement e.g the measurement of knowledge, abilities, attitudes, and personality traits. Psychometric properties of a test or scale are usually considered to include two main measures - validity and reliability.

Reliability

Reliability is the degree to which a scale or measure measures consistently. The main formal test for reliability is test-retest reliability (see below).

Spearman's rank correlation

Nonparametric correlation coefficient used to describe the strength and direction of a monotonic relationship between two variables.

Standard Deviation

The standard deviation of a data set or distribution shows how much variation there is in that population from the mean or average. In statistical terms it is the square root of the variance. In a normal distribution, 68% of individuals are within one standard deviation of the mean, and 95% of individuals are within 2 standard deviations of the mean.

Test-retest reliability

Describes the extent of agreement of initial test results with results of repeat measurements model later on. Test-retest reliability can be assessed by calculating ICC (see above).

Validity

Validity of a scale is defined as the ability of that scale to measure to what it is supposed to measure. Many types of validity are defined – in this study we are mainly investigating construct validity; comparing WEMWBS to scales which measure a similar construct.

Appendix 11. Abbreviations used in this report

| Abbreviation | Full text |
|--------------|---|
| BREC | Biomedical Research Ethics Committee |
| CC | Correlation coefficient |
| CI | Confidence interval |
| FAS | Family Affluence Scale |
| GHQ12 | 12-item General Health Questionnaire |
| ICC | Intra class correlation coefficient |
| MHC-SF | Mental Health Continuum-Short Form |
| NICE | National Institute for Health and Clinical Excellence |
| Ofsted | Office for Standards in Education |
| SALSUS | Scottish Schools Adolescent Lifestyle and Substance Use Survey |
| SATS | Standardised Assessment Tests |
| SDQ | Strengths and Difficulties Questionnaire |
| TAMFS | Towards a Mentally Flourishing Scotland: Policy and Action Plan 2009-2011 |
| WAVES | Warwick-Edinburgh Mental Well-being Scale (WEMWBS) acceptability and validation in English and Scottish secondary school students |
| WEMWBS | Warwick-Edinburgh mental well-being scale |
| WHO | World Health Organization |
| WHO-5 | WHO (Five) Well-Being Index |