School of Psychology
Ysgol Seicoleg

Measuring Psychological Flexibility in Adolescence

Thesis submitted in partial fulfilment of the requirement

for the degree of:

Doctorate of Clinical Psychology (DClinPsy)

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Cardiff University

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Thesis Abstract

This thesis is submitted in partial fulfilment of the requirement for the degree of Doctorate of Clinical Psychology (DClinPsy). It is a portfolio thesis and as such consists of two separate papers. The systematic review and empirical paper have been prepared in accordance with the author guidelines for the target journal, the *Journal of Contextual Behaviour Science.*

Psychological Flexibility

Psychological Flexibility is a person's ability to maintain or change behaviour according to their goals or values, with an awareness of impacts on their situation and complete openness to ongoing thoughts and feelings.

The construct of PF has been hypothesised to be a principal aspect of psychological health and mental well-being. PF is understood to reflect three dyadic sub-processes, referred to as *open, aware* and *active.* PF is a common target of contemporary cognitive and behavioural interventions for promoting psychological health, but this is most explicitly stated within Acceptance and Commitment Therapy (ACT).

Paper 1: Systematic Literature Review

The Avoidance and Fusion Questionnaire – Youth (AFQ-Y) is a process measure, designed to assess psychological *inflexibility* in young people. The AFQ-Y8 (short-form) is increasingly being adopted for research and clinical use, but its psychometric properties are unexamined.

The COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) is a set of explicit guidelines for the selection of process / outcome measures in both research and clinical use. The guidelines provide robust methodological criteria for undertaking systematic reviews of process / outcome

measures and whilst examining the psychometric properties they also critically evaluate the quality of the evidence.

Through the application of COSMIN methodology, the review provides a benchmark for the level of confidence that can be held by researchers and clinicians when selecting to use the AFQ-Y8.

Paper 2: Empirical Paper

Given its purported centrality to psychological health, it is important that validated measures of PF are available; however, no comprehensive measure of PF exists for use with an adolescent population. In order to comprehensively measure PF, there is a requirement to reliably measure the three dyadic sub-processes. The Comprehensive assessment of ACT (CompACT) is a validated process measure currently used with adults but has not been validated with an adolescent population.

The empirical paper evaluates the construct validity of the CompACT in order to understand whether it is understood by an adolescent population i.e., whether item content is clear, relevant, and interpreted/responded to in terms of targeted meaning. To achieve this, two studies were undertaken.

In study 1, cognitive interviewing was conducted with 36 students (11-18yrs), with analysis showing that adolescents found problems with all 23-items, specifically in the understanding stage, and predominantly lexical problems. Subsequent analysis generated an alternative pool of items with age-specific adaptations. In study 2, consultation was undertaken with 11 international experts (in PF and/or using ACT with adolescents) using a web-based survey tool. The outcome informed selection of a final set of 23 alternative items with confirmed construct relevance for gauging PF in an adolescent population.

The overall outcome of study 1 and 2 is a revised comprehensive measure of PF, which requires psychometric validation.

Avoidance and Fusion Questionnaire for Youth (short-version):

A systematic review of measurement properties

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Systematic Literature Review Word Count: 6504

The systematic literature review has been prepared for submission to the *Journal of Contextual Behavioral Science*. The editorial guidelines can be found at Appendix 1. The guidelines state the word limit for a review paper is 10,000 words (excluding references, tables, and figures but include the abstract).

Abstract

Background: The Avoidance and Fusion Questionnaire – Youth 8-item version (AFQ-Y8) is a short-from process measure, designed to assess psychological inflexibility (the antithesis of psychological flexibility) in an adolescent population. Psychological flexibility is a change process for fostering improved psychological health (well-being), which is being increasingly referenced in both clinical and non-clinical child and adolescent populations. Short-form process measures have received criticism for their methodological quality and psychometric validity. The aim of this study was to systematically review the measurement properties of the AFQ-Y8.

Method: Systematic searches were carried out on PsycINFO, MEDLINE, Web of Science, EMBASE and PubMed of studies reporting primary data on the AFQ-Y8. The updated (2018) The COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) methodology was applied to 24 studies. Each study was evaluated against the COSMIN taxonomy and rated using the COSMIN Risk of Bias Checklist and criteria for good measurement properties. The quality of evidence was then graded through the application of the modified GRADE approach.

Results: The content validity of the AFQ-Y8 demonstrated low quality of evidence, alongside low quality of evidence for reliability. The process measure exhibited high quality evidence for unidimensional structural validity, internal consistency, hypothesis testing and responsiveness. The AFQ-Y8 demonstrated moderate quality of evidence for measurement variance and criterion validity.

Conclusions: The AFQ-Y8 demonstrated sufficient high-quality evidence for 4 out of the 8 examined measurement properties. However, content validity is viewed as the most important of the COSMIN taxonomy of measurement properties, and the review raised questions about numerous aspects of content validity for the AFQ-Y8. Further studies are therefore recommended into the AFQ-Y8's content validity and

reliability and in addition, there is a requirement for a robustly developed comprehensive measure of PF for use with the adolescent population.

Keywords: Psychological flexibility, process measure, short-form, COSMIN, psychometric properties, adolescence.

Background

Acceptance and Commitment Therapy (ACT) is a form of behavioural therapy that is attracting increasing research and clinical interest, as evidenced by the growing number of randomised control trials (A-Tjak et al., 2015; Atkins et al., 2017; Öst, 2014). The nexus of ACT is Psychological Flexibility (PF). The PF model is based on an experimental analysis of language and thought, with the hypothesis that these processes exert control over our behaviour. The model reflects that this verbal control can have both negative and positive consequences for an individual, with potential to facilitate or obstruct effective action, depending on the adaptive flexibility of our responses to verbal and cognitive events. The PF model is composed of six processes: (1) cognitive defusion, (2) acceptance, (3) present moment focus, (4) self as context, (5) chosen values, and (6) committed action (Levin et al., 2012). Kashden and Rottenberg's (2010) paper on PF highlights the inconsistent path of PF as a concept/model. Others, such as Kashden and Rottenberg, have noted that PF is similar to other concepts such as ego-resiliency (Block, 1961), executive control (Posner & Rothbart, 1998), response modulation (Patterson & Newman, 1993), and self-regulation (Carver & Scheier, 1998; Muraven & Baumeister, 2000).. PF pertains to the "ability to contact the present moment more fully as a conscious human being and to change or persist in behaviour when doing so serves valued ends" (Hayes, Luoma, Bond, Masuda & Lillis, 2006, p.7). However, PF is not simply the presence of positive emotions and absence of negative symptoms, it is plausible that an individual could demonstrate inflexibility despite the presence of positive feelings (Schmaltz & Murrell, 2010). Gloster et al., (2011) assessed PF as a construct and concluded that "The analyses of specific aspects of construct validity, namely clinical validity and incremental validity, reveal that PF is not only clinically useful but also adds unique, if overlapping, predictions and descriptions to those of more established constructs (p. 980).

ACT posits that suffering, whilst unpleasant, is a characteristic of being human. The overarching goal of ACT is not symptom alleviation (although this is

often observed), but to improve PF and values-based living, irrespective of an individual's thoughts, feelings, and sensations. From an ACT perspective, normal suffering can be compounded and exacerbated by psychological *inflexibility* (the antithesis of PF), defined as, "the rigid dominance of psychological reactions over chosen values and contingencies in guiding action" (Bond et al., 2011, p.678).

Cookson, Luzon, Newland, and Kingston (2019) stated that psychological inflexibility is a function of two interrelated processes: *experiential avoidance* and *cognitive fusion*. Experiential avoidance is characterised by attempts to avoid or escape painful experiences (thoughts, feelings, and physical sensations) even when attempted avoidance or escape is obstructive to personally meaningful and valued pursuits (Hayes, Wilson, Gifford, Follette & Strosahl, 1996). Cognitive fusion is characterised by relating to thoughts as *truths* which can develop into rigid ('fused') rule-following, insensitive to any opposing information from the environment or others (Hayes, Strosahl & Wilson, 2011).

PF is understood to reflect three dyadic sub-processes, referred to by Hayes, Villatte, Levin and Hildebrandt (2011) as *open, aware* and *active*. In more recent developments of the psychological flexibility model, Hayes, Strosahl, and Wilson (2012) have grouped the six subprocesses of PF into three pairings or 'dyadic' subprocesses: (1) openness to experience and detachment from literality (acceptance; defusion); (2) self-awareness and perspective taking (present moment awareness; self as context); and (3) motivation and activation (values; committed action). ACT attempts to increase PF by reducing: experiential avoidance, cognitive fusion, lack of value-based decision making, lack of contact with the present moment, unworkable individual actions and attachment with a negative conceptualised self (Harris, 2019). This is achieved through individuals learning to relate to difficult thoughts, feelings and impulses in a more mindful and accepting manner, in service of longer-term values-based goals (Ciarrochi & Blackledge, 2006; Hayes, Strosahl & Wilson, 1999).

ACT is often cited as a *third wave* therapy, which has superseded behaviour therapy (*first wave*) and Cognitive Behaviour Therapy (CBT; Hoffman & Asmundson, 2008). Although ACT proponents have suggested that the model represents a radically different way of responding to private experiences (Hayes 2004), some have overtly challenged this and have suggested that there are significant similarities with other main-stream approaches such as CBT (Arch & Craske, 2008; Hoffmann & Asmundson, 2008). CBT was appraised as the *second wave* of behavioural therapies and the leading proponent, Aaron Beck, described CBT in the following way: " Cognitive therapy is best viewed as the application of the cognitive model of a particular disorder with the use of a variety of techniques designed to modify the dysfunctional beliefs and faulty information processing characteristic of each disorder" (Beck 1993, p. 194). CBT is one of the most widely recognised therapeutic approaches and became the dominant model for a variety of mental health disorders (Butler, Chapman, Forman, & Beck, 2006). There is continued debate regarding third wave and whether approaches such as ACT, Dialectic Behaviour Therapy (DBT: Lineham, 1993), Mindfulness-based Cognitive Therapy (MBCT; Segal, Williams & Teasdale, 2001) or Metacognitive Therapy (MCT; Wells, 2000) are distinctively different or are extensions of the second wave (i.e. CBT). Critics of the proposition of a *second wave* have highlighted the misconceptions and criticisms of CBT. Hoffman and Asmundson (2008) draw attention to the main misconceptions and criticisms (for example, CBT is mechanistic, overly symptom-focused, and both the link between cognitive therapy and cognitive science and support for hypothesised mediators of change are weak) and provide their evidence to challenge these narratives. In addition, some authors have directly compared ACT and CBT and highlighted what they view as considerable overlap in key aspects of each model for example, 'reappraisal' and 'acceptance' (Liverant, Brown, Barlow, & Roemer, 2008; Wolgast, Lundh, & Viborg, 2013). Despite the identification of similarities there are equally acknowledgments of differences. For example, Hoffman & Asmundson (2008) highlighted the vast differences in the philosophical foundations of ACT and CBT, alongside recognition that ACT works through different mechanisms. Hayes et al., (2011) have suggested that the *term third* wave itself might be a source of resistance, leading

traditional CBT proponents to believe that this infers that CBT is "old hat" (Hoffman & Asmundson, 2008) and have suggested that actually evolution/modernisation of therapies have led to a third generation, which they term "contextual CBT", which is inclusive of a range of therapies including ACT and CBT.

Evidence-based practice and prudent healthcare are now regarded as the foundation for psychological health approaches (Spring, 2007; World Health Organization, 2005; Youngstrom, 2013). A strength of ACT lies in its assertion of being an evidenced process i.e. articulating a testable theory of therapeutic change and systematic evaluation of the (ACT) model (Ruiz, 2010). In order for resources to be provided for service development (e.g. staff training, intervention development), there is an increasing prerequisite to scientifically demonstrate that *change* (i.e. an individual's increase in psychological flexibility or decrease in psychological inflexibility) is a result attributable to the therapeutic approach (i.e. ACT) and not due to non-specific factors.

In the last decade ACT and ACT-informed interventions have been increasingly used with both child and adolescent populations, with accumulating evidence for efficacy. For example, ACT has resulted in positive outcomes for children and adolescents when applied to low mood (Petts, Duenas & Gaynor, 2017), compulsive behaviour (Armstrong, Morrison & Twohig, 2013), and pain conditions (Wicksell, Melin, Lekander & Olsson, 2009). In addition to ACT's use in clinical populations, it has been effectively implemented with non-clinical school-based populations (Grégoire, Lachance, Bouffard, & Dionne, 2018; Hayes, Boyd, & Sewell, 2011; Swain, Hancock, Dixon, & Bowman, 2015). This is important given the increasing prevalence of distress and decreasing levels of well-being observed in these populations (Department of Health, Department of Education 2017).

Corresponding with the development and application of ACT in a child and adolescent population, is the requisite to measure the underlying theory and processes. There is a need for appropriate and readily available measures that

accurately assess clinically relevant outcomes and processes (Bentley, Hartley & Bucci, 2019; Kwan & Rickwood, 2015). In addition to gauging effectiveness, process and outcome measurement is valuable more broadly: for identifying core mediators of outcome change, which can subsequently inform intervention development, refinement, and systematisation. In order for ACT to be seen as an evidenced-based model for use in the child and adolescent population, it is important that the underlying construct of ACT (i.e. PF) can be reliably examined using validated process/outcome measures.

With increasing levels of research being conducted with children and adolescents (the Wolfson* Foundation, 2019) and many schools agreeing to students completing batteries of psychometric assessments (School Health Research Network, n.d.), there is an ethical requirement to consider the potential research burden. Lingler, Schmidt, Gentry, Hu and Terhorst, (2014) in their development of a measure of respondent burden, reported that burden is a significant factor that contributes to participant enrolment levels, retention and attrition rates, and is poorly considered during research development. The issue of burden is particularly relevant for child and adolescent research given that parental 'opt-in' is often a pre-requisite. Groves, Cialdini, and Couper (1992) reported that families are less likely to consent to individuals participating (e.g. children and adolescent) if they perceive research as burdensome. With increased burden there is a risk that unnecessary or impractical decisions are made between evaluating processes and outcomes of interest versus the need to consider minimising potential burden and the possibility of significant withdrawals. It is therefore important that validated and minimally burdensome process/outcome measures are available for routine clinical and research use with the child and adolescent population.

One way to make process/outcome measures less demanding is to develop or adapt them into shortened versions. For an adolescent population, this is frequently viewed as an advantage in research and clinical settings due to an

increasing use of sessional measures (Edbrooke-Childs, Gondek, Deighton, Fonagy & Wolpert, (201). Other articulated benefits of shortened measures include decreasing the burden, particularly when respondents are required to complete several measures, increased take-up and completion rates and reducing potential pressures on researchers / clinicians to make difficult decisions about inclusion and exclusion of process or outcome measures (Credé, Harms, Niehorster & Gaye-Valentine, 2012; Gogol et al., 2014). Donnellan, Oswald, Baird, and Lucas, (2006) found that outcome measures that had more items led to respondents either omitting questions or declining to take part in follow-up studies and therefore reducing the opportunities to develop robust psychometrics or validate interventions.

Conversely, Smith, Dennis, and Anderson (2000) provide an extensive critique of the methodological "*sins"* of short-form measurements. The majority of the Smith et al. (2000) critique focuses on methodological errors; for example, failure to empirically demonstrate that the short form reliably reproduces the factor structure of the long form. Given validity concerns around short-form measures, there is a need to subject abbreviated forms to rigorous independent psychometric evaluation and to not assume that evidence for long-form versions simply transfer to derivations.

Avoidance and Fusion Questionnaire for Youth (Shor…

Adolescent PF Measures

Kashdan and Rottenberg (2010) claim that PF is a change process for fostering improved psychological health (well-being), which in the current child and adolescent population is seen as being vitally important (Public Health England, 2014). Whilst PF arguably forms a unitary focus/target of contemporary evidence-based cognitive behavioural models, PF is most explicitly operationalised and targeted within the ACT model (Hayes et al., 2011). Correspondingly, most measures of PF have been developed within an ACT framework (Ong, Lee, Levin, & Twohig, 2019).

As ACT was originally developed for an adult population, there are a greater number of validated PF measures for this population. For example, Acceptance and Action Questionnaire II (*AAQ-II*; Bond et al., 2011), Comprehensive assessment of Acceptance and Commitment Therapy processes (*CompACT*; Francis, Dawson & Golijani-Moghaddam, 2016), Generalised Pliance Questionnaire (*GPQ*; Ruiz, Suárez-Falcón, Barbero-Rubio & Flórez, 2019), Multidimensional Psychological Flexibility Inventory (*MPFI*; Rolffs, Rogge & Wilson, 2018), and Open and Engaged State Questionnaire (*OESQ*; Benoy et al., 2019).

Amongst an adolescent population, a search (Appendix 2; search strategy) of three main databases (MEDLINE, EMBASE and PsycINFO) suggested that the Avoidance and Fusion Questionnaire – Youth (*AFQ-Y*) (Greco, Lambert, & Baer, 2008) is the most widely used PF measurement tool.

AFQ-Y

The AFQ-Y is an ACT specific measure, designed to assess PF (in terms of psychological *inflexibility*) in young people (Greco et al., 2008). The development and validation of the AFQ consisted of 5 studies. The development occurred in study 1. The initial step involved identification of a pool of possible items. This development was done by doctoral and masters level psychologists with training in ACT. The item content was based on the

Acceptance and Action Questionnaire (AAQ; Hayes et al., 2004). An initial pool of items was evaluated by four raters with expertise in ACT, who provided feedback on their clarity, theoretical coherence, and developmental appropriateness. The initial version was then administered to 9 children (8-14 years), who were asked to put the items into their own words. These were then sent back to the raters, who made minor alterations. The resultant measure was then subsequently administered to 181 11-14year old students. In order to assess comprehensibility, students were asked to circle items that they found confusing. Items rated as confusing by over 2% of the total sample were either reworded or replaced. Study 2 involved exploratory factor analysis, with 513 students (5-10 years old) in order to remove items that were deemed to not fit with ACT theory. Study 3 applied a multimethod statistical approach with stated aims of reducing the items and developing a short-form (AFQ-Y8). Study 4 evaluated the psychometric properties of both versions and Study 5 reported the normative data and validity testing.

The AFQ-Y has two versions, a 17-item version (most commonly referred to as AFQ-Y) and an 8-item short form (AFQ-Y8). The items from the 17-item version with the highest factor loadings (above 0.50) were selected and together formed the AFQ-Y8. Both versions are self-administered and use a Likert scale from 0 (not at all true) to 4 (very true) for each item; item scores are then summed to produce a total score ranging between 0-68 (AFQ-Y) and 0-32 (AFQ-Y8). A high score indicates greater psychological inflexibility and a low score indicates an adolescent has a higher level of PF.

The AFQ-Y and AFQ-Y8 are presented by the authors as being unidimensional, although there is an extensive debate surrounding the stability of the factor structure of the AFQ-Y (García-Rubio, Lecuona, Blanco Donoso, Cantero-García, Paniagua, & Rodríguez-Carvajal, 2020; Valdivia-Salas, Martín-Albo, Zaldivar, Lombas, & Jiménez, 2017). Greco et al., (2008) reported that the AFQ-Y shows good internal consistency, with Cronbach's alpha of .90, whilst the AFQ-Y8 has a Cronbach's alpha of .83. Greco et al., (2005) is understood to have developed the

shortened version of the AFQ-Y8 for screening purposes, with the literature demonstrating increasing use of the AFQ-Y8 in recent years. It is plausible that given the increasing use of process/outcome measures by academics and clinicians that individuals are defaulting to short-form tools on an increasing basis; for the reasons of decreasing burden, particularly within an evidence-based practice context, in which there is an increased requirement for session-by-session measures.

Rationale

With increasing use and evaluation of ACT-based interventions in children and young people, it is important that clinicians and researchers can measure changes in PF (the target process of ACT) in order to draw conclusions about ACT's efficacy and mechanisms of action in this population. Despite the growing use of the AFQ-Y8 there have not been any systematic reviews that have examined its psychometric properties and accounted for the quality of the evidence underpinning the reviewed studies.

The COnsensus-based Standards for the selection of health Measurement INstruments (COSMIN) was an initiative established to provide explicit guidelines for the selection of Patient-Reported Outcome Measures (PROM) in both research and clinical use (Prinsen et al., 2018). The COSMIN initiative has also provided robust methodological guidelines for undertaking systematic reviews of PROM(s). Given the rigorous methodology, evidence suggests that conclusions drawn from these systematic reviews can be used with high levels of confidence (Mokkink et al., 2010).

This review focuses on the AFQ-Y8, as an emerging measure of PF that is being increasingly adopted in research and practice. The potential benefits of the AFQ-Y8 are clear: a derivation of the most prominent measure of PF in young people, which offers greater economy and acceptability for use in both clinical and research contexts. However, as observed above, short form measures are often

implemented ‘ahead of the evidence’, with limited appraisal of their psychometric properties or performance in relation to the original measure. Through the application of COSMIN methodology (Prinsen et al., 2018), this review will provide a benchmark for the level of confidence that can be held by researchers and clinicians when selecting to use this outcome/process measurement tool.

Methodology

This review was developed according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses Protocols (PRISMA-P; Moher, Liberati, Tetzlaff & Altman, 2010). Table 1 shows the COSMIN systematic review 10-step guideline (Prinsen et al., 2018), which was followed for the systematic review of the AFQ-Y8.

Table 1.
Guideline for Systematic Review of Process/Outcome Measures

Stage	Step	Procedure
A	1	Formulate the aim of the review
	2	Formulate the eligibility criteria
	3	Perform a literature search
	4	Select abstracts and full-text articles
B	5	Evaluate content validity
	6	Evaluate internal structure Structural validity Internal consistency Cross-cultural validity
	7	Evaluate the remaining properties Reliability Measurement error Criterion validity Hypothesis testing for construct validity Responsiveness
C	8	Evaluate interpretability and feasibility
	9	Formulate recommendations
	10	Report the systematic review

Avoidance and Fusion Questionnaire for Youth (Shor…

Stage A

Eligibility Criteria

For studies to be included the following inclusion criteria had to be met:

- Studies published in a peer review journal from 2008, which is reflective of the Greco et al., 2008 development and evaluation study
- Full text studies in English
- Studies that contained and reported measurement properties of the AFQ-Y8 as defined by the COSMIN (Prinsen et al., 2018) *'taxonomy of measurement properties*[1]*'* (i.e. reliability, validity and responsiveness).
- Studies pertaining to clinical or non-clinical populations as the AFQ-Y8 was designed as a transdiagnostic outcome measure.
- Studies where the AFQ-Y8 reported (primary) data on children and/or adolescents ≤20 years of age. The AFQ-Y was originally developed and validated on an (American) adolescent population, consisting of individuals from Grades 4-10 (development stage 8-14 and validation stage 10-16 years of age). However, subsequent validation studies have used children and adolescents outside of these ages.

Literature Search

The MEDLINE, EMBASE, PsycINFO, Web of Science, and PubMed databases were searched from 2008. COSMIN guidance (Mokkink et al., 2017) recommends the search strategy consists of three groups of search terms: Population (population of interest, age), name of the instrument, and measurement properties (Terwee et al., 2009). The AFQ-Y8 is a population-specific measure and the current review aimed to gather primary data on measurement properties from *any studies* using the AFQ-Y8. For this reason, the *population* term was not incorporated

[1] The exact definitions and (referenced) figure, can be viewed at Appendix 3.

into the review search terms as it was deemed to be too limiting. In addition, the measurement properties term was also not adopted due to this review wanting to include *all* data reported on the AFQ-Y8.

Table 2 shows the search terms that were utilised. The reason that the broader term, AFQ-Y was used and not AFQ-Y8 is that following an initial search, it was evident that some studies refer to the AFQ-Y8 as the AFQ-Y short-form. Therefore, by using the broader term, the chance of missing studies was reduced.

Table 2.
Search Terms Utilised

Search Group	Search Terms
process/outcome measures	((Avoidance and Fusion Questionnaire) OR (Avoidance and Fusion Questionnaire for Youth) OR AFQ*)

Initial information was extracted for all of the studies identified from the *search terms* and *inclusion criteria*. Information included *authors* (year published), *population characteristics* (N, age range, age mean (SD), gender, female (%), and characteristics of administration (setting (clinical or non-clinical), *country* and *language*).

Stage B

Evaluating Measurement Properties

Stage B of the COSMIN systematic review 10-step guideline involves data extraction and evaluation of the selected studies. The COSMIN taxonomy divides the quality of a process/outcome measure into three distinctive domains: *reliability* (the degree to which the measurement is free from measurement error), *validity* (the degree to which a process/outcome measure actually measures the construct(s) it purports to measure) and *responsiveness* (the ability of a process/outcome measure

to detect change over time in the construct to be measured) (Prinsen et al., 2018, p.11).

The initial process involved evaluating the content validity of the AFQ-Y8 using the Greco et al., (2008) development and evaluation paper. The content validity process involved systematically rating pre-defined areas: process/outcome measure design; cognitive interview study or other pilot study; asking participants and professionals about relevance, comprehensiveness and comprehensibility. For example, under '*process/outcome measure design*', quality of design is assessed by questions such as *'Is a clear description provided of the construct to be measured?*'. Each of the pre-defined areas and associated questions were rated as either *V= very good; A = adequate; D = doubtful; I = inadequate; N= not applicable.* Having rated the pre-defined areas and associated questions (a total of 66 questions), the *criteria content validity* is rated.

To rate content validity, 10 criteria (Relevance [5 areas], Comprehensiveness [1 area], and Comprehensibility [4 areas]) were rated as either + = *sufficient;* - = *insufficient; ?* = *indeterminate;* ± = *inconsistent.* Each criterion and associated questions were combined with a definition (and/or example) to facilitate the rating process and an overall evaluation was scored on the premise of 'worst score counts' (Appendix 4; Terwee et al., 2012). In addition to the Greco et al., (2008) paper being evaluated, for the *content validity* phase, COSMIN guidelines required the author to provide a subjective view. Finally, an overall '*quality of evidence'* score for each of the 3 domains (relevance, comprehensiveness, and comprehensibility) was established following the modified Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach (Balshem et al., 2011; GRADE working group, 2020). Table 3 shows the grading quality of the evidence on content validity, using the modified GRADE approach.

Table 3.
Grading the Quality of Evidence for Content Validity Using the Modified GRADE approach (Terwee et al., 2018)

Study design evidence	Quality of evidence rating	Rating modified by
≥1 Content validity study	High	Risk of bias: -1 Serious -2 Very serious -3 Very serious Inconsistency: -1 Serious -2 Very Serious Indirectness -1 Serious -2 Very Serious
No Content validity studies	Moderate Low Very Low	

Synthesis of the Evidence

Following the evaluation of the content validity of the AFQ-Y8, an evaluation of the internal structure (structural validity, internal consistency and cross-cultural/measurement variance) and remaining measurement properties (reliability, measurement error, criterion validity, hypotheses testing and responsiveness) was completed for all studies involved in the review. Studies were subject to an initial qualitative evaluation using *'+' = sufficient, '-' = insufficient, '?' = indeterminate*. On completion of the internal structure evaluation of the reviewed studies, the individual measurement properties were pooled and compared against the criteria for good measurement properties to enable conclusions to be drawn about whether the overall measurement property of the process/outcome measures is sufficient (+), insufficient (–), inconsistent (±), or indeterminate (?). Finally, an overall score using the modified GRADE approach was applied to assess the '*quality of evidence'* for the internal structure.

Avoidance and Fusion Questionnaire for Youth (Shor…

Rigour

As a means of ensuring the COSMIN tool was applied correctly, another postgraduate student in a doctoral clinical psychology programme with experience of the COSMIN process/outcome measures tool reviewed 25% of the studies.

Results

AFQ-Y8 Studies Selection

The selection process and the included studies are presented in Figure 1. The search strategy resulted in a total of 1599 hits. After removing any duplicates (using EndNote), 1038 articles were screened based on their title, abstract, and key words, to remove studies that were irrelevant to this review. One hundred and forty-five articles remained, of which 121 were excluded after full-text screening. References of the included articles were also checked for any additional potentially relevant studies, but none were identified. On completion, **24** studies were retained for assessment and evaluation.

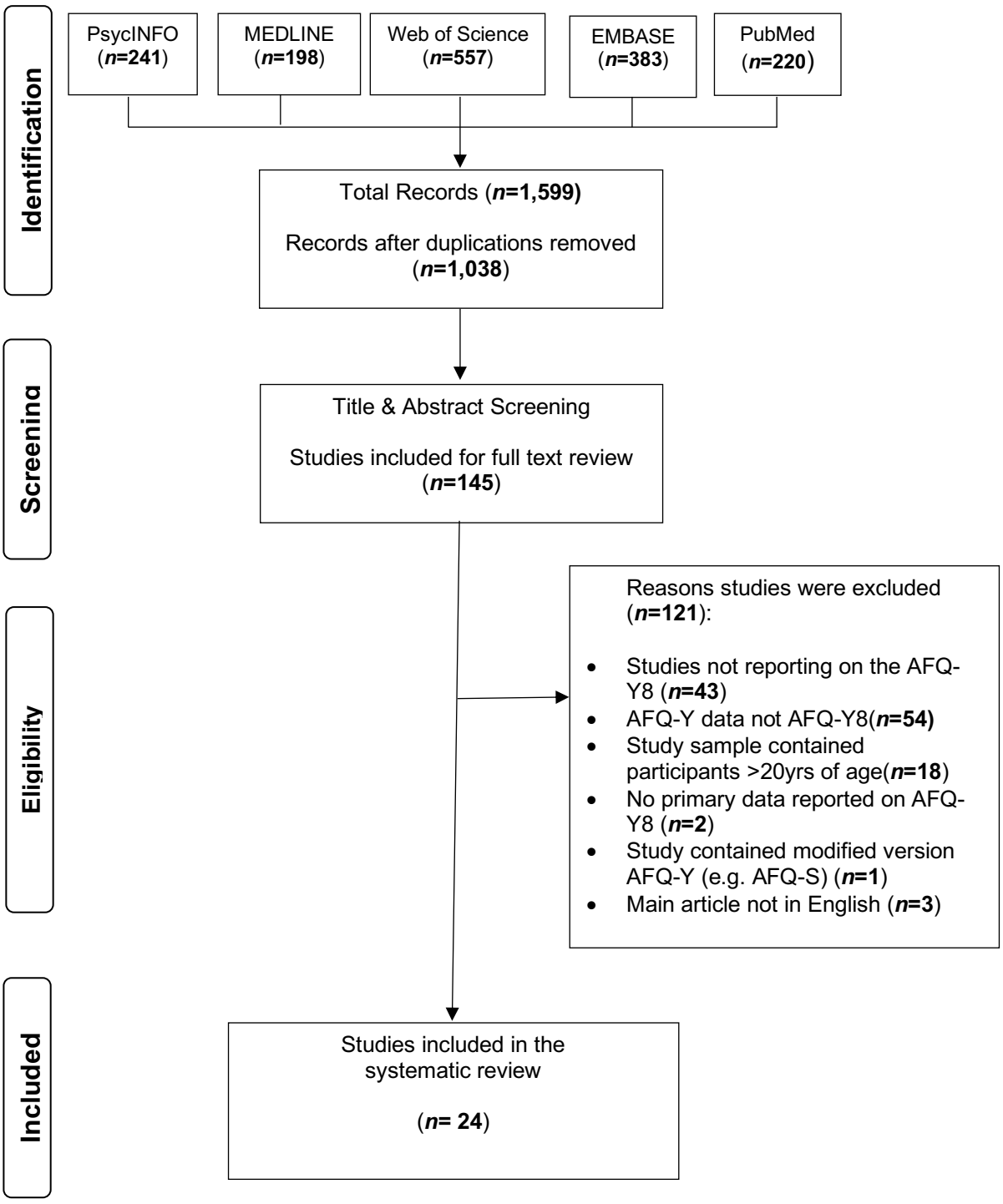

Figure 1: PRISMA Flow Diagram

Avoidance and Fusion Questionnaire for Youth (Shor…

General Characteristics of the Studies

Table 4 presents the characteristics of the AFQ-Y8.

Table 4.
Characteristics of the AFQ-Y8

Characteristic	AFQ-Y8
Country (language) of development	USA (English)
Response options	5-point Likert scale
Range of scores	0 to 32 (Higher scores indicate a greater level of psychological inflexibility)
No. of scales	Unidimensional
Missing data	If AFQ-Y at least 85% complete (≤1 missing) then: 1) Calculate the average item score from all non-missing items: add ratings (0 to 4) of the completed items and divide by the total number of items completed. 2) Multiply the average item score obtained in step 1 by the total number of items. For the AFQ-Y8, multiple the average item score by 8.
Recall period	Unclear
Mode of administration	Self-administered
Language versions available	Dutch Italian Persian Spanish Swedish

Table 5 presents the characteristics of the development and evaluation study of the AFQ-Y8. This includes the details of the 4 sub-studies that were involved in the development and evaluation of the AFQ-Y8.

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Table 5.
Development and Evaluation Study of the AFQ-Y8

Authors	Population characteristics				Characteristics of administration		
	N	Age Range	Age Mean (SD)	Gender, female (%)	Setting	Country	Language
Greco et al., (2008)	181 (Study 1)	11-14	12.69 (SD 1.98)	56%	Non-clinical	USA	English
	513 (Study 2)	10-16	12.43 (SD 2.14)	53%			
	346 (Study 3)	10-16	12.63 (SD 1.74)	60%			
	329 (Study 4)	10-16	12.70 (SD 1.56)	64%			

Table 6 presents the characteristics of the included studies. The original (Greco et al., 2008) English version of the AFQ-Y8 was evaluated in 10 studies, with 5 studies from USA (Biglan et al., 2015; Fung et al., 2019; O'Dell et al., 2020; Petts et al., 2017; Renshaw 2017) and 4 studies from Australia (Livheim et al., 2015; Tan & Martin 2012, 2015, 2016). The most frequently evaluated non-English language versions were Swedish (Cederberg et al., 2017, 2018, 2019; Livheim et al., 2016, 2020) and Spanish (Garcia-Robio et al., 2020; Salazar et al., 2019; Turanzas et al., 2018). Most of the studies (***n***= 16) were conducted in a non-clinical setting (e.g. school) and had a higher percentage of female to male respondents (***59.7%***).[2]

[2] Livheim et al., (2020) did not provide a percentage.

Table 6.

*Characteristics of Study Populations that completed the AFQ-Y8 (**n**= 24)*

Authors	Population characteristics				Characteristics of AFQ-Y8 administration		
	N	Age Range	Age Mean (SD)	Gender, female (%)	Setting	Country	Language
Biglan et al., (2015)	3965	11-14	___ (SD ____)	50.3%	Non-clinical	USA	English
Cederberg et al., (2017)	61	7-18	12.70 (SD 3.4)	45.9%	Clinical	Sweden	Swedish
Cederberg et al., (2018)	61	7-18	12.70 (SD 3.4)	45.9%	Clinical	Sweden	Swedish
Cederberg et al., (2019)	61	7-18	12.70 (SD 3.40)	45.9%	Clinical	Sweden	Swedish
Christodoulou et al., (2018)	432	15-19	16.10 (SD 0.99)	37.5%	Non-clinical	Cyprus	Greek
Fung et al., (2019)	145	13-15	13.99 (SD 0.36),	67.6%	Non-clinical	USA	English
Garcia-Robio et al., (2020)	459 Sample 1	7-12	9.44 (SD 1.12)	46%	Non-clinical	Spain	Spanish
	523 Sample 2		13.63 (SD 0.79)	49.5%			
Livheim et al., (2015)	51	12-18	14.6 (SD 1.03)	85.8%	Non-clinical	Australia	English
Livheim et al., (2020)	69	16-18	17.3 (SD ____)		Clinical	Sweden	Swedish
	91	16-18	____ (SD ____)				
Livheim et al., (2016)	159	15-20	___ (SD ____)	41%	Clinical	Sweden	Swedish
Mohsenabadi et al., (2020)	600	12-18	15.18 (SD 1.66)	48%	Non-clinical	Iran	Persian
Moran & McHugh (2020)	76	15-17	15.67 (SD 0.53)	75%	Non-clinical	Ireland	English
O'Dell et al., (2020)	110	12-19	15.1 (SD 1.5)	81.8%	Clinical	USA	English
Papachristou et al., (2018	718	13-18	15.52 (SD 1.12)	64.1%	Non-clinical	Cyprus	Greek
Petts et al., (2017)	15	14-18	15.82 (SD 1.40)	76.3%	Non-clinical	USA	English
Renshaw (2017)	219	14-19	16.30 (SD 1.29)	54.8%	Non-clinical	USA	English

Authors	Population characteristics				Characteristics of AFQ-Y8 administration		
	N	Age Range	Age Mean (SD)	Gender, female (%)	Setting	Country	Language
Salazar et al., (2019)	1127	8-18	11.11 (SD 2.73)	57%	Non-clinical	Colombia	Spanish
Shimoda et al., (2018)	660	12-15	13.18 (SD 0.89)	52.6%	Non-clinical	Japan	Japanese
Simon & Verboon (2016)	267	8-10	9.18 (SD 0.79)	49%	Non-clinical	Netherlands	Dutch
Szemenyei et al., (2018)	1572	11-20	15.39 (SD ___)	51%	Non-clinical	Hungary	Hungarian
Tan & Martin (2012)	10	13-17	15.7 (SD 1.07)	70%	Clinical	Australia	English
Tan & Martin (2015)	108	13-18	15.40 (SD 1.55)	75%	Clinical	Australia	English
Tan & Martin (2016)	93	13-18	15.02 (SD 1.55)	48%	Non-clinical	Australia	English
Turanzas et al., (2018)	22	8-14	11.36 (SD 1.89)	27.3%	Non-clinical	Spain	Spanish

Synthesised evidence

The overall ratings for the evidence for each of the COSMIN taxonomy areas of the AFQ-Y8 and the quality of evidence for this measure are described below.

Tables 7 and 8 present the COSMIN taxonomy areas examined in the reviewed studies. The tables illustrate the '*methodological quality'* rating (very good to inadequate) alongside a '*result rating'*. The result rating was obtained through the application of the 'updated criteria for good measurement properties' (sufficient to indeterminate). As not all studies examine every area of measurement, some boxes could not be completed. According to COSMIN guidelines, measurement properties that are not explored in studies should be ignored, but it is recommended to still apply the format as shown for Tables 7 and 8.

Table 9 presents the 'summary of findings', which summarises the pooled evidence from the '*internal structure'* and then using the modified GRADE approach, provides a rating of the *quality of reviewed evidence* (high to low).

Content Validity

Greco et al's., (2008) development and evaluation study was the only source available to examine content validity. Using the COSMIN guidelines and applying the modified GRADE approach, there was deemed to be *low* quality of evidence for *relevance, comprehensiveness,* and *comprehensibility* for the AFQ-Y8. This decision was reached due to several failings in the Greco study. Examples of some of the reasons are as follows: (1) From a 'PROM design' perspective, the study was judged to have not used a scientifically robust process (e.g. Delphi) to identify relevant items. (2) It is not evidenced within the paper if a cognitive interview protocol was used or following the pilot process whether conversations were coded or analysed. (3) The study sample was small (9 individuals) and it was therefore judged that saturation was unlikely to have been reached. (4) With respect to 'comprehensibility', although the adolescent participants were asked about the wording of the items, they

were not asked about the scale or instructions. (5) With respect to 'comprehensiveness', it appears that neither the adolescent participants nor professionals were asked about this area." As a result, the quality of evidence for the *content validity* for the AFQ-Y8 was rated *low*.

Structural Validity

The AFQ-Y8 is presented by Greco et al., (2008) as being a one-factor unidimensional scale. Of the 24 studies reviewed, 9 studies examined the structural validity of the AFQ-Y8. By applying the COSMIN methodology quality rating, 8 studies rated *very good* and 1 study rated *adequate* (Cederberg et al., 2018). Cederberg et al., (2018) used Principal Component Analysis, which COSMIN rates as adequate. COSMIN emphasise the importance of sample size for structural validity and to be graded as very good, a sample size of ≥100 was required. As a result, Cederberg et al., (2018) was further downgraded (N = 61). Due to the quality of the other studies, the overall quality of evidence for *structural validity* was rated as *high.*

Internal Consistency

Internal consistency of the AFQ-Y8 was well supported in the 13 studies that examined this measurement. In this review, the reported range was α =.74 (Szemenyei et al., 2018) to α =.90 (Livheim et al., 2016), with one measure using omega (ωs). Whilst COSMIN recommends Cronbach's Alpha, Sijtsma & Emons (2011) commented on appropriateness of alpha and made an argument for omega. Shimoda et al., (2018) reported ωs =.90 for internal consistency, which was interpreted in-line with the other studies and incorporated into the grading. Overall, the 13 studies demonstrated very good methodological quality and the overall quality of evidence, using the modified GRADE approach, was *high*.

Cross-cultural Validity/Measurement Invariance

Six studies examined measurement invariance. Measurement invariance evaluates whether statistically the same construct (e.g. PF) is being measured across comparable (e.g. demographic) groups. Findings from 4 of the studies provided evidence for measurement invariance for both age and gender and in addition, Garcia-Robio et al., (2020) found measurement invariance for age and gender for both a child and adolescents sample. The methodological quality rating for these 4 studies was *very good*. Conversely, Christodoulou et al., (2018) and Livheim et al., (2016) were rated as *doubtful* and *adequate* for methodological quality. Consequently, both studies were downgraded from very good due to limitations with their sample. The Christodoulou et al., (2018) sample was restricted to adolescents aged 15-17years old, which is deemed an *important flaw* when applying the COSMIN guidelines. Livheim et al., (2016)'s sample (*N* = 160) is deemed too small according to the COSMIN guidelines, which requires ≥200 to obtain a rating of very good. In addition, Livheim et al., (2016) and Szemenyei et al., (2018) reported differences in *scalar invariance* and that the AFQ-Y8 may have different interpretation depending on age.

The two areas that were most commonly used to determine *measurement invariance* were gender and age. Overall, using the modified GRADE approach and applying the risk of bias, the quality of evidence grade was *moderate*.

Reliability

Reliability (test-retest) measures the amount of the total variance in the process/outcome scores, which is the result of true differences between respondents. COSMIN requires an intraclass correlation coefficient (ICC) of >.70 to be rated as very good. Reliability was reported for 9 studies, 3 studies evaluated the intraclass correlation coefficient (ICC) reliability, one study used Pearson (*r*), and the remaining 5 studies did not report ICC or (*r*) and were therefore downgraded. The

studies using an ICC reported ratings lower than the COSMIN criteria and were subsequently rated as *insufficient*. The 3 remaining studies were also rated as *insufficient*. There were several methodological limitations and overall the quality of evidence for reliability was deemed *low.*

Criterion Validity

COSMIN regard criterion validity as an identified measure's ability to accurately reflect a 'gold standard' measure, which for short-form measures is the full-form. One study reported on *criterion validity*. The COSMIN standards require an Area Under the Curve (AUC) or correlation report of ≥ .70. Renshaw et al., (2017) study evaluated the AFQ-Y8 as a school mental health tool for identifying cases of depression and anxiety. The study reported the AFQ-Y8 had an excellent ability to identify students with and without clinical-level depression (AUC 0.91) and anxiety (AUC 0.90). However, the methodological quality was rated as *doubtful*, due to the sample diversity and study design. Overall, due to the methodological quality, using the modified GRADE approach, the quality of evidence was deemed *moderate*.

Hypotheses Testing and Responsiveness

The final two measurement properties examine construct approach through evaluation of hypotheses testing for construct validity and responsiveness. In this systematic review, included studies reported the AFQ-Y8 being compared with other measure(s) for either convergence or divergence, or used the AFQ-Y8 as an outcome/process measure with an intervention.

COSMIN guidance references that measuring construct validity requires a comparison against a '*gold standard' or* other (appropriately validated) process/outcome measures. The guidance states that for a short-form, the full version can be considered as a 'gold-standard'. Of the studies that were reviewed under responsiveness, 10 studies used the AFQ-Y8 as a process measure with

individuals to evaluate an intervention. Applying the COSMIN guidelines, the studies where rated as *sufficient* and graded as having a *high* quality of evidence.

In considering other measures, Greco et al., (2008) correctly hypothesised that the AFQ-Y8 would correlate positively with adverse outcomes such as somatic complaints, internalising symptoms and problem behaviour; and negatively correlate with outcomes such as quality of life, social skills, and academic competence. Greco et al., (2008) also correctly anticipated positive connections with specific categories of cognitive avoidance (i.e. thought suppression) and negative associations with processes related to psychological flexibility (i.e. mindfulness and acceptance). Some studies demonstrated methodological limitations due to use of non-validated measures or reporting comparisons with measures, but not stating psychometric properties. For example, Biglan et al., (2015) hypothesised a relationship between family conflict and experiential avoidance. This study used the AFQ-Y8 and provided the following description for the family conflict measures: “items were assessed on a 4-point scale. The items asked how frequently family members (1) insulted or yelled at each other and (2) had serious arguments” (p.32). In similar studies this resulted in the methodological quality of the study being rated as doubtful or inadequate. Overall, there were 16 hypotheses related to convergent and divergent validity, with *sufficient* to *high* quality of evidence.

Table 7.

Methodological Quality and Result Rating for Structural Validity, Internal Consistency, Measurement Invariance and Reliability

Author	Structural Validity		Internal Consistency		Measurement Invariance		Reliability	
(*N = Sample*)	Meth Qual	Result (Rating)	Meth Qual	Result (Rating)	Meth Qual	Result (rating)	Meth Qual	Result (rating)
Cederberg et al., (2018) *(N= 61)*	Adequate	Not all information for a (+) report (?)	Very good	Cronbach's α = 0.76 (+)	-	-	Adequate	ICC (agreement) = 0.64 (-)
Christodoulou et al., (2018) *(N= 432)*	Very good	Unidimensional scale (CFI = 0.97) (+)	Very good	Cronbach's α = 0.85 (+)	Doubtful	No important DIF found (+) (age and gender)	-	-
Fung et al., (2019) *(N= 145)*	-	-	Very good	Cronbach's α = 0.79 (+)	-	-	-	-
Garcia-Robio et al., (2020) *(N= 982)*	Very good	Unidimensional scale (CFI = 0.98 / TLI = 0.97) (+)	Very good	Cronbach's α = 0.83 (+)	Very good	No important DIF found (age and gender) (+)	Adequate	ICC (agreement) = 0.64 children 0.68 adolescent (-)
Livheim et al., (2015) *(N= 51)*	-	-	Very good	Cronbach's α = 0.89 (+)	-	-	-	-
Livheim et al., (2016) *(N= 159)*	Very good	Unidimensional scale (CFI = 0.98 / SRMR 0.07) (+)	Very good	Cronbach's α = 0.90 (+)	Adequate	DIF was found (age) (-)	Adequate	Pearson (agreement) = 0.80 (-)

Note: '-' = No information provided

Author (*N* = *Sample*)	Structural Validity		Internal Consistency		Measurement Invariance		Reliability	
	Meth Qual	Result (Rating)	Meth Qual	Result (Rating)	Meth Qual	Result (rating)	Meth Qual	Result (rating)
Moran & McHugh (2020) *(N= 76)*	-	-	Very good	Cronbach's α =.78 (+)	-	-	-	-
O'Dell et al., (2020) *(N= 110)*	-	-	-	-	-	-	Inadequate	No ICC or Pearson or Spearman correlations calculated (?)
Papachristou et al., (2018) *(N= 718)*	-	-	Very good	Cronbach's α =.85 (+)	-	-	-	-
Petts et al., (2017) *(N= 15)*	-	-	-	-	-	-	Doubtful	Pearson / Spearman correlation coefficient calculated without additional evidence (-)
Renshaw (2017) *(N= 219)*	Very good	Unidimensional scale (CFI = 0.99 / RMSEA 0.03) (+)	Very good	Cronbach's α =.83 (+)			-	-
Salazar et al., (2019) *(N= 1127)*	Very good	Unidimensional scale (CFI = 0.99 / RMSEA 0.04) (+)	Very good	Cronbach's α =.82 (+)	Very good	No important DIF found (age & gender) (+)	-	-
Shimoda et al., (2018) *(N= 660)*	Very good	Unidimensional scale (CFI = 0.99 / SRMR 0.05) (+)	Very good	Omega ωs =.90 (+)	-	-	-	-

Author (*N* = *Sample*)	Structural Validity		Internal Consistency		Measurement Invariance		Reliability	
	Meth Qual	Result (Rating)	Meth Qual	Result (Rating)	Meth Qual	Result (rating)	Meth Qual	Result (rating)
Simon & Verboon (2016) *(N= 267)*	Very good	Unidimensional scale (CFI = 0.97 / TLI = .96 / RMSEA 0.05) (+)	Very good	Cronbach's α =.79 (+)	Very good	No important DIF found (age & gender) (+)	-	-
Szemenyei et al., (2018) *(N= 1572)*	Very good	Unidimensional scale (CFI = 0.95 / TLI = .93 / RMSEA 0.05) (+)	Very good	Cronbach's α =.74 (+)	Very good	DIF was found (Age) (-)	-	-
Tan & Martin (2012) *(N= 10)*	-	-	-	-	-	-	Inadequate	No ICC or Pearson or Spearman correlations calculated (?)
Tan & Martin (2015) *(N= 108)*	-	-	-	-	-	-	Inadequate	No ICC or Pearson or Spearman correlations calculated (?)
Tan & Martin (2016) *(N= 93)*	-	-	-	-	-	-	-	-
Turanzas et al., (2018) *(N= 22)*	-	-	-	-	-	-	Inadequate	No ICC or Pearson or Spearman correlations calculated (?)

Table 8.

Methodological Quality and Result Rating for Measurement Error, Criterion Validity, Hypotheses Testing, Responsiveness

Author	Measurement Error		Criterion Validity		Hypotheses (H) Testing		Responsiveness	
(*N = Sample)*	Meth Qual	Result (Rating)	Meth Qual	Result (Rating)	Meth Qual	Result (rating)	Meth Qual	Result (rating)
Biglan et al., (2015) *(N= 3965)*	-	-	-	-	Inadequate	Convergent Validity - Results in line with 1 H (1+)	Inadequate	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Cederberg et al., (2017) *(N= 61)*	-	-	-	-	Very good	Convergent Validity - Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Cederberg et al., (2018) *(N= 61)*	-	-	-	-	Very good	Convergent Validity - Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Cederberg et al., (2019) *(N= 61)*	-	-	-	-	Very good	Convergent Validity - Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Christodoulou et al., (2018) *(N= 432)*	-	-	-	-	Doubtful	Convergent Validity - Results in line with 1 H (1+)	Doubtful	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Fung et al., (2019) *(N= 145)*	-	-	-	-			Very good	Construct approach (Intervention) – Results in line with 1 H (1+)

Note: '-' = No information provided

Author	Measurement Error		Criterion Validity		Hypotheses (H) Testing		Responsiveness	
(*N = Sample)*	Meth Qual	Result (Rating)	Meth Qual	Result (Rating)	Meth Qual	Result (rating)	Meth Qual	Result (rating)
Garcia-Robio et al., (2020) *(N= 982)*	-	-	-	-	Very good	Convergent Validity - Results in line with 1 H (1+)	Very good	Construct approach (Intervention, another measure) - Results in line with 2 H (2+)
Livheim et al., (2015) *(N= 61)*	-	-	-	-	-	-	Very good	Construct approach (Intervention) – Results in line with 1 H (1+)
Livheim et al., (2020) *(N= 61)*	-	-	-	-	-	-	Very good	Construct approach (Intervention) – Results in line with 1 H (1+)
Livheim et al., (2016) *(N= 61)*	-	-	-	-	Very good	Convergent Validity - Results in line with 1 H (1+)	Very good	Construct approach (Intervention, another measure) - Results in line with 2 H (2+)
Mohsenabadi et al., (2020) *(N= 61)*	-	-	-	-	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Moran & McHugh (2020) *(N= 61)*	-	-	-	-	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)
O'Dell et al., (2020) *(N= 61)*	-	-	-	-	-	-	Doubtful	Construct approach (Intervention) Results in line with 1 H (1+)

Author	Measurement Error		Criterion Validity		Hypotheses (H) Testing		Responsiveness	
(*N = Sample)*	Meth Qual	Result (Rating)	Meth Qual	Result (Rating)	Meth Qual	Result (rating)	Meth Qual	Result (rating)
Papachristou et al., (2018 *(N= 718)*	-	-	-	-	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Petts et al., (2017) *(N= 15)*	-	-	-	-	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (Other instrument / Intervention) Results in line with 2 H (2+)
Renshaw (2017) *(N= 219)*	-	-	Doubtful	AUC = .91 (+)	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (Comparison AFQ-Y / another instrument 2 H (2+)
Salazar et al., (2019) *(N= 1127)*	-	-	-	-	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Shimoda et al., (2018) *(N= 660)*	-	-	-	-	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Simon & Verboon 2016) *(N= 267)*	-	-	-	-	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)
Szemenyei et al., (2018) *(N= 1572)*	-	-	-	-	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (another measure(s)) - Results in line with 1 H (1+)

Author (*N = Sample)*	Measurement Error		Criterion Validity		Hypotheses (H) Testing		Responsiveness	
	Meth Qual	Result (Rating)	Meth Qual	Result (Rating)	Meth Qual	Result (rating)	Meth Qual	Result (rating)
Tan & Martin (2012) *(N= 10)*	-	-	-	-	-	-	Very good	Construct approach (Another instrument) Results in line with 1 H (1+)
Tan & Martin (2015) *(N= 108)*	-	-	-	-	-	-	Very good	Construct approach (Intervention) Results in line with 1 H (1+)
Tan & Martin (2016) *(N= 93)*	-	-	-	-	Very good	Convergent Validity – Results in line with 1 H (1+)	Very good	Construct approach (Another instrument) Results in line with 1 H (1+)
Turanzas et al., (2018) *(N= 22)*	-	-	-	-	-	-	Very good	Construct approach (Intervention) Results in line with 1 H (1+)

Table 9.
Summary of Findings for AFQ-Y8

COSMIN taxonomy measurement property	Summary or pooled results	Overall rating	Quality of evidence
Content validity	-Only the development study available to examine content validity	Insufficient (-)	Low
	-Relevance	Indeterminate (?)	Low
	-Comprehensiveness	Insufficient (-)	Low
	-Comprehensibility	Insufficient (-)	Low (downgraded due to methodology quality)

COSMIN taxonomy measurement property	Summary or pooled results	Overall rating	Quality of evidence
Structural validity	-One factor, unidimensional scale (100% supported) Christodoulou et al., (2018) – CFI 0.97 Garcia-Robio et al., (2020) – CFI 0.98 Livheim et al., (2016) – CFI 0.98 Renshaw (2017) – CFI 0.99 Salazar et al., (2019) – CFI 0.99 Shimoda et al., (2018) – CFI 0.99 Simon & Verboon 2016 – CFI 0.97 Szemenyei et al., (2018) – CFI 0.95 Total sample size: 5650	Sufficient (+)	High
Internal consistency	CFI: α =.74 to .90 Cederberg et al., (2018) - α =.76 Christodoulou et al., (2018) - α =.85 Fung et al., (2019) - α =.79 Garcia-Robio et al., (2020 - α =.83 Livheim et al., (2015) - α =.89 Livheim et al., (2016) - α =.90 Moran & McHugh (2020) - α =.78 Papachristou et al., (2018) - α =.85 Renshaw (2017) - α =.83 Salazar et al., (2019) - α =.82 Shimoda et al., (2018) - ωs =.90 Simon & Verboon (2016) - α =.79 Szemenyei et al., (2018) - α =.74 Total sample size: 6140	Sufficient (+)	High

COSMIN taxonomy measurement property	Summary or pooled results	Overall rating	Quality of evidence
Cross-cultural validity / measurement invariance	Christodoulou et al., (2018) Garcia-Robio et al., (2020) Livheim et al., (2016) Salazar et al., (2019) Simon & Verboon 2016) Szemenyei et al., (2018) Total sample size: 5383	Indeterminate (?)	Moderate (downgraded due to methodological quality and good measurement properties)
Reliability	ICC ≥ 0.70 or no analysis Cederberg et al., (2018) Christodoulou et al., (2018) Garcia-Robio et al., (2020) Livheim et al., (2016) O'Dell et al., (2020) Petts et al., (2017) Tan & Martin (2012) Tan & Martin (2015) Turanzas et al., (2018) Total sample size: 2362	Insufficient (-)	Low (downgraded due to methodological quality and good measurement properties)
Criterion validity	AUC ≥ .70 Renshaw et al., (2017) – .91 Total sample size: 1845	Indeterminate (?)	Moderate (downgraded due to methodology quality)

COSMIN taxonomy measurement property	Summary or pooled results	Overall rating	Quality of evidence
Hypotheses testing	Convergent validity: Comparison with another measure 16 hypotheses 16 (+)	Sufficient (+)	High
Responsiveness	Construct approach: Another instrument and/or intervention 28 hypotheses 28 (+)	Sufficient (+)	High

Discussion

This review focused on the AFQ-Y, as an emerging measure of PF that is being increasingly adopted in research and practice. The potential benefits of the AFQ-Y8 are clear: a derivation of the most prominent measure of PF in young people, which offers greater economy and acceptability for use in both clinical and research contexts. However, short-form measures are often implemented 'ahead of the evidence', with limited appraisal of their psychometric properties or performance in relation to the original measure. Through the application of the COSMIN methodology, this systematic review evaluated the psychometric properties and the quality of evidence for the AFQ-Y8 in 24 studies.

Content Validity

Terwee et al., (2018) describe content validity as the most important measurement property and define it as, "the degree to which the content of an instrument is an adequate reflection of the construct to be measured" (p.6). Content validity consists of *relevance*, *comprehensiveness* and *comprehensibility* and COSMIN guidelines recommend that this should be examined prior to other measurement properties. The overall quality of evidence for AFQ-Y8 for relevance, comprehensiveness and comprehensibility was graded as *low,* suggesting key concepts are missing and raising questions about its face validity as a measure of psychological inflexibility in an adolescent population.

Internal Structure Properties

The COSMIN guidelines stipulate that evidence for structural validity is a pre-requisite for measurement invariance and internal consistency as these measurement properties focus on the process measure items and their relationship. The initial AFQ-Y8 development study reported a one-factor unidimensional scale, which was supported in the reviewed studies.

Avoidance and Fusion Questionnaire for Youth (Shor…

Internal consistency was the most commonly reported measurement property for the internal structure properties (i.e. structural validity, internal consistency, measurement invariance) and was graded *high* for its quality of evidence. Measurement invariance is a measure of how reliably the instrument measures the stated construct across different groups (e.g. age, gender, culture). This incorporates configural (factor structure is the same across groups), metric (factor loadings are similar across groups) and scalar (values are equivalent across groups) invariance, with the two downgraded studies (Livheim et al., 2016; Szemenyei et al., 2018) concluding scalar differences. Overall, using the modified GRADE approach and applying the risk of bias, the quality of evidence grade was *moderate*.

Remaining Measurement Properties

With respect to reliability, both the methodological quality and subsequent rating were less than adequate and resulted in the quality of evidence being graded *low*. Of the 24 studies, criterion validity was only reported on by Renshaw et al., (2017). Despite the AUC .91 being sufficient, the methodological quality resulted in the study being graded as *moderate*. However, given the limited information available, it is recommended that further studies evaluate criterion validity before any firm conclusions can be asserted. Applying the COSMIN guidelines to the final two measurement properties, hypotheses and responsiveness, the overall rating was sufficient and graded as having a high quality of evidence.

Integration of the Findings

Smith et al., (2000) highlighted several concerns about the potential structural '*sins'* of short-form measures. By cross referencing the Greco et al., (2008) study and results of the review, Smith's concerns appear well founded.

In evaluating content validity, a limitation in the Greco et al., (2008) development and evaluation study is the absence of information regarding how item

content was derived. It is not stated whether cognitive interviews were conducted with adolescents and specifically there is no information pertaining to whether *comprehensiveness* was considered or evaluated at any point. Additionally, with regards to professionals, the Greco et al., (2008) paper does not provide any information on whether *relevance*, *comprehensiveness* and *comprehensibility* were evaluated. Willis, Lessler and Casper (1999) have questioned the validity of research, when the overall face validity of a measure is threatened due to individuals perceiving item meaning in a different way to the author's original intention. The process and outcome literature suggest that cognitive interviewing should be considered mandatory in the development of process/outcome measuring tools (Boeije and Willis, 2013). The issues highlighted with content validity present a significant challenge to researchers and clinicians who have used the AFQ-Y8 as a means of evaluating process change or for providing evidence for validating interventions or commissioning services.

The highlighted content validity issues raise questions not only with the English version of the AFQ-Y8, but also with the many translated versions. COSMIN guidelines emphasise the importance of conducting further cognitive interviews following translation. This recommendation has not been adhered to in any of the reviewed studies. This raises additional questions about the validity of the translated versions and the reliability of current research.

A further concern following the review relates to the general application of the AFQ-Y8. Due to its lower internal consistency ($\alpha = 0.83$, and person separation reliability .75), Greco et al., (2008) recommended that the AFQ-Y8 might be best utilised for group research as opposed to being primarily used as an individual clinical evaluation tool. Also, with regards to reliability, Greco et al., (2008) concluded that the results of the cross-validation sample meant the AFQ-Y8 reliability was considered too low for individual patient assessment. Of the reviewed studies, all of them applied the AFQ-Y8 on an individual basis, with 11 out of 13 using it with

a non-clinical population for either the purpose of validating a translated version or as part of a school-based intervention. This raises a concern as the examined evidence does not show any additional content validity work, which again raises questions regarding the validity of data from studies that have applied the AFQ-Y8; and also, the ability for the measure to perform reliably on a test-retest basis.

With respect to the general applicability of the AFQ-Y8, findings of measurement non-invariance raise concerns about developmental differences and the applicability of the AFQ-Y8 across its intended age range. Livheim et al., (2016) and Szemenyei et al., (2018) found significant scalar non-invariance between age groups. Of note, both of these studies included samples with older adolescents (15-20 and 11-20 years of age) and observed differences that may reflect developmental differences, such that item-wordings are interpreted differently by older adolescents (Christodoulou et al., 2018; Livheim et al., 2016). As the AFQ-Y8 is being widely used amongst children and younger adolescents, this raises further questions about the validity of available data.

Psychological health and mental well-being are being increasingly viewed as priorities within an adolescent population (Department of Health, Department of Education, 2017). It is recognised that PF is a key change process for fostering improved psychological health (well-being) and there is a growing recognition that appropriate [validated] measurement tools are needed for key constructs, i.e. three dyadic sub-processes of PF (Bentley et al., 2019; Kwan & Rickwood, 2015). At present, the AFQ-Y and AFQ-Y8 are the most widely cited measures of psychological flexibility in an adolescent population. Whilst the AFQ-Y8 has seen increasing use, this review suggests significant psychometric flaws. In addition, Greco et al., (2011) acknowledge that the AFQ-Y8 is limited as a measure of PF due to it not measuring ‘present moment awareness’, whilst Garćia-Rubio et al., (2020) have raised concerns about its ability to accurately measure experiential avoidance in an adolescent population. The increasing utilisation of ACT in an adolescent

population demands that a validated measurement tool exists to measure all sub-aspects of the model's central construct, psychological flexibility. More broadly, clinical and research activities require robust and valid measurement tools. From a research perspective, whilst measuring PF is important, there is a requirement to quantify where and how change has taken place, i.e. within which area(s) of the three-dyadic sub-processes. This will provide important information as to whether change is occurring in line with the expected underlying theory and will be important in intervention-based research in comparing ACT/ACT-based interventions against treatment as usual. Clinically, a greater understanding of the sub-processes enables clinicians to inform the clinical cycle. Collectively, this will also provide a more robust scientifically based justification for service developments or commissioning ACT-based interventions.

Strengths and Limitations

The findings of this study should be considered in the context of the limitations. The strength/conclusiveness of any review is contingent on the quality of underpinning primary studies, and so present findings are partly limited by the identified limitations of studies included in the review. For example, of the selected studies, several displayed limitations due to the sample heterogeneity and power. Equally, there were inconsistencies in the reporting of ACT experience and skills in studies that evaluated ACT-informed interventions. With respect to reliability, there was poor reporting generally with variation in test-retest periods (2-weeks – 3-months) and also a failure to report conditions surrounding test-retest. A further limitation of the review was the author was not able to evaluate or report on measurement error, due to an absence of reviewed studies reporting on this domain.

A significant limitation of the AFQ-Y8 was the content validity. Whilst there is no reference to cognitive interviews being used it is possible that they did but were

not reported. If there is additional information, then this could have an impact on the results.

For the purpose of this report, it was a requirement that the review was completed individually (by a single author). This directly contradicts both the COSMIN and Cochrane guidance, which suggest a minimum of two reviewers, one of whom should have a prior knowledge of outcome measure development and evaluation.

A strength of this study however was the use of the COSMIN guidelines. The author acknowledges some level of subjectivity, but the dependability and reproducibility of the present review was bolstered through adherence to the strict, consensus-based COSMIN guidelines.

Recommendations for Future Work and Implications for use

The review has raised questions about the application of the AFQ-Y8. Future research should evaluate the psychometric properties of the AFQ-Y8 and its use with different child and adolescent age-groups. Given that the AFQ-Y and AFQ-Y8 were developed alongside one another, it is also suggested that the AFQ-Y be reviewed using the COSMIN guidelines as, due to the measures being co-developed, it is likely that the content validity of the 17-item version may experience similar limitations.

Conclusions

The AFQ-Y8 demonstrated sufficient high-quality evidence for 4 out of the 8 examined COSMIN taxonomy of measurement properties (measurement error was not assessed). With regards to the proposed one-factor unidimensional scale, the reviewed studies found very good methodological quality and a high quality of evidence. Similar supportive findings were reported for internal consistency. In the studies that examined convergent validity and known-group hypotheses, both

concluded sufficient high-quality evidence, with a similar conclusion drawn for responsiveness. However, despite the strong conclusions for the methodological quality and quality of evidence for key psychometric properties, the content validity of the AFQ-Y8 was evaluated as being low in quality of evidence for relevance, comprehensibility and comprehensiveness. COSMIN identifies content validity as the principal condition for the validity of a process/outcome measurement tool. The outcome of this review raises questions and concerns about what the AFQ-Y8 measures and whether researchers and clinicians can confidently report their findings when using this measure. Given the findings, COSMIN guidelines suggest that the AFQ-Y8 can be used but requires additional research to assess quality. Further studies are therefore recommended into the AFQ-Y8's content validity and reliability. Moreover, there remains an unmet need to identify a robustly developed comprehensive measure of PF for use with the adolescent population, which evaluates all sub-processes of this important construct.

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Cognitive Interviewing-based Validation of the Comprehensive Assessment of Acceptance and Commitment Therapy in an Adolescent Population.

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This empirical paper has been prepared for submission to the *Journal of Contextual Behavioral Science.* The editorial guidelines can be found at Appendix 1.
The South Wales DClinPsy have placed an 8000-word limit on this paper due to the removal of paper 3

Abstract

The author describes the evaluation of content validity of an extant measure of Psychological Flexibility (PF) and presents the development of a revised measure for an adolescent population. PF is recognised as a key aspect of psychological health and mental-well-being and a common target of contemporary cognitive and behavioural interventions for promoting psychological health, most explicitly within Acceptance and Commitment Therapy (ACT). Given its purported centrality to psychological health, it is important that validated measures of PF are available; however, no comprehensive measure of PF exists within an adolescent population. Across 2 studies, an extant PF measure – the Comprehensive assessment of ACT processes (CompACT) was evaluated in terms of its content validity for an adolescent population and responsively adapted to produce a suitable population-specific measure. In study 1, cognitive interviewing was conducted with 36 students (11-18yrs), with analysis showing that adolescents found problems with all 23-items, specifically in the understanding stage and predominantly lexical problems. Analysis generated an alternative pool of items with age-specific adaptations. In study 2, consultation with 11 experts (in PF and/or using ACT with adolescents) using a web-based survey informed selection of a final set of 23 alternative items with confirmed construct relevance for gauging PF in this population. The outcome of study 1 and 2 is a revised comprehensive measure of PF, which requires psychometric validation.

Keywords: Psychological Flexibility, Acceptance and Commitment Therapy, Cognitive Interviewing, Process/Outcome Measure, Adolescence

Introduction

In the present study, cognitive interviewing procedures were used with an adolescent population to examine the translational[3] validity of a psychometric measure initially validated with an adult population.

Adolescent Mental Health & Wellbeing

The World Health Organisation (WHO) (2019) defines '*adolescence*' as the period between the ages of 10–19 years old, and reference it as a unique and formative time in an individual's life. During adolescence, significant physical, emotional, and social changes occur, leaving adolescents susceptible to developing mental health problems (Bellis, Hughes, Leckenby, Perkins, & Lowey, 2014).

The Government green paper, '*Transforming children and young people's mental health provision*' stated that "one in ten young people has some form of diagnosable mental health condition" and acknowledged "that children with mental health problems face unequal chances in their lives" (Department of Health, Department of Education, 2017, p. 3-4). Historically, mental health has been viewed from the perspective of a medical model and diagnosis (Deacon, 2013). However, a growing literature has provided an alternative framework, whereby individuals' mental health difficulties are seen as better understood within the context they occur (Boyle & Johnstone, 2014). This shift has moved the focus from diagnosis towards preventive ideas, such as increasing an individual's sense of self-worth and self-efficacy, strengthening positive relationships, and directing focus towards ideas/activities that positively impact a person's purpose in life. These ideas have been referred to as '*mental wellbeing*' or '*positive mental health*' and are proposed as buffers against the development of mental health difficulties (for example, depression and anxiety) (Peter, Roberts, & Dengate, 2011; Van Agteren & Iasiello, 2019).

[3] Translational validity reflects extent to which a measure reflects our theoretical understanding of a target concept – in terms of face-to-face content validity

The WHO (2005) identified the key components of positive mental health as "(1) [an individual's] well-being, (2) effective functioning of an individual, and (3) effective social functioning for a community" (p.2). Consistent with this view, the focus has shifted to approaches which strive to increase psychological health and improve psychological functioning (Schulenberg, Bryant, & O'Malley, 2004; Westerhof & Keyes, 2010).

School-based approaches to psychological health are often targeted at promotion of prosocial behaviours and skills and exist at varying levels from nationally to local education authorities, to individual schools. As school-based research has developed, government papers have highlighted the necessity to identify and evaluate the effectiveness of school well-being interventions (Department of Education, 2018; NHS Health Scotland, 2012; Public Health, England, 2014). In collaboration with the Anna Freud Centre for Children and Families, Public Health England (2016) produced 'A Toolkit for Schools and Colleges', which provided a comprehensive rationale for monitoring mental well-being and evaluating well-being initiatives.

Outcome measurement tools for monitoring and evaluating psychological health are limited in school-based populations (Blank et al. 2009). In school settings, authors have highlighted that this has led to *ad-hoc* tools being developed (Sancassiani et al., 2015). Sancassiani et al., (2015) suggest that this is a result of a lack of understanding and uncertainty around key constructs.

Psychological Flexibility

Psychological Flexibility (PF) is defined as the individual's ability to maintain or change behaviour according to personally-held goals or values, with appreciative awareness of situational affordances and non-judgmental openness to ongoing thoughts and feelings (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Hayes, Strosahl, & Wilson, 2011). The PF model is based on an experimental analysis of language and

thought, with the hypothesis that these processes exert control over our behaviour. The model reflects that this verbal control can have both negative and positive consequences for an individual, with potential to facilitate or obstruct effective action, depending on the adaptive flexibility of our responses to verbal and cognitive events. Whilst PF is now widely known as a model, it is not an entirely new concept given that similar concepts exist , among them ego-resiliency (Block, 1961), executive control (Posner & Rothbart, 1998), response modulation (Patterson & Newman, 1993), and self-regulation (Carver & Scheier, 1998; Muraven & Baumeister, 2000).. PF pertains to the "ability to contact the present moment more fully as a conscious human being and to change or persist in behaviour when doing so serves valued ends" (Hayes, Luoma, Bond, Masuda & Lillis, 2006, p.7). In a paper assessing PF as a construct it was concluded PF whilst clinically useful also provided a uniqueness amongst other overlapping constructs (Gloster et al., 2011).

The construct of PF has been postulated to be a central aspect of psychological health, with a paper by Kashdan and Rottenberg (2010) providing a clear rationale to support its claims regarding PF being the "*cornerstone*" of health.

PF is understood to reflect three dyadic sub-processes, referred to by Hayes, Villatte, Levin and Hildebrandt (2011) as *open, aware* and *active*. 'Open' pertains to an individual's ability to practice non-judgemental awareness of internal and external events and the process of learning to notice thoughts and not view them as 'real'. 'Aware' involves an individual being aware of the sensory experience of the present moment and being able to make the distinction between themselves and the challenges / distress they are experiencing. Lastly, 'active', refers to an individual's ability to demonstrate committed action to lead a life based upon their values.

In comparison to the extensive adult PF literature (Bond, Flaxman & Lloyd, 2016), there is a dearth of evidence evaluating the role of PF in an adolescent sample. McCracken, Gutiérrez-Martínez and Smyth, (2013) concluded that individuals with chronic pain who have higher levels of PF (i.e. non-judgemental openness to experience) are more able to lead meaningful and fulfilled lives. In

addition, Wersebe, Leib, Meyer, Hofer and Gloster, (2018) demonstrated in a randomised control trial that it is possible to decrease prolonged stress and increase well-being through a self-help PF adolescent intervention.

PF arguably forms a common target of contemporary behavioural and cognitive therapies (Hayes et al., 2011). However, PF is most explicitly operationalised and targeted within the model of Acceptance and Commitment Therapy (ACT; Bond et al., 2011; Harris, 2019; Hayes et al., 2006; Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Swain, Hancock, Dixon and Bowman (2015) reviewed the evidence for ACT's effectiveness in an adolescent population. The paper reported on 21 studies involving interventions for various presenting factors and concluded that despite the "infancy" of ACT as a PF-focussed intervention, "emerging" evidence suggests that it produces significant results.

Psychological Flexibility Psychometric Measures

Despite the increasing recognition of the role of PF in psychological health and well-being a debate remains regarding the comprehensiveness of existing PF measures to accurately capture the theoretical aspects of the PF Model (Gámes, Chmielewski, Kotov, Ruggero, & Watson 2011; Wolgast, 2014). For example, the AAQ-II (Acceptance and Action Questionnaire II; Bond et al., 2011) although psychometrically valid, does not measure PF in a more general sense, as it fails to address avoidance of physical sensations (Livheim et al., 2016). The development of the 23-item CompACT (Comprehensive assessment of Acceptance and Commitment Therapy processes) by Francis, Dawson & Golijani-Moghaddam (2016) was purported to be the first singular comprehensive measure of PF. The CompACT assesses three sub-processes of PF, shifting beyond the single-dimension of the AAQ-II. The CompACT aims to provide a more thorough representation of the PF sub-processes by assessing: (1) openness to experience, (2) behavioural awareness, and (3) valued action. However, the CompACT was not developed for,

and has not been validated with an adolescent population. Willis (2015) highlighted the risks of using measurement tools on unvalidated populations, stressing the challenges to both the construct validity and comprehensibility. Additionally, in a recent study where the CompACT was used as a primary outcome measure amongst an adolescent sample, Harris, Samuel and Constable (2019) found that respondents reported difficulties interpreting the meaning of many items of the questionnaire.

Whilst the AAQ-II and CompACT were developed for an adult population, the 17-item, Avoidance & Fusion Questionnaire - Youth (AFQ-Y) (Greco, Lambert & Baer, 2008) is a self-report measure of cognitive fusion and experiential avoidance for adolescents. Although the AFQ-Y has been referenced as being a measure of psychological inflexibility within the adolescent population (Garćia-Rubio et al., (2020) it has been recognised that it is not a comprehensive measure of PF as it fails to measure 'present moment awareness' (Greco et al., 2011). In addition, several studies have raised concern over its unstable factor structure and the subsequent effects on its internal consistency (García-Rubio et al., 2020; Valdivia-Salas, Martín-Albo, Zaldivar, Lombas, & Jiménez, 2017).

Outcome measure research has identified the importance of ensuring measures are relevant, comprehensive, and comprehendible for their target population (Conrad & Blair 1996; Drenman, 2003; Tourangeau, 1984). Poorly developed measures have a significant impact on the ability to effectively evaluate interventions and produce empirically grounded recommendations.

Cognitive Interviewing

Cognitive interviewing (CI) is an applied qualitative method for examining and improving the validity of psychological measures. CI has its origins in the early 1980's and in the fields of psychology and survey methodology. Survey methodology is a form of quantitative enquiry despite it comprising of quantitative elements.

Theoretically, CI has its roots in cognitive psychology. The original version of CI comprised of four instructions, which had primarily been derived from two cognitive theories: the multicomponent view of the memory trace (Bower, 1967) and the encoding specificity principle (Tulving & Tomson, 1973). The original version faced criticism (from its employment by police investigators) for not accounting for participant anxiety or poor articulation (Köhnken et al., 1999. A further iteration, known as enhanced CI (Geisleman et al., 2986) drew on social psychology and included principles such as rapport building, giving the interviewee control and the use of pauses. Whilst acknowledgement was given to the various possibilities of how cognitive theory could be used (e.g. free and dimensional sort tasks; Forsyth & Lessler, 1991), much of the CI development arose from the laboratory setting. In particular, think aloud and retrospective reports (Ericsson & Simon, 1993).

To date, 'think aloud' and 'verbal probing' are the most consistent procedures used in cognitive interviewing (Blair & Brick, 2010). 'Think aloud' requires individual participants to verbalise their thought processes whilst responding to questionnaire items. With verbal probing, participants think aloud and are additionally asked scripted or unscripted probing questions by an interviewer (Willis, 2005). The procedure for verbal probing can be completed item-by-item or retrospectively after all items have been completed (Willis, & Artino Jr., 2013). These techniques are designed to complement one another and are used in combination throughout interviews to elicit rich data (Collins, 2003).

Eddy, Khastou, Cook and Amtmaan (2011) and Willis (2015) both emphasise the importance of early CI for measure development. In considering the context of survey or questionnaire testing, Willis (2005) asserts that cognitive interviewing aims to elucidate cognitive processes through which participants arrive at their answers. This is important as questionnaire validity is threatened when the way an individual understands and processes a statement differs from the author's original intention (Willis, Lessler & Casper, 1999).

The current evidence suggests that PF is regarded as a change process that is a cornerstone of psychological health, and that ACT is an approach that most comprehensibly operationalises and targets PF. The currently available psychometrics measure different individual sub-process of PF for young people and adolescents, but no single comprehensive measure exists for collectively measuring all sub-processes. This has resulted in a disparity of measures being used both clinically and in research, restricting potentially valuable pooling of data, as well as placing a burden on adolescents to complete multiple measures.

A validated adolescent version of the CompACT would provide a comprehensive psychometric measure to assess levels of PF in an adolescent population. This could be used to track ACT consistent process change, as well as providing a screening measure for identifying adolescents who may require additional support.

Aims

The principal aim of the study was to evaluate the construct validity of the CompACT using cognitive interviewing. Specifically, the aim was to ascertain whether or not the CompACT in its current format is understood by an adolescent population; i.e., whether item content is clear, relevant, and interpreted/responded to in terms of targeted meaning. To accomplish this aim, the construct validity of the CompACT firstly needed to be examined, prior to consulting professionals about any age-specific adaptations. To achieve this, two studies were undertaken. The following research questions were developed, informed by Walden (2008).

Research Questions

Study 1

1. Are the current item phrasings of the CompACT items comprehensible to an adolescent population?

2. If they are not, what types of problems are identified through cognitive interviewing in the context of individual responses?

3. [Subsequently] what age-specific adaptations might be required/recommended, to provide a theoretically and empirically informed item pool that has been examined with and adapted for use by an adolescent population?

Study 2

1. Can age-specific adaptations of CompACT items be identified, through consultation with ACT/PF experts, that retain the targeted meaning of the original items?

Study 1: Adolescent CI & Item Development

Methodology

Study Design

The study consisted of a cross-sectional research design using CI. CI was selected as it produces rich data on the cognitive processes by which participants arrive at their answers. As a technique, CI has been extensively used with young people. However, there is limited research directly comparing individual and group CIs to ascertain which yields the best results (Adler, Salanterä, & Zumstein-Shaha, 2019; Woolley, Edwards, & Glazebrook, 2018). Focus groups have the potential benefit of providing a safe peer environment, potentially avoiding possible power imbalance between a researcher and the adolescents, and being most efficient with time (Shaw, Brady & Davey, 2011). Conversely, there is opposing research that highlights the strengths of individual CIs, including producing more unique ideas and respondents being more likely to share personal insights and reflections, free from peer scrutiny and judgement (Guest, Namey, Taylor, Eley, & McKenna, 2017; Heary & Hennessey, 2006). There is however no conclusive evidence favouring either approach.

Despite the increasing use of CI there remains a significant variation in the manner in which specific procedures are implemented and employed; additionally, evidence suggests that reports and publications often miss (e.g. have failed to collect or measure) critical information (Boeije & Willis, 2013). To address these limitations. Boeije and Willis (2013), developed the '*Cognitive Interviewing Reporting Framework*' (CIRF): proposing that research using CI should exploit the framework to increase transparency and enable more methodologically robust CI research. The current study has employed the CIRF[4].

General Procedures

[4] For details about the CIRF, to view the framework and how the present study meets each area see Appendix 5.

The target population for this study were adolescents (aged 11–18 years) recruited from secondary school education establishments. The current study sought to interview a sample of ≥30 participants. This sample size was in-line with other similar studies (Willis, 2015).

A letter/email was sent to 8 schools inviting them to participate in the research. The letter/email (Appendix 6) was addressed to either the Head Teacher or Head of Pastoral Care and contained comprehensive information about the study. Consent for this study utilised a hybrid approach. For KS3 (Years 7-8) and KS4 (Years 9-11), there is a requirement for Parental opt-in and child opt-in. For KS5 (Years 12-13) there is a requirement for child opt-in and parental opt-out. This was consistent with recommendations from the ethics approving body.

Participants were recruited from two secondary schools, one in England (Bristol – School 1) and the other from Wales (South Wales – School 2). The schools were encouraged to openly advertise the project during year group or key stage assemblies. The schools' information systems (for example, weekly newsletter, Schoop, ParentMail) were also suggested as supplementary means to increase awareness. Interested participants were provided with a Parent/Guardian Information Sheet (Appendix 7), an Easy-read Participant Information sheet (Appendix 8), a Participant Information Sheet (Appendix 9) and a Consent Form (based upon the hybrid consent process). Individuals were given three weeks to decide on participation and to provide appropriate consent (Appendix 10). Demographic information was collected and monitored to ensure equal key stage representation and ensure maximum generalisability.

Ethical Approval

This research received ethical approval from Cardiff University (approval date: 12/04/2019; approval ref: EC.19.02.12.5568R2).

Participants

Participants were provided with a unique identifying number (UIN[5]), which was then communicated to the author. Students were assigned to either participate in an individual or group-level CI, with the only criterion being gender balance. This procedure was completed by the author who had been provided with the UIN, key stage and gender, with no other information provided.

Students were informed that they would be required for approximately 30-45 minutes (i.e., the duration of a school lesson) and anything over this would be consented at the time. Participants were also offered the opportunity to be entered into a prize draw following completion of the study. Participants received a verbal and written debrief (Appendix 11).

A total of 36 students participated of the 40 who initially volunteered (four pupils withdrew – 2 x sickness, 2 x no reasons given). Twenty students were female, 15 male and 1 student identified themselves as "other[6]". Students were 11-18 years (*M* = 15.56). The students were 83.33% White, 5.56% Mixed – White & Asian, 5.56% Black or Black British – African and 5.56% Mixed – White & Other. A total of 16 individual CIs and 5 group CIs were conducted. Aside from one group CI, which involved a mixture of key stage 3 and 4, the remaining CIs were completed within key stage ages (Table 10).

Table 10.
Summarises of Key Stage and Cognitive Interview Information

	No of students per key stage		
	Key Stage 3	Key Stage 4	Key Stage 5
School 1			
Individual CI	2	1	2

[5] This was provided by the school and was the individual's school number that is used on official communications and during examinations.
[6] The individual ticked 'other' but selected not to divulge any further information. A blank line was available for individuals to choose if they wished to divulge further categorical information regarding the 'other' choice.

Group CI	5 (1)	4 (1)	4 (1)
School 2			
Individual CI	2	4	5
Group CI	4 (1)		3 (1)
Total students %	11	11	14

Note: The (*) bracketed number acknowledges that this is one (1) group, consisting of KS3, KS4 & KS5

Interview procedure

Interviews occurred in school 1 between 4th-5th July and in school 2 between 15th-17th July 2019. All CIs took place in the respective schools within a designated classroom. The CIs were scheduled around the school day and efforts were taken to minimise interruptions.

To ensure standardisation of the information provided, students and the school nominated point of contact (PoC) were collectively briefed. The students completed a demographic questionnaire and then listened to the brief, which re-iterated the research intent, consenting process and process of withdrawal. The author also introduced the students to 'think aloud' and 'probing' procedures. This was completed using an example statement from another validated adolescent measure so that items from the CompACT were not prematurely introduced, thus avoiding item bias. Students were also offered the opportunity to ask questions and it was explained that there would be a further opportunity to ask questions before their individual or group CIs. In the presence of the school PoC, verbal and written consent was re-obtained from each student.

All interviews were audio-recorded in full, including re-consenting, individual question opportunity, 'think aloud' example and practice, and the main research, to ensure the integrity of the data. Interviews were semi-structured, with the use of a protocol comprising standardised instructions (Appendix 12). The identified probes (e.g. "Can you tell me a bit more about that?") were based on example CIs published

in Willis (2005) and further informed by the author, his supervisors and their collective professional experience.

During individual and group CIs, students were provided with the opportunity to ask any clarification questions. Students were then introduced to the study paperwork that had been placed (face down) on the table. The paperwork consisted of the CompACT measure (Appendix 13), two pens, and the think aloud practice example scene. During the group CIs, students were provided with a blank proforma for noting additional comments/feedback. This enabled individuals who did not feel comfortable speaking up to write comments down and also allowed students to note additional points if they remembered something after the item discussion had ceased.

Students were provided with the following instruction prior to each item. "Please look at item number ___ and read it aloud[7]. Once you have read it aloud, please circle your answer [author pointed to the CompACT] and then tell me out loud whatever comes into your mind". This process was rehearsed three times prior to undertaking the first item of the CompACT. This repetitive process was used with both individual and group CIs. The only variation was that in the group CIs, individual students took turns in reading the statement out loud.

Following the completion of all the items, every student was asked:

- to suggest an alternative phrasing to the current option, if they felt one was necessary;
- to comment on the [Likert] scale, with specific probing about the wording, numbers, whether there were too many or too few options;
- to comment on the lack of contextual instructions on the adult measure and whether instructions were required and what needed to be in them;

[7] Reading the question aloud also proved beneficial during the CI analysis as it provided definitive breaks.

- to comment on whether in the instructions a specific recall period was required (probes were again provided, e.g. last month, this year etc)

Data Analysis

Data were analysed according to the Conrad and Blair (1996) systematic method for analysing CI data. This method was derived from Tourangeau's (1984) cognitive model of the survey response process and assumes that individuals experience four distinct stages in a fixed sequence when responding. Conrad and Blair's (1996) modification of Tourangeau's (1984) model consists of three distinctive response stages: (Stage 1) understanding what information is being asked for and how to provide it; (Stage 2) executing the task with the cognitive processes necessary (for example, retrieval, comparison, deduction, arithmetic, evaluation) and (Stage 3) mapping the results of the task onto the response options available. Errors can occur at any stage of the response process. By examining the content of the verbal responses, the stage at which the error occurred can be detected (Conrad & Blair, 1996). Conrad and Blair (1996) suggested that underpinning the three stages, there are five types of error classification: (1) lexical, (2) temporal, (3) logical, (4) computational, and (5) omission.

In addition to the five main classification areas, an additional classification area of *Psychological Flexibility Construct Adherence* (see Table 11 for explanations) was included to ensure responses could be evaluated for consistency with the targeted PF construct.

Table 11.
Error Classification Areas and Descriptions

Error Classification	Description
Lexical	Involves not knowing the meanings of words or how to use them. By *meanings*, this refers to the "core" or "central" meaning of a word or phrase, not the subtleties of its scope.
Temporal	Involves the time period to which the question applies, e.g. interpreting/estimating time periods.
Logical	Problems involving *logic embedded in the item* (e.g., double-barrelled statements, assumptions/pre-suppositions that may not apply to the respondent [e.g., concerning their family or educational status], contradictions, or redundancies).
Computational	Problems involve respondents' difficulty processing and manipulating information included in a question. For example, a long and complicated question can make it difficult for the respondent to parse the sentence and understand the meaning of the question.
Omission	Problems where respondent struggles to interpret the scope of a term in the item – or interprets this as narrower or broader than intended: Excluding or including concepts in ways that are inconsistent with (or demonstrate difficulty understanding) item term(s).
Additional Error Classification Areas	
PF Construct Adherence	Response does not map to the Psychological Flexibility sub-process being measured

The first individual and first group CI were transcribed verbatim. These CIs were then checked for accuracy by the author's supervisors. Subsequent individual and group interviews were then intelligently transcribed[8]. Analysis followed Conrad and Blair's (1996) respondent problem matrix, identifying the cognitive coding approach a priori. This was used in conjunction with the CompACT's originally

[8] Intelligent transcription excludes: All ums, ahs, ehs; all fillers such as 'you know', 'know what I mean?', 'all repeated words unless repeated for emphasis e.g. 'I'm so *so* happy'; All stutters and stammers; All 'non-standard language' e.g. ain't, 'cause; throat clearing, coughing, details of interruptions etc.

targeted PF construct, to systematically code for the presence or absence of any of the Conrad and Blair problems or a problem related to the PF construct.

Blair and Brick (2010) stated that using a deductive, top-down approach is advised in the context of questionnaire testing as a clear, concise coding framework is likely to be more effective at assessing difficulties or problems. When student responses did not contain evidence of problems from any of the error classification areas these were coded as problem-free. When there was evidence of divergence, these were coded using the respondent problem taxonomy.

Before full analysis of the transcribed words, the research team met to discuss the data, agree on the definition of errors, and to complete an analysis of items 1-5 for four individual CIs. This meeting was recorded, and process notes were circulated on completion. Whilst the analysis of the individual CIs followed the Conrad and Blair methodology, a decision was taken that a problem from any individual in the focus group would be counted as a whole group problem, due to the difficulty of separating this process into individual cognitive thought processes (i.e. whether the first respondent biased the remaining group members and informed their understanding).

Reflexivity

Several measures were taken to increase the objectivity of the data collection and subsequent analysis. A CI protocol was produced to enhance consistency of the interview and audio recording the interviews mitigated the risk of impressionistic data collection.

Additionally, an independent reviewer (AS), who had completed cognitive interview training and was experienced in using Conrad and Blair's (1996) method of data analysis, coded a random selection of four transcripts (20%). Appendix 14 contains the output from this process. The purpose of this was to enhance the rigour and objectivity of the analysis. A Cohen's Kappa was calculated to assess the

agreement on the presence or absence of a problem in the item (*k* = .901) and to assess agreement on the type of problem coded (*k* = .764). Using Altman's (1991) scale this can be interpreted as *very good* for presence of an error and *good* for agreement on the type of error category.

Results

Overall Frequency of Student Problems

Analysis of the CI data produced 4246 responses. This consisted of 2779 responses from the 16 individual CIs and 1467 responses from the five group CIs. The number of transcribed words were 110,488[9] and, in total, the CIs were conducted over an 18-hour period

Types of Problems

Table 12 illustrates the Conrad and Blair classification of Problems (*n*=160) and PF Construct Adherence (*n*= 164). The table shows at which stage of the response (i.e. understanding, task performance or response formatting) the problem occurred. The most problems (85.6%) arose at the *understanding* stage (*n*= 137), with the second (9.4%) and third (5%) most problems occurring in the *response formatting* (*n*= 15) and *task performance* (*n*= 8) stage respectively.

With respect to the classification of problem, the most identified commonly occurring problem category was *Lexical* (*n*=89, 55.6%), then *Computational* (n=44, 27.5%), and *Omission* (*n*=27, 16.9%). The classifications of *PF Construct Adherence* accounted for the following, separately counted, problems (*n*= 164). There were no identified *Temporal* or *Logical* problems at any of the three stages. Item 3 (*I rush through meaningful activities without being really attentive to them*) contained the most problems (15); 71.4% error rate (13 *Lexical* and 2 *Omission*

[9] The figure does not include the re-consenting process and 'Think Aloud' practice prior to commencing each CI.

problems). Items 1, 5, 9, & 13 contained ≥10 problems equating to a 47% error rate, with a mixture of Lexical (Items 1 and 5) Omission (Item 2) and Computational (Item 13) problems. Item 18 (*Even when something is important to me, I'll rarely do it if there is a chance it will upset me)* contained the least problems, 1 *Lexical* problem, 4.8% error rate.

Concerning the PF construct adherence, item 1 (*I can identify the things that really matter to me in life and pursue them – values/committed action*) proved to be the easiest for students to connect with the underlying PF construct. In contrast, students found item 3 (contact with the present moment) and item 5 (values/committed action) difficult to connect to the underlying PF construct.

In the context of both problem areas, over 50% of the problems occurred in the first half of the questions (items 1–12), for both the Conrad & Blair Classifications of Problems (66.3%) and PF Construct Adherence (61.6%).

Table 12.

Overview of All Types of Student Problems Identified Using Conrad & Blair's (1996) Respondent Problem Taxonomy and Problems with Psychological Flexibility Contact Adherence.

CompACT Item	Conrad & Blair's Classification of Problem					Total Errors	PF Construct Adherence	Total Errors
	Lexical	Temporal	Logical	Computational	Omission			
1	P2, P3, P9†, P11, P12, P14, P15, Gp5,				P1†, P2†, Gp1†,	11	P7, Gp5,	2
2	P15†, P16†,				P1†, P10, P11, P12, P13, Gp1†, Gp3†,	9	P8, P9, P11, P12, P15, P16, Gp1, Gp3, Gp4,	9
3	P3, P4, P5, P8, P9, P10, P11, P13, P15, P16, Gp1, Gp2, Gp5,				P2, P7,	15	P2, P3, P4, P5, P8, P9, P10, P11, P14, P15, Gp1, Gp2, Gp5,	13
4	P8, P15, P16,				P1, P2, P6, P7, P14,	8	P1, P2, P4, P6, P7, P8, P10, P14, P15, P16, Gp2,	11
5	P3, P6, P9, P13, P14, P15, P16, Gp2, Gp5,			Gp1,	P2, P12,	12	P2, P3, P4, P9, P11, P12, P13, P14, P15, P16, Gp1, Gp2, Gp5,	13
6				P15, P16,	P1, P3, P10,	5	P1, P3, P4, P5, P10, P11, P15, P16,	8
7	P15, Gp2,				P13,	3	P5, P11, P13, P15, Gp2, Gp3,	6
8				P3, P14, P15,	P16,	4	P3, P12, P14, P15, P16,	5
9	P1, P2, P3, P10, P11, P15, Gp1,			Gp2, Gp5,	P16,	10	P1, P2, P3, P10, P11, P15, Gp1, Gp2,	8
10	P4, P10, P11, P12, P15, P16, Gp1, Gp5,			P11,		9	P4, P10, P11, P15, P16, Gp1, Gp5,	7

CompACT Item	Conrad & Blair's Classification of Problem					Total Errors	PF Construct Adherence	Total Errors
	Lexical	Temporal	Logical	Computational	Omission			
11	P6, P8, P9, P12, P13, P14, P15, P16, Gp5,			P1, P10, P13‡	P11,	13	P1, P6, P8, P9, P10, P11, P14, P15, P16, Gp5,	10
12				P3, P7, P16, Gp1, Gp3, Gp4, Gp5,		7	P3, P7, P11, P15, P16, Gp1, Gp3, Gp4, Gp5,	9
13	P2†, P14†,			P1‡, P9‡, P10, P11, P13, P15, P16, Gp1, Gp2, Gp5,		12	P10, P13, P14, P15, P16, Gp1, Gp2, Gp3, Gp4, Gp5,	10
14	P5, P12, P13, P15, Gp1, Gp4, GP5,			P2†		8	P2, P5, P13, P15, Gp1, Gp4, Gp5,	7
15	P16, Gp5,			P3, P7‡, P9, P12‡		6	P3, P7, P9, P15, Gp5,	5
16				P9, Gp5,	P7	3	P4, P9, P14, P15, P16, Gp1, Gp5,	7
17	P4, P12, Gp1,			P2,		4	P2, P4, P12, P15, P16, Gp1,	6
18	P14,					1	P13, P15, Gp1,	3
19	P5, P12, P13, P15, Gp5			P7‡		6	P7, P12, P13, P15, P16, Gp5,	6
20	P12,			P11†, P15		3	P11, P12, P13, P15,	4
21	P4, P10, P12, P15					4	P4, P15, Gp1, Gp5,	4
22	P2, P4, P7,			P8‡, P15‡		5	P2, P4, P7, P8, P10, P15, P16,	7
23				P2†, P9†		2	P2, P4, P9, P15,	4

Note. P = participant, Gp = group; †Denotes problems in the Task Performance response stage; ‡ denotes problems in the Response Formatting response stage; all other problems were identified as being in the Understanding response stage.

Table 13 provides an illustrative example of students' responses to the CompACT, each demonstrating one of the five classifications of problem.

Table 13.
Classification of Problems & Examples of the Types of Student Problems Identified During Individual and Group Cognitive Interviews

Classification of Problem	CompACT Item	Example Quotation
Lexical	Item 10: *I behave in line with my personal values* (Values / committed action)	"What do you mean by values, I don't understand that?"
Temporal	No errors detected	
Logical	No errors detected	
Computational	Item 22: *I can take thoughts and feelings as they come without attempting to control or avoid them* (acceptance)	"Neither agree nor disagree. I think that's because I just feel like the question is worded weirdly. Like, I'm not really sure what it is asking me to do. I feel like there is too much in the statement and it contradicts itself."
Omission	Item 2: *One of my goals is to be free from painful emotions* (acceptance)	What are classed as painful emotions? Like, is that sadness or being upset or is it like anger and an unpleasant emotion?
PF Construct Adherence	Item 7: *I make choices based on what is important to me, even if it is stressful* (values / committed action)	I'm going to put strongly agree with that because I find I want to please people.

Distribution of Student Problems

Figure 2 shows the overall frequency distribution of the identified problems experienced by the students (16 individuals and 5 groups, with each group counted as 1 CI, not as separate students). This includes the '*Conrad and Blair Classification of Problems*' and *'PF Construct Adherence'*. The CI process detected a problem in all 23 items of the CompACT for both Conrad and Blair and PF Construct.

A generally accepted guideline for coding is if ≥15% of administrations of a particular item show ≥1 more problem, the item should be flagged as a candidate for adaptation (Blair & Srinath, 2008). In this study, any CompACT item where ≥3 students identified a problem was a candidate for adaptation. Only Items 18 and 23 fell below this cut-off for the Conrad and Blair Classification. Of note, 13 of the 23 items had ≥6 identified problems within the Conrad and Blair Classification of problems, with item 3 having the highest (15 students identifying a problem). For the PF construct adherence, only item 1 fell below the ≥15% cut-off; 16 of the 23 items had ≥6 identified problems, with items 3 and 5 proving most problematic (13 students identified problems with these items).

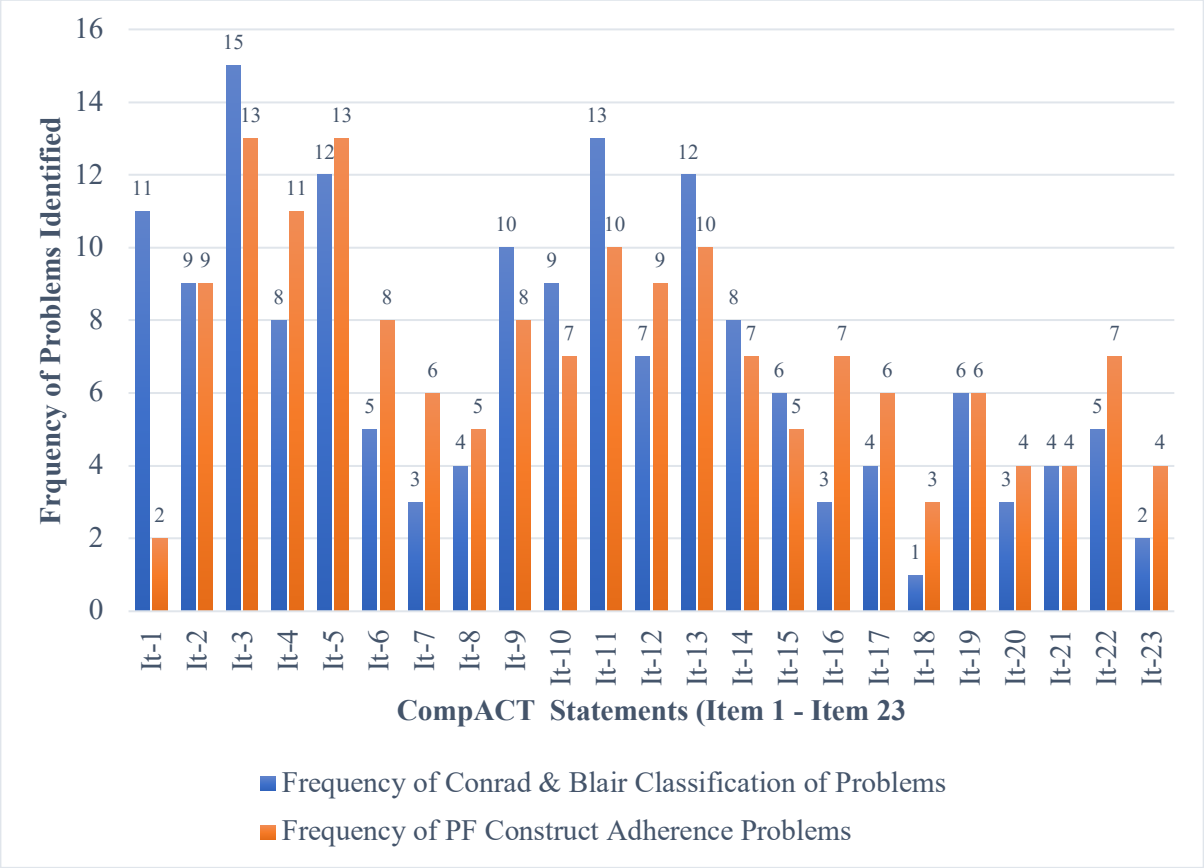

Figure 2: Overall Distribution of Student Identified Problems Across the 23 CompACT Items for Conrad & Blair Classification & PF Construct Adherence Problems

Figure 3 provides information on the response processes. It shows that the *understanding* stage of the response process accounted for the most problems, second was *task performance* and then *response formatting.* A problem at the understanding response stage occurred in 22 out of the 23 items, whilst a task performance error occurred in 6-items and response formatting in 5-items.

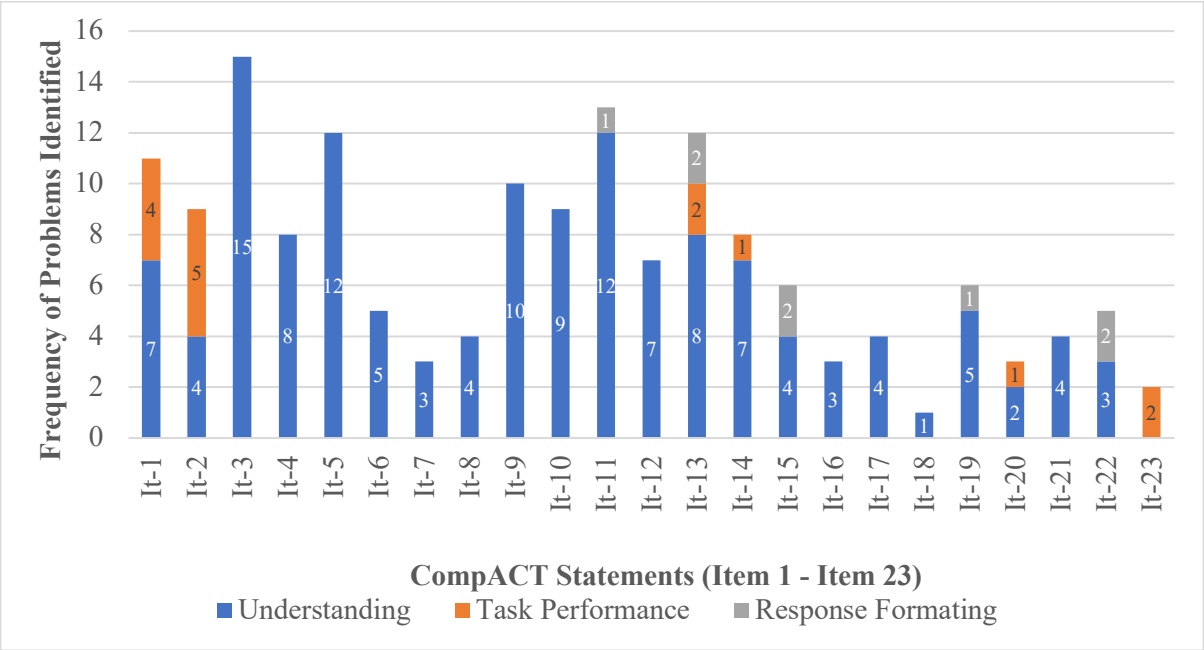

Figure 3: Overall Distribution of Student Problems Across the 23 CompACT Items for the 'Response Processes' identified by Conrad & Blair Classification of Problems.

Figure 4 provides information on the overall distribution of Conrad and Blair Classification of Problems. Lexical problems were attributed as the main source of problems and this type of problem occurred in a total of 18-items. Computational accounted for the second highest classification and Omission third.

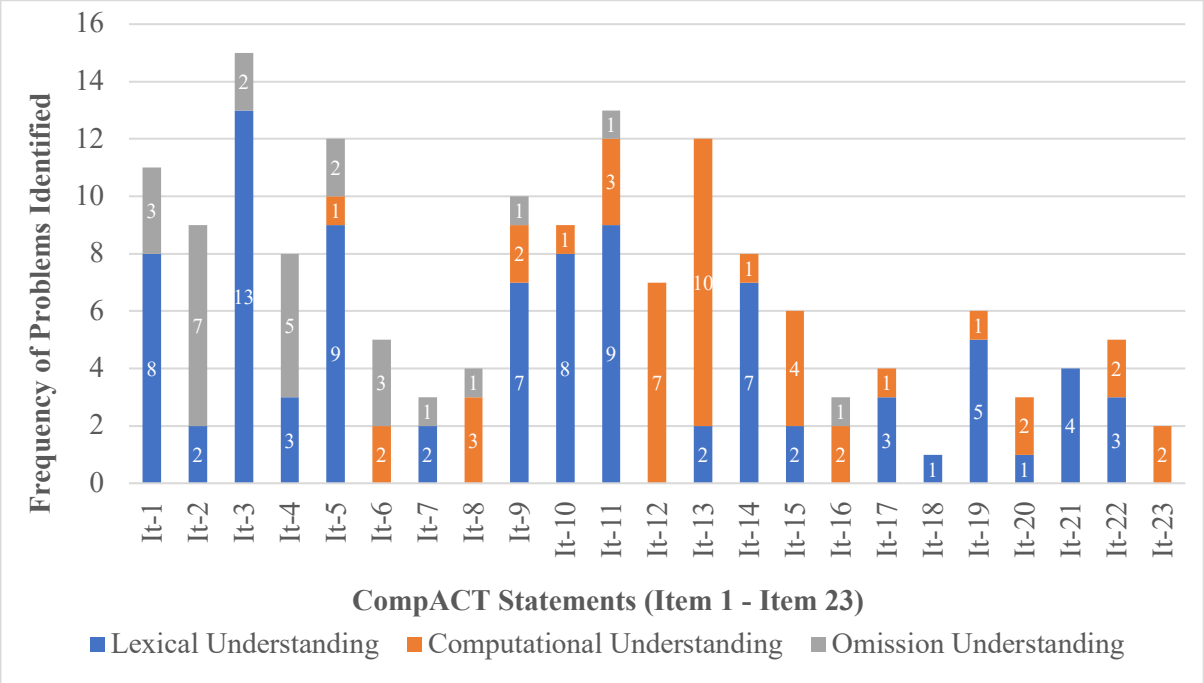

Figure 4: Overall Distribution of Student Identified Problems Across the 23 CompACT Items by Individual Classification Areas of the Conrad & Blair Classification of Problems.

Figures 5 and 6 order the Conrad and Blair Classification of Problems and the PF construct adherence from most to least problems per item. The ordering process shows that across the two problems areas, problems occurred randomly and that there was no fatigue effect on students (i.e. for construct adherence items 3-5 had the most problems and item 1 the least). Whilst there are some similarities between the two problem areas, for example, items 3 and 5 are positioned towards the end with problems, there is no obvious pattern between the Conrad and Blair Classification of Problems and PF construct adherence.

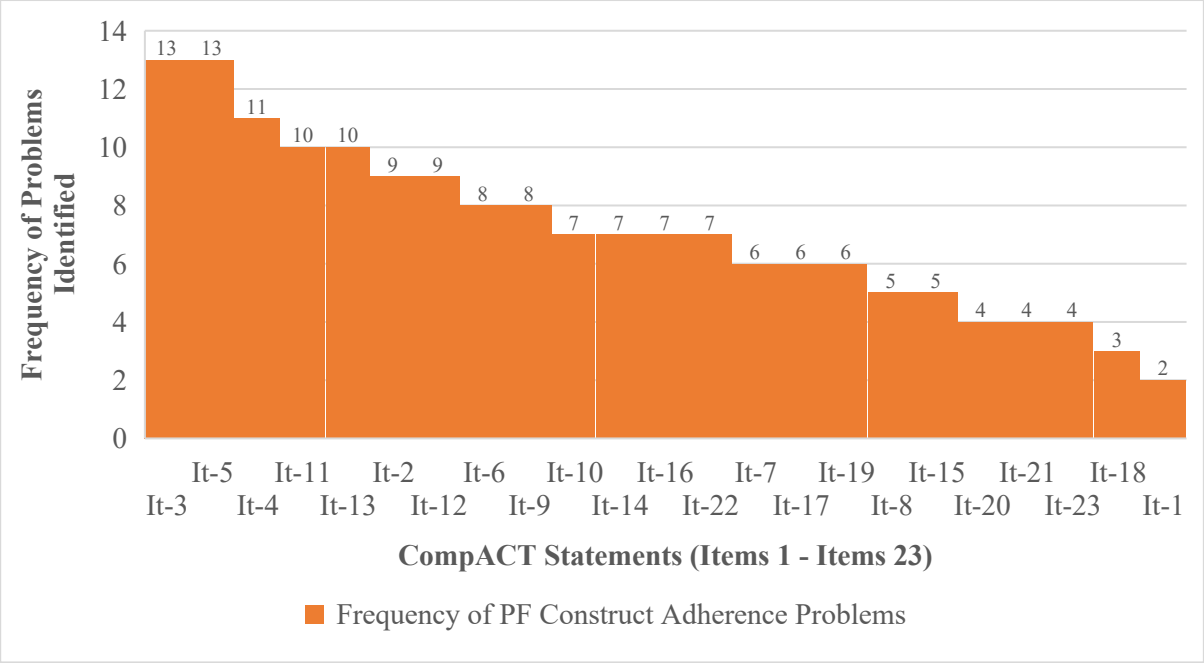

Figure 5: Student identified problems across the 23 CompACT. Items ordered from items with most to least problems for PF Construct Adherence Problems.

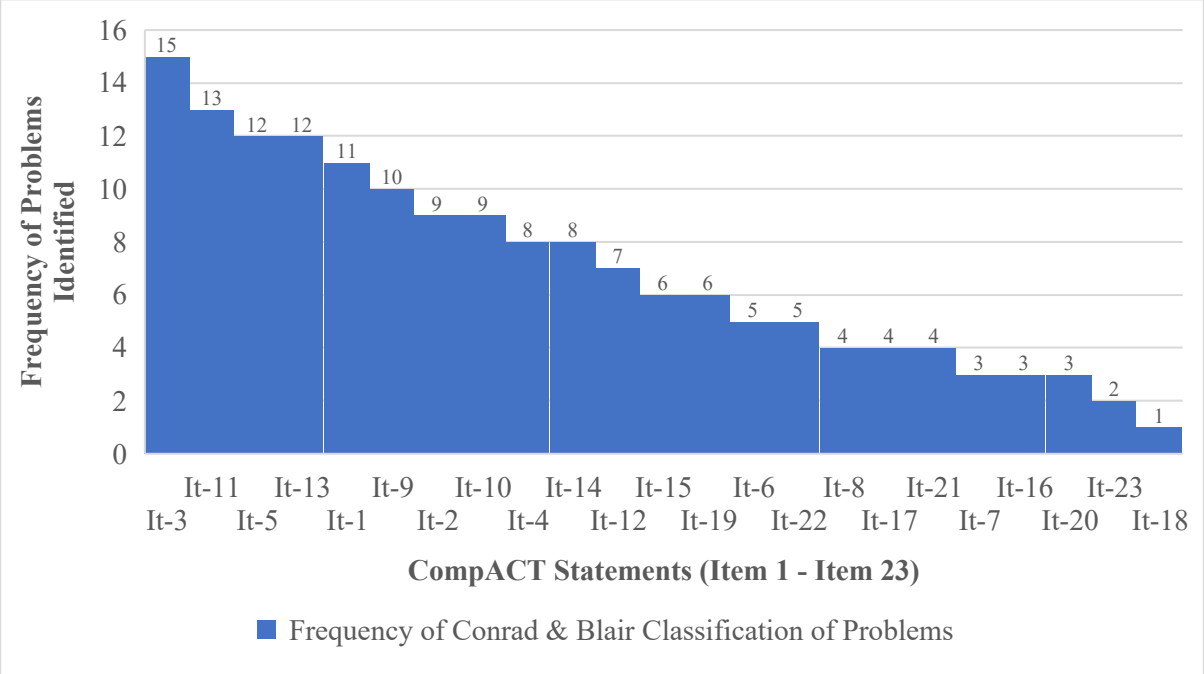

Figure 6: Student Identified Problems Across the 23 CompACT Items Ordered from Items with Most to Least Problems for Conrad & Blair Classification of Problems.

Suggested revisions to the CompACT

Table 14 provides a summary of the problems identified alongside possible alternatives that were informed by the students' comments during the CI process. Suggestions were used to generate more comprehensible alternative terms, which could be used when developing adapted items. Ultimately, adoption of a student-suggested phrase was subject to (1) the authors' analytical judgments that it retained the intended (ACT-relevant) meaning of the original terms and (2) subsequent screening by an independent expert panel (weighing both the population-appropriateness and theory-congruence of items informed by student suggestions). During a research meeting, each new item was considered and then two possible new items were identified based on alternatives pre-identified by the author and supervisors. These were then checked against the problems to ensure that they were providing a solution, whilst retaining the overarching PF construct.

Table 14.

Shows the original CompACT Items, PF (ACT) Construct, Key issues & Alternative Options (informed by student participants).

Item	CompACT /items	PF (ACT) Construct	Key Issues / Learning Points	Alternative Option 1	Alternative Option 2
1	I can identify the things that really matter to me in life and pursue them	Values / Committed action	Difficulty understanding the word 'pursue' E.g. P2 "I can't say that word (pursue)"	I know the things that are important to me and I go after them	I can work out what matters to me in life and go after these things
2	One of my big goals is to be free from painful emotions	Acceptance	Difficulty understanding the phrase 'big goals' E.g. P1 "Does that mean an ambition…it's a bit vague?"	I aim to be free from painful emotions	Something that is really important to me is to not have upsetting feelings
3	I rush through meaningful activities without being really attentive to them	Contact with the present moment / Mindfulness	Difficulty understanding the word 'attentive' and the dual aspect of the item E.g. P10 "Attentive is not really a word that I've seen before"	I rush through activities that are important to me without really paying attention	I hurry through activities that are important to me without really paying attention
4	I try to stay busy to keep thoughts or feelings from coming	Acceptance	Difficulty around comprehension, specifically around the phrase 'from coming' E.g. P8 "I try to stay busy because I don't like feeling bored	I distract myself to stop difficult thoughts and feelings from taking over	I try to distract myself to block out difficult thoughts and feelings
5	I act in ways that are consistent with how I wish to live my life	Values / Committed action	Difficulty around the word 'act' being understood as being fake, false or pretending E.g. P16 [Probe on meaning of act] "It's acting! So, you're being fake…playing someone else"	I behave in ways that reflect what is important to me	The way I behave matches how I want to live my life

Item	CompACT /items	PF (ACT) Construct	Key Issues / Learning Points	Alternative Option 1	Alternative Option 2
6	I get so caught up in my thoughts that I am unable to do the things that I most want to do	Defusion	Difficulty understanding the phrase 'caught up' E.g. P15 "Does it mean you're too busy to do something you actually want to?"	I get so tangled in my thoughts that I don't do things that really matter to me	I get so distracted by my thoughts that I don't do the things that are important to me
7	I make choices based on what is important to me, even if it is stressful	Values / Committed action	Not a singular dominant issue identified, but all students provided an alternative E.g. Gp2 "That's a bit vague, what type of choices?"	I choose to do what's important to me, even if it is stressful	I will choose to do what is important to me, even if it causes difficult emotions
8	I tell myself that I shouldn't have certain thoughts	Acceptance	The dominant issue identified by Stage 1 was comprehensibility to KS3 student's E.g. P16 "Say if you want to go to sleep or something and someone tells you no. Your certain thought would be, go to sleep, so you do it so much that you concentrate so much that you go to sleep since you are certain about it"	I tell myself it's wrong to have certain thoughts	I tell myself certain thoughts are not normal
9	I find it difficult to stay focused on what's happening in the present	Contact with the present moment / Mindfulness	Difficulty understanding the concept of the 'present' E.g. P1 "I don't know what the present is…I know people would say, "Oh this morning is in the past". I think of the past as…maybe last year as the minimum"	I struggle to focus on what's happening in the here and now	I find it hard to focus on the thing that I'm doing

Item	CompACT /items	PF (ACT) Construct	Key Issues / Learning Points	Alternative Option 1	Alternative Option 2
10	I behave in line with my personal values	Values / Committed action	Difficulty with comprehending the phrase 'behave in line' and 'personal values' E.g. P4 "I don't even know what personal values are"	How I behave reflects the things I care about	I live my life in a way that matches what I care about
11	I go out of my way to avoid situations that bring difficult thoughts, feelings, or sensations	Acceptance	Difficulty with comprehension of 'thoughts, feelings or sensations' E.g. P3 [Thoughts, Feelings or sensations probe] "I think that's like all your feelings, so you go out of your way to avoid all feelings"	I try hard to avoid situations that might feel uncomfortable	I try to avoid situations that might bring up difficult thoughts or feelings
12	Even when doing the things that matter to me, I find myself doing them without paying attention	Contact with the present moment / Mindfulness	Not a singular dominant issue identified, but all students provided an alternative E.g. P3 "It is asking you when you're doing something that is important to you, you will naturally do it and wouldn't think twice about it, whether it is right or wrong."	Even when I'm doing things that are important to me, I find myself doing them without paying attention	Even when doing things that I care about, I find myself not paying attention
13	I am willing to fully experience whatever thoughts, feelings and sensations come up for me, without trying to change or defend against them	Acceptance	Difficulty with the length of the question and the phrases 'defend against' and 'fully experience' E.g. P11 "I circled 3, because the statements quite hard to get my head around"	I'm willing to let myself have whatever thoughts and feelings come up without trying to block them	I let myself have all of my thoughts and feelings without trying to change or avoid them
14	I undertake things that are meaningful to me, even when I find it hard to do so	Values / Committed action	Difficulty with the word 'undertake' E.g. P8 "When I first read undertake, my first thought was like undertakers, like funeral directors"	I do things that matter to me even if it is hard to do so	I do things that matter to me, even when it is difficult

Item	CompACT /items	PF (ACT) Construct	Key Issues / Learning Points	Alternative Option 1	Alternative Option 2
15	I work hard to keep out upsetting feelings	Acceptance	Difficulty around the phrases 'work hard' and 'keeping out' E.g. P13 "Again you're trying to be a different person…pretending to be someone else"	I try hard to block the feelings I don't want	I put in a lot of effort to block difficult emotions
16	I do jobs or tasks automatically, without being aware of what I'm doing	Contact with the present moment / Mindfulness	Difficulty around the word 'automatically' E.g. P2 "Automatically – makes me sound like a machine…it is too scientific and not like we are human"	I do things without being aware of what I'm doing	I often find myself doing things on autopilot
17	I am able to follow my long--term plans including times when progress is slow	Values / Committed action	Difficulties with the phrases 'progress is slow' and 'long-term plans' E.g. Gp1 [long-term plans probe] "I think that question is ok for adults, but I think for younger people you have to read the question two or three times"	I can keep going with important things, even when it's difficult	I can stick with things that I care about, even when it's difficult
18	Even when something is important to me, I'll rarely do it if there is a chance it will upset me	Acceptance	Difficulty with the word 'rarely' E.g. P14 "I'm drawn to rarely for a negative reason…you're hardly ever gonna take the chance to do something that's important to you because of the chance it could upset you"	I avoid things that are important to me if there is a risk that I will feel upset	Even if something's important to me, I wouldn't do it if it could upset me
19	It seems I am "running on automatic" without much awareness of what I'm doing	Contact with the present moment / Mindfulness	Difficulty with the word 'automatic' E.g. P12 "The running on automatic bit…it's quite confusing. I don't really know what that means"	I often seem to do things without much awareness of what I'm doing	It seems I'm just following routines without much awareness of what I'm doing

Item	CompACT /items	PF (ACT) Construct	Key Issues / Learning Points	Alternative Option 1	Alternative Option 2
20	Thoughts are just thoughts – they don't control what I do	Defusion	Not a singular dominant issue identified, but all students provided an alternative, which was used to inform option 2	Thoughts are just thoughts – they don't control what I do	I don't let my thoughts control what I do
21	My values are really reflected in my behaviour	Values / Committed action	Not a singular dominant issue identified, but all students provided an alternative, which was used to inform option 2	My values are really reflected in my behaviour	My values are shown in my actions
22	I can take thoughts and feelings as they come, without attempting to control or avoid them	Acceptance	Not a singular dominant issue identified, but all students provided an alternative, which was used to inform option 2	I can take thoughts and feelings as they come, without attempting to control or avoid them	I can accept how I feel without having to change it
23	I can keep going with something when it's important to me	Values / Committed action	Not a singular dominant issue identified, but all students provided an alternative, which was used to inform option 2	I can keep going with something when it's important to me	When something is important to me, I'll carry on with it

Study 2: Expert Consultation on Adolescent Age-Specific Adaptations

Methodology

Study Design

Study 2 involved consultation with experts using Qualtrics, a web-based survey platform. The author invited psychological flexibility (PF) and Acceptance and Commitment Therapy (ACT) experts, who specialised in working with children and adolescents, to consult on the age-specific adaptations that resulted from data analysis in study 1.

Ethical Approval

This research received ethical approval from Cardiff University (approval date: 12/04/2019; approval ref: EC.19.02.12.5568R2).

Participants

An email was sent to experts working clinically with children and young people using ACT as a primary therapeutic model, or those who had completed research using ACT with young people. An email was also sent to those with an expertise in PF. In addition, an open invite was placed on the '*Children, Adolescents, and Families SIG*' of the Association for Contextual Behaviour Science (ACBS; https://contextualscience.org).

Following the email, 15 professionals expressed an interest, 13 responses from email invites and 2 responses from the ACBS post. Professionals expressing an interest in participating in the study were sent a '*Professionals Information Sheet*', (see Appendix 15). A total of 11 professionals consented and met the inclusion criteria, 3 professionals declined to continue, and 1 professional was screened out at the inclusion/exclusion stage.

Consenting professionals were from different countries (7 from the UK, and 1 each from America, Australia, Canada and Spain) and had different expertise / professional backgrounds, including clinical psychologists, educational psychologists, life coaches, and

academics. The study sought to consult ≥10 PF (ACT) experts. This sample number was based upon Delphi panel research, which recommends a range from 10-18 professionals/experts (Okoli & Pawlowski, 2004).

Consultation procedure

Study 2 consisted of completing an on-line survey, administered through Qualtrics, a web-based survey platform. Consenting professionals were provided with a unique Qualtrics link, which was embedded within the Professionals Information Sheet. Professionals were required to use the link to access the consultation and were required to re-consent before being screened for suitability against the inclusion/exclusion criteria. Table 15 shows the inclusion/exclusion criteria for the 11 professionals.

Table 15.
Stage 2: Eligibility Criteria met by Professional Participants

Professionals	Category	Total	%
Inclusions /Exclusion	• Researcher with 3 or more publications relating to ACT for children and adolescents;	1	9.1%
	• Author of published book/s on ACT for children and adolescents/families;	2	18.2%
	• Clinician who has undertaken specialist ACT training, in addition to their core professional training, and who has been using ACT as their primary model working with children and young people in supervised clinical practice for 5 or more years;	5	45.4%
	• Professional who is recognised as a peer reviewed ACT trainer by the ACBS;	1	9.1%
	• One of the original authors of the CompACT	2	18.2%

Those meeting the inclusion criteria were able to access the consultation survey. Professionals were asked to review on an item-by-item basis: the original CompACT statement; the PF construct; problems identified by the adolescent CIs (study 1) and two alternative item options. Professionals were requested to consider the two alternatives and indicate a choice. Professionals were also given the option to provide qualitative feedback. This process was the same for all 23-items. Figure 7 provides an example of the question format for each item.

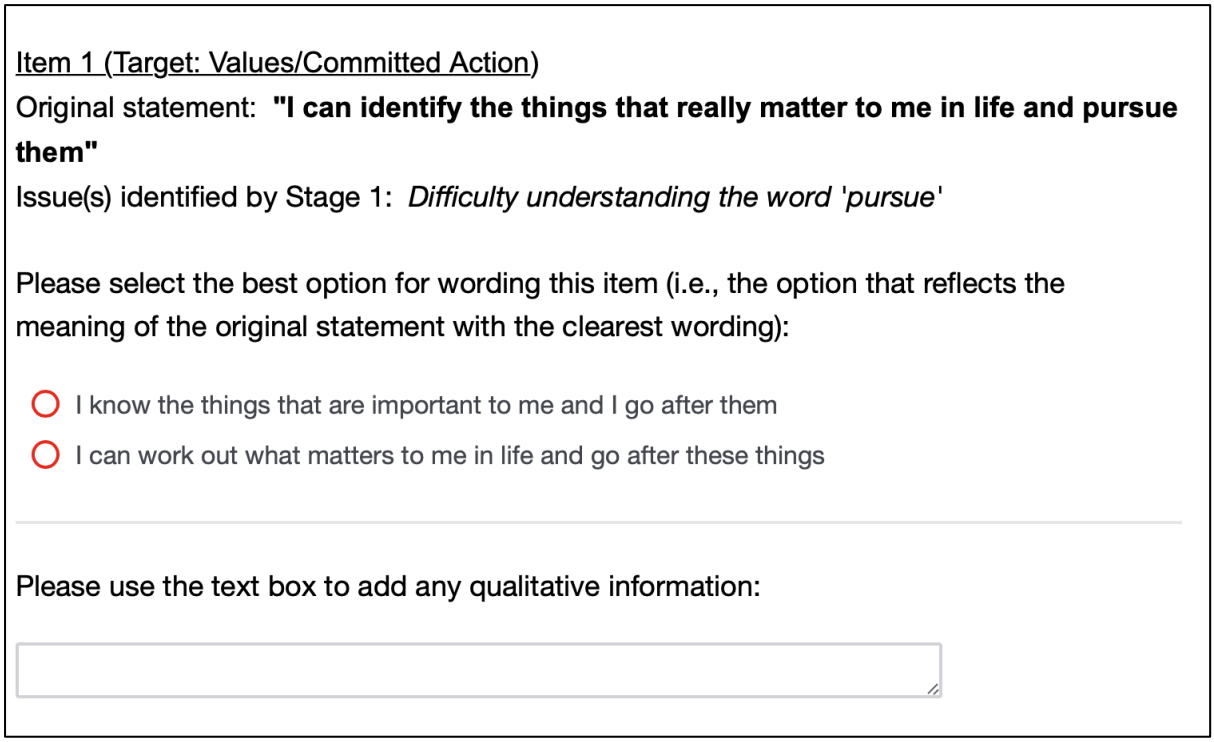

Figure 7: An Example of Information Provided to Participating Professionals

Data analysis

Following the closure of the Qualtrics survey, the author met with his supervisors to discuss the results. Each item was reviewed using the Qualtrics report and the outcome from study 1. The original transcripts were also available to consult.

Where an option was clearly preferred by a majority of the experts, this was automatically selected. Where there was ambiguity, the author and the supervisors

discussed the options, holding in mind the original statement, intended PF construct, Stage 1 data and expert reflections. The outcome of this process was either the selection of one of the options presented in the survey, or an alternative (synthesis) option informed by all of the above points.

Results

Table 16 shows the outcome of the professional consultation study. Professionals were presented with 2 alternatives for each of the 23-items. Items 1-19 consisted of two new alternatives, whereas items 20-23 consisted of the (original) statement from the CompACT and a new alternative. Items 21 and 23 were retained and item-20 was modified, incorporating the qualitative feedback from professionals. Item-7 was a new option following consultation between the author and his supervisors, taking information from study 1 and 2 into account.

Table 16

Results from Professional Consultation Study

Item	Alternative Option 1	Alternative Option 2	Stage 2 Outcome	Supporting professional comments	Final Decision
1	I know the things that are important to me and I go after them	I can work out what matters to me in life and go after these things	Option 1: 3/11 Option 2: 8/11	I know feels like quite a certain/passive process, as if you just 'know' at a fixed point in time. Work out suggests that this is [an] active process and you may never come to a stage of 'knowing'. "Work out" provides active engagement in [the] process; "know" elicits rule-following (it's "known" and not experienced) rather than 'go after', would something like "and I know what steps to take to do what matters?"	**Option1**
2	I aim to be free from painful emotions	Something that is really important to me is to not have upsetting feelings	Option 1: 3/11 Option 2: 8/11	No Qualitative Supporting Remarks	**Option 2**
3	I rush through activities that are important to me without really paying attention	I hurry through activities that are important to me without really paying attention	Option 1: 10/11 Option 2: 1/11	In my experience, youth use the word "rush" more than "hurry" I rush through doing things that are important to me...unsure on the word activities.	**Option 1**
4	I distract myself to stop difficult thoughts and feelings from taking over	I try to distract myself to block out difficult thoughts and feelings	Option 1: 2/11 Option 2: 9/11	I think the 'try' is quite important in this statement, as distraction is often an ineffective method, but is used a lot. The first statement implies that it is an effective method. However, I prefer 'stop difficult thoughts and feelings from taking over', as opposed to 'block out' as I think it's more ACT consistent. Ideally, I'd have 'I try to distract myself to stop difficult thoughts and feelings from taking over'.	**Option 2**

Item	Alternative Option 1	Alternative Option 2	Stage 2 Outcome	Supporting professional comments	Final Decision
5	I behave in ways that reflect what is important to me	The way I behave matches how I want to live my life	Option 1: 6/11 Option 2: 5/11	I do things that match the way I think I want to live my life. I'm not sure that kids will really understand this item anyway depending on their age.	**Option 1** Having reviewed that data from Stage 1, the use of the word *behave* was informed via this process.
6	I get so tangled in my thoughts that I don't do things that really matter to me	I get so distracted by my thoughts that I don't do the things that are important to me	Option 1: 7/11 Option 2: 4/11	Perhaps a slight re-phrase to: I get so tangled UP in my thoughts that I don't do the things that are important to me	**Option 1** Plus incorporating the suggestion from the expert.
7	I choose to do what's important to me, even if it is stressful	I will choose to do what is important to me, even if it causes difficult emotions	Option 1: 7/11 Option 2: 4/11	I don't like the word "causes" in the second option, too mechanistic...in first option, I wonder about replacing 'stressful" with something like "even if unwanted / difficult / uncomfortable emotions show up" I choose to do what's important to me, even if it causes tricky emotions	**New Option** *"I choose to do what's important to me, even if it brings up difficult emotions"*
8	I tell myself it's wrong to have certain thoughts	I tell myself certain thoughts are not normal	Option 1: 8/11 Option 2: 3/11	Both seem ok to me and they say slightly different things. the first one is more congruent with the original statement though. I think both of these statements are extending a meaning to why you 'shouldn't have' thoughts that is not in the original statement e.g. either it's wrong, or not normal. I prefer 'wrong' as it's more inclusive.	**Option 1**
9	I struggle to focus on what's happening in the here and now	I find it hard to focus on the thing that I'm doing	Option 1: 3/11 Option 2: 8/11	Maybe add "while I'm doing it?"	**Option 2**

Item	Alternative Option 1	Alternative Option 2	Stage 2 Outcome	Supporting professional comments	Final Decision
10	How I behave reflects the things I care about	I live my life in a way that matches what I care about	Option 1: 4/11 Option 2: 7/11	Do you want to add any sort of "qualifier" such as "most of the time" "or more than half the time" as many teens I know will say 'no' unless they do it all the time, which no one does, so they'll discount what they are doing	**Option 2** Discussion that post validation, a guidance document [for clinicians] could be included with the measure [for clinicians to use as a prompt]
11	I try hard to avoid situations that might feel uncomfortable	I try to avoid situations that might bring up difficult thoughts or feelings	Option 1: 5/11 Option 2: 6/11	"Difficult thoughts and feelings", continues language that might be used in interventions. i.ie., "uncomfortable" is too broad.	**Option 2**
12	Even when I'm doing things that are important to me, I find myself doing them without paying attention	Even when doing things that I care about, I find myself not paying attention	Option 1: 7/11 Option 2: 4/11	No Qualitative Supporting Remarks	**Option 1**
13	I'm willing to let myself have whatever thoughts and feelings come up without trying to block them	I let myself have all of my thoughts and feelings without trying to change or avoid them	Option 1: 6/11 Option 2: 5/11	Would saying "I'm willing to have all of my thoughts" be any clearer to get away from the idea of just passively being overtaken by them	**New Option** *“I’m willing to let myself have whatever thoughts and feelings come up, without trying to change or avoid them.”*

Item	Alternative Option 1	Alternative Option 2	Stage 2 Outcome	Supporting professional comments	Final Decision
14	I do things that matter to me even if it is hard to do so	I do things that matter to me, even when it is difficult	Option 1: 3/11 Option 2: 8/11	do you need / want to clarify, such as "even when thoughts and feelings show up that I don't want" Both I think are workable	**Option 2**
15	I try hard to block the feelings I don't want	I put in a lot of effort to block difficult emotions	Option 1: 7/11 Option 2: 4/11	I don't like either; the use of the word block (change, get rid of) how do you block a feeling (stop a feeling)?	**Option 1**
16	I do things without being aware of what I'm doing	I often find myself doing things on autopilot	Option 1: 6/11 Option 2: 5/11	I like autopilot but not sure everyone would get that- Most would but not sure all would	**Option 1**
17	I can keep going with important things, even when it's difficult	I can stick with things that I care about, even when it's difficult	Option 1: 5/11 Option 2: 6/11	Neither statement captures the doing. I can keep doing things that are important to me, even when doing it is tricky.	**Option 2**
18	I avoid things that are important to me if there is a risk that I will feel upset	Even if something's important to me, I wouldn't do it if it could upset me	Option 1: 7/11 Option 2: 4/11	No Qualitative Supporting Remarks	**Option 1**

Item	Alternative Option 1	Alternative Option 2	Stage 2 Outcome	Supporting professional comments	Final Decision
19	I often seem to do things without much awareness of what I'm doing	It seems I'm just following routines without much awareness of what I'm doing	Option 1: 9/11 Option 2: 2/11	I think awareness is a tricky word but unsure what is better! I often seem to do things without noticing what I am doing	**Option 1**
20	Thoughts are just thoughts – they don't control what I do	I don't let my thoughts control what I do	Option 1: 7/11 Option 2: 4/11	Thoughts are just thoughts - they don't have to control what I do (sometimes thoughts do control what I do and that is ok)	**Option 1** Plus incorporating the suggestion from the expert.
21	My values are really reflected in my behaviour	My values are shown in my actions	Option 1: 5/11 Option 2: 6/11	Do you need to define values?	**Option 1** Having reviewed the data from Stage 1, it was felt that it was most appropriate to stay with the original given the lack of issues cited during Stage 1.
22	I can take thoughts and feelings as they come, without attempting to control or avoid them	I can accept how I feel without having to change it	Option 1: 5/11 Option 2: 6/11	No Qualitative Supporting Remarks	**Option 2**
23	I can keep going with something when it's important to me	When something is important to me, I'll carry on with it	Option 1: 7/11 Option 2: 4/11	No Qualitative Supporting Remarks	**Option 1**

Study 1 and 2 Outcome - Final revised measure

Following completion of CIs with adolescents and consultation on item adaptions with professionals, the final revised measure was confirmed. Figure 8 contains the revised (currently unvalidated) adolescent version of the CompACT. The Likert scale has been retained as none of the students during CIs identified difficulties / criticisms. The scoring guidance for the sub-scales has also been retained, but this may change due to future validation.

CompACT-Y	Name:	Date

Thinking about all the different areas of your life,
please rate the following 23 statements using the scale below:

0	1	2	3	4	5	6
Strongly disagree	Moderately disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Moderately agree	Strongly agree

1.	I can work out what matters to me in life and go after these things	0	1	2	3	4	5	6
2.	Something that is really important to me is to not have upsetting feelings	0	1	2	3	4	5	6
3.	I rush through activities that are important to me, without really paying attention	0	1	2	3	4	5	6
4.	I try to distract myself to block out difficult thoughts and feelings	0	1	2	3	4	5	6
5.	I behave in ways that reflect what is important to me	0	1	2	3	4	5	6
6.	I get so tangled up in my thoughts that I don't do the things that really matter to me	0	1	2	3	4	5	6
7.	I choose to do what's important to me, even if it brings up difficult emotions	0	1	2	3	4	5	6
8.	I tell myself it's wrong to have certain thoughts	0	1	2	3	4	5	6
9.	I find it hard to focus on the thing that I'm doing	0	1	2	3	4	5	6
10.	I live my life in a way that matches what I care about	0	1	2	3	4	5	6
11.	I try to avoid situations that might bring up difficult thoughts or feelings	0	1	2	3	4	5	6
12.	Even when I'm doing things that are important to me, I find myself doing them without paying attention	0	1	2	3	4	5	6
13.	I'm willing to let myself have whatever thoughts and feelings come up, without trying to change or avoid them	0	1	2	3	4	5	6
14.	I do things that matter to me, even when it is difficult	0	1	2	3	4	5	6
15.	I try hard to block the feelings I don't want	0	1	2	3	4	5	6
16.	I do things without being aware of what I'm doing	0	1	2	3	4	5	6
17.	I can stick with things that I care about, even when it's difficult	0	1	2	3	4	5	6
18.	I avoid things that are important to me, if there is a risk that I will feel upset	0	1	2	3	4	5	6
19.	I often seem to do things without much awareness of what I'm doing	0	1	2	3	4	5	6
20.	Thoughts are just thoughts – they don't have to control what I do	0	1	2	3	4	5	6
21.	My values are really reflected in my behaviour	0	1	2	3	4	5	6
22.	I can accept how I feel without having to change it	0	1	2	3	4	5	6
23.	I can keep going with something when it is important to me	0	1	2	3	4	5	6

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Scoring instructions (administrative use only)

- Scores are derived by summing responses for each of the three subscales (Openness to Experience; Behavioral Awareness; Valued Action) or the scale as a whole (CompACT Total score).
- Twelve items are reverse scored before summation (items 2, 3, 4, 6, 8, 9, 11, 12, 15, 16, 18, and 19).

Openness to Experience (OE) subscale

Calculated as the sum of scores for items: 2 (reversed), 4 (reversed), 6 (reversed), 8 (reversed), 11 (reversed), 13, 15 (reversed), 18 (reversed), 20, and 22.
Subscale scores range from 0-60, with higher scores indicating greater openness to experience (willingness to experience internal events [thoughts, feelings, sensations, etc.] without trying to control or avoid them)

Behavioral Awareness (BA) subscale

Calculated as the sum of scores for items: 3 (reversed), 9 (reversed), 12 (reversed), 16 (reversed), and 19 (reversed).
Subscale scores range from 0-30 with higher scores indicating greater behavioral awareness (mindful attention to current actions)

Valued Action (VA) subscale

Calculated as the sum of scores for items: 1, 5, 7, 10, 14, 17, 21, and 23.
Subscale scores range from 0-48 with higher scores indicating greater engagement in valued actions (meaningful activity)

CompACT Total

Calculated as the sum of the three subscale scores, the full-scale CompACT Total score ranges from 0-138, with higher scores indicating greater psychological flexibility.

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Figure 8: Revised CompACT for an Adolescent Population

Discussion

The extant adolescent PF psychometrics measure different individual sub-processes of PF; no single measure exists for collectively measuring all PF processes. This has resulted in multiple and disparate measures being used, restricting potentially valuable pooling of data, as well as placing a burden on adolescents to complete multiple measures. The CompACT has been developed as a single comprehensive measure of PF in adults but has not been validated with adolescents. Its authors have highlighted the need to "examine the performance of the CompACT among different populations (cross validation and replication)" (Francis et al., 2016; p.144). The principal aim of this study was to establish whether the CompACT is understandable by an adolescent population and could fulfil the role of being a stand-alone measure of PF within this population.

To address the aims, two studies were developed. Study 1 consisted of 36 cognitive interviews with adolescent students attending mainstream comprehensive schools (11-18 years of age). Study 2 consisted of consultation with 11 experts from the field of ACT/PF (specific to children and adolescents) around the age-specific adaptations to the CompACT.

Discussion – Study 1

Q1 – Are the current item phrasings of the CompACT items comprehensible by an adolescent population?

Using Conrad and Blair's (1996) Respondent Problem Taxonomy and problems identified with PF construct adherence, the analysis revealed problems with all 23 CompACT items when presented to an adolescent population.

Q2 – What types of problems are identified through cognitive interviewing in the context of individual responses?

Given the extent of the identified problems (23 out of 23 items) it is important to understand the classification of the problems identified by adolescents. The analysis indicated fewer problems occurred at the *Task Performance Stage* and the *Response Stage* combined (14%) than they did at the *Understanding Stage* (86%). This implies that students uncovered problems early in the response process. This could be interpreted in two-ways: (a) if students were able to parse the questions, they were generally able to perform the implied task using the necessary cognitive processes; (b) that even when students did parse the item, given the quantity of (overall) errors across the response format, they still struggled with items.

The latter suggests that adolescents were unable to understand the CompACT items. Taking into consideration 55.6% of the problems were lexical, this would further support comprehensibility and relevance issues. Further supporting evidence, which is important to note, is that even when students were able to perform the required cognitive processes, they were not always able to understand the intended PF construct (e.g. item 16, 18 and 23).

Knafl et al., (2007) noted, "if instrument developers are to take full advantage of cognitive interviewing techniques, they should specify and refine appropriate analytic strategies" (p.225). The use of PF construct adherence was an example of refining the Conrad and Blair approach and justly provided additional evidence to complement the data from the Conrad and Blair approach.

Whilst analysis of the profile suggests no clear pattern for problems encountered (for example, student fatigue), there were many examples of common problems within individual items. For example, with item 3, '*I rush through meaningful activities without being really attentive to them*', several of the reported problems related to the word '*attentive*' (lexical problem) and students not understanding the dual meaning of the question (PF construct: *contact with the*

present moment / mindfulness). A similar problem was observed with item 13, *'I am willing to fully experience whatever thoughts, feelings and sensations come up for me, without trying to change or defend against them*' where students struggled with the understanding of '*fully experience*'. This is further corroborated by Table 16 where items 1-19 highlight specific problems (e.g. item-1 identified problems with the word *pursue*; item-14 identified problems with the word *undertake*) of a lexical, omission or computational nature.

Deighton et al., (2014) and Eddy et al., (2011) highlighted specific concerns around ensuring measures are age-appropriate (e.g. reading age and presentation) and the importance of being diligent during the development phase, particularly in considering *how* children will interpret items. Measures that are poorly developed risk item design that does not measure the desired construct and will therefore distort research findings, mask clinical change and make research findings potentially meaningless. The COSMIN (COnsensus-based Standards for the selection of health Measurement Instruments) methodology for systematic reviews of Patient-Reported Outcome Measures, states that *content validity* (i.e. relevance, comprehendible and comprehensibility) is the most important measurement property of an outcome measurement (Prinsen et al., 2018). In total, at least a third of problems (i.e. >7 problems) identified through either the Conrad and Blair or PF construct criteria were encountered in 14 statements (60.9%) and 10 statements (43.5%) contained greater than a third in both problem criteria. Whilst the author acknowledges that when viewing both criteria collectively there is an element of double counting (as some students struggled in both problem criteria), the evidence still suggest significant problems with the current items in the context of an adolescent population.

Q3 – What age-specific adaptations might be required / recommended, to provide a theoretically and empirically informed item pool that has been examined with and adapted for use by an adolescent population?

Given the significant problems identified with the content validity of the CompACT from an adolescent perspective, there was a definite requirement to make age-specific adaptations. The CI process presented students with the opportunity to provide an alternative version of each item. During the analysis this generated an extra resource and was valuable in cross referencing the identified problems with alternative versions. These combined processes proved advantageous in identifying and guiding age-specific adaptations that were developed for study 2.

Discussion – Study 2

Through consultation with ACT/PF experts, do the age-specific adaptations still adhere to the original CompACT stated PF individual processes (e.g. acceptance, present moment focus)?

Whilst study 1 provided empirical evidence for adaptations, study 2 afforded a means of confirming the theoretical component i.e. that item adaptations retained their original correspondence to PF processes; correspondence that had been established in the initial CompACT development and validation study (Francis et al., 2016) through expert consensus and psychometric analysis of response data. The original CompACT employed a Delphi to generate the item pool (Francis et al., 2016). Given this rigorous process had already been undertaken, it was decided that a repeat of this approach was not warranted. Consultation with professionals who had expertise in PF/using the ACT model of PF with children and adolescents was considered a valid means of ensuring the revised statements retained the (originally) intended PF construct.

The study design had several important features. Firstly, it provided assurances from leading experts and professionals that the presented age-specific adaptations retained the intended PF construct. This was significant as there was a risk that the CI process undertaken in study 1 could have undermined the Delphi study that was imperative in previously identifying the item pool. Secondly, it

provided additional information on comprehensibility, which is a vital component of outcome measure development (Terwee et al., 2018). Lastly, it invited leading professionals to contribute to the item content, adding to the face validity of the measure.

Strengths and Limitations

There are several strengths and limitations of the study. A limitation is that only the author completed the full analysis of the data. Despite steps to mitigate this, (independent review and the author's supervisors checking the initial transcriptions for accuracy), sole analysis does incur an element of bias within the process.

Willis (2015) attested that the goal of CI was facilitating a process where respondents can provide researchers with a deeper understanding of questionnaire items, free from the standard constraints usually observed under normal conditions. The use of CI has the potential to assess content validity and reliability of self-report measures by assessing comprehensibility, relevance, and clarity of items. Conversely, whilst the extra processing time is beneficial for providing rich data, it can result in a potentially artificial situation due to the increased time allotted for the response process. This could be viewed as a potential limitation of the study. However, steps were taken to mitigate this by adopting concurrent and retrospective CI styles. Additionally, ensuring the students circled a response prior to beginning the *think-aloud* process aimed to mitigate bias.

A further limitation of study 1 was that the ethical approval required the author to adopt a hybrid approach to consent for study 1, which then entailed a combination of Opt-in and Opt-out, where KS3 (Years 7-8) and KS4 (Years 9-11) required parental opt-in and KS5 (Years 12-13) required adolescent opt-out. It is acknowledged that due to the hybrid consent process it is possible that the sample may not be fully representative of the adolescent population as parental opt-in consent has been shown to lead to samples that are less representative, with fewer

socially deprived students being included (Spence, White, Adamson & Matthews, 2015).

Studies involving outcome measurement tools can be limited by sample demographics which are not representative, thus limiting generalisability (Greco et al., 2008). The sample in study 1 is broadly representative of the UK population in terms of ethnicity (Office for National Statistics, 2019). Additionally, recruitment for the study avoided schools from high socio-economic areas / high academic achievement. This was to ensure that the sample was not unrepresentative in terms of the ability of participants, as this could have introduced a bias that would have made generalisable conclusions difficult. To ensure greater generalisability, one of the schools was within an area classified as socioeconomically disadvantaged and the other school was rated as '*requires improvement*'[10] by Ofsted (Office for Standards in Education, Children's Services and Skills) in 2018.

In Drenman's (2003) review of the use of Cognitive Interviewing (CI) for instrument development, he reflected that "analysing cognitive interview data remains overtly subjective, and this remains the greatest flaw in an otherwise comprehensive method of questionnaire pretesting" (p.62). To offset the influence of individual subjectivity, study 1 obtained an independent review of a sample (20%) of the transcripts. Using Altman's (1991) scale the independent review conclude *very good* and *good* reliability for presence of an error and agreement on the type of error category. This provides supporting information that the CI process in study 1 was not biased towards the author's view.

Guidance regarding the optimal sample size for CI is lacking in both clarity and consensus. A commonly cited method for deciding the number of participants to recruit is based on the concept of saturation, Sudman, (1976), in Willis, (2015) or when no new information is elicited. Other researchers advocate using small sample

[10] Not reference to protect against possible identification.

sizes (Sheatsley, 1983; Willis 2005; Beatty & Willis, 2007). Blair and Conrad (2011) advise that the sample size should be linked to the probability of observing a problem, CI technique and the number of items in the psychometric instrument being examined.

As previously mentioned, CI as a technique, has been extensively used with young people, with both individual and group techniques being employed. However, research has provided inconsistent views on which method, if any, is dominant (Alder, Salanterä, & Zumstein-Shaha, 2019; Guest, Namey, Taylor, Eley, & McKenna, 2017; Shaw, Brady, & Davey, 2011; Woolley, Edwards, & Glazebrook, 2018). Given that there is no conclusive evidence favouring either approach the present study elected to use a hybrid approach (Individual & Group, Concurrent and Retrospective), which resulted in a rich source of data (>100,000 words) and significant consensus over identified problems and classification.

The study design also allowed for a balance in opportunities for students to provide thoughts and rationales, therefore counterbalancing possible biases (for example, turn-taking) from the group CIs. Equally, to avoid potential limitations such as shyness in the individual CI (and group CIs), students were provided with the means to write any information that they felt unable to share directly, although this was rarely used. Given that children within a school environment most often communicate to adults within a group environment, the group CIs were seen as an acceptably familiar method of collecting data with this population. In practice, the group CIs also provided richer data with respect to the depth of understanding of a problem. The group CIs provided students with the opportunities to discuss items with their peers which opened up debate and rationalisation of views. The process also enabled students to clarify meanings with each other, which was important for the author in making age-specific adaptations. In addition, a hybrid approach has been employed in other current research studies (see Heary & Hennessy, 2012; Popper & Petrjánošová 2016 & Reeve et al., 2017).

In addition, the study design of adolescent CI supported by expert consultation provided a rich data source that following analysis produced alternatives that professionals deemed better options (for an adolescent population) whilst verifying that the alternatives still mapped to the original PF construct.

Directions for Future Research

The current study explored whether the CompACT is a suitable measure of PF with an adolescent population. The outcome of the study is a version of the CompACT which has received significant age-specific adaptations. This version has not been validated with an adolescent population and it is therefore unknown whether the adaptations have retained the 3-factor structure of the CompACT, which is concordant with the three dyadic processes of PF (Francis et al., 2016). Rigorous validation is now required to assess the performance alongside existing convergent and divergent measures, which have been developed for and/or validated with an adolescent population. Whilst the intention of this study was to develop a measure of PF for an adolescent population, the author reflects that the new version could also be used with an adult population. If this version was to supersede the extant version, then a future study would need to compare both measures against each other to ensure that the new version maintains face and psychometric validity with an adult population.

Implications for Clinical Practice

The data from this study have provided evidence that the CompACT (Francis et al., 2016) in its adult format is not suitable for an adolescent population. Whilst the author is not aware if it is being utilised in practice, this paper should provide reason for caution here until further evidence is collected. The adolescent version developed through this study, once successfully validated, could provide clinicians with a comprehensive psychometric measure to assess adolescent levels of PF. This could be used to track PF transdiagnostic processes and ACT-consistent

process change within clinical practice and within interventional research studies. In addition, given our understanding about the relationship between PF and psychological distress, the adapted measure may be valuable as a screening measure for identifying adolescents who may require additional support. From a service perspective, the validated measure could provide evidence to inform commissioning of services and projects in an evidence-based climate.

Conclusion

This study has demonstrated, using a robust methodology, that the CompACT in its current format is not suitable for use with an adolescent population. Analysis found students had difficulty with every item of the CompACT. Most problems occurred at the understanding response stage and were lexical in nature, i.e. a problem that indicated that a student did not know the meaning(s) of [a] word(s) or how to use them. Student responses also indicated difficulties with understanding the intended PF construct in every statement. A modified CompACT for adolescents has been developed and future research should now assess the psychometric properties of this version in both clinical and non-clinical settings.

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Appendix 1.
Author Guidance for submission to Journal of Contextual Behavioural Science

GUIDE FOR AUTHORS

Types of article
All manuscripts must clearly and explicitly be of relevance to CBS. You may find the JCBS article "Contextual Behavioral Science: creating a science more adequate to the challenge of the human condition" helpful in assessing whether your manuscript is likely to be of interest to readers of this journal.

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5. In practice (up to 3000 words)
6. Practical innovations (up to 3000 words)
7. Professional interest briefs (up to 3000 words)

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[dataset] Oguro, M., Imahiro, S., Saito, S., Nakashizuka, T. (2015). *Mortality data for Japanese oak wilt disease and surrounding forest compositions*. Mendeley Data, v1. https://doi.org/10.17632/ xwj98nb39r.1.
Reference to a conference paper or poster presentation:
Engle, E.K., Cash, T.F., & Jarry, J.L. (2009, November). The Body Image Behaviours Inventory-3: Development and validation of the Body Image Compulsive Actions and Body Image Avoidance Scales. Poster session presentation at the meeting of the Association for Behavioural and Cognitive Therapies, New York, NY.

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Appendix 2.

Search Terms Applied for Measures of Psychological Flexibility in an Adolescent Population

<table>
<tr><th>Population</th><th>Intervention</th><th>Comparison</th><th>Outcome measure</th></tr>
<tr><td>Subject Headings:
• None recognised</td><td>Subject Headings:
• “Acceptance and commitment therapy”/</td><td></td><td>Subject Headings:
• Questionnaires/
• Measurement/ or educational measurement/ or psychological assessment/ or psychometrics/ or testing/ or evaluation/ or statistical analysis/
• Self-report/ or data collection/ or patient reported outcome measures/ or self-evaluation/ or self-monitoring/</td></tr>
<tr><td>Key word (.ti,ab,id. and .ti,ab,kf. and .ti,ab.kw.)</td><td>Key word (.ti,ab,id. and .ti,ab,kf. and .ti,ab.kw.)</td><td>Key word (.ti,ab,id. and .ti,ab,kf. and .ti,ab.kw.)</td><td>Key word (.ti,ab,id. and .ti,ab,kf. and .ti,ab.kw.)</td></tr>
<tr><td>Child*</td><td>Psychological flexibility</td><td></td><td>Question*</td></tr>
<tr><td>Adolesc*</td><td>Psychological inflexibility</td><td></td><td>Measure*</td></tr>
<tr><td>Teen*</td><td>Experiential avoidance</td><td></td><td>Psychological assessment*</td></tr>
<tr><td>Young person*</td><td>Cognitive fusion</td><td></td><td>Psychometric*</td></tr>
<tr><td>Young people*</td><td>Acceptance and commitment therapy</td><td></td><td>Evaluation</td></tr>
<tr><td rowspan="8">OR</td><td>(Acceptance adj1 commitment therapy)</td><td></td><td>Statistical analys#s</td></tr>
<tr><td>Acceptance & commitment therapy</td><td></td><td>Self-report</td></tr>
<tr><td rowspan="6">OR</td><td></td><td>Patient reported outcome measure*</td></tr>
<tr><td></td><td>PROM</td></tr>
<tr><td></td><td>Self-evaluation</td></tr>
<tr><td></td><td>Self-monitoring</td></tr>
<tr><td></td><td>OR</td></tr>
<tr><td colspan="4">Then…</td></tr>
<tr><td colspan="4">AND</td></tr>
</table>

Appendix 3.
COSMIN definitions of domains, measurement properties, and aspects of measurement properties (Prinscen et al., 2018, p.11-12)

Term			Definition
Domain	**Measurement property**	**Aspect of a measurement property**	
Reliability			The degree to which the measurement is free from measurement error
Reliability (extended definition)			The extent to which scores for patients who have not changed are the same for repeated measurement under several conditions: e.g. using different sets of items from the same PROM (internal consistency); over time (test-retest); by different persons on the same occasion (inter- rater); or by the same persons (i.e. raters or responders) on different occasions (intra-rater)
	Internal consistency		The degree of the interrelatedness among the items
	Reliability		The proportion of the total variance in the measurements which is due to 'true'† differences between patients
	Measurement error		The systematic and random error of a patient's score that is not attributed to true changes in the construct to be measured
Validity			The degree to which a PROM measures the construct(s) it purports to measure
	Content validity		The degree to which the content of a PROM is an adequate reflection of the construct to be measured
		Face validity	The degree to which (the items of) a PROM indeed looks as though they are an adequate reflection of the construct to be measured

Term			Definition
Domain	**Measurement property**	**Aspect of a measurement property**	
Construct validity			The degree to which the scores of a PROM are consistent with hypotheses *(for instance with regard to internal relationships, relationships to scores of other instruments, or differences between relevant groups)* based on the assumption that the PROM validly measures the construct to be measured
		Structural validity	The degree to which the scores of a PROM are an adequate reflection of the dimensionality of the construct to be measured
		Hypotheses testing	Item construct validity
		Cross- cultural validity	The degree to which the performance of the items on a translated or culturally adapted PROM are an adequate reflection of the performance of the items of the original version of the PROM
	Criterion validity		The degree to which the scores of a PROM are an adequate reflection of a 'gold standard'
Responsiveness			The ability of a PROM to detect change over time in the construct to be measured
Interpretability			Interpretability is the degree to which one can assign qualitative meaning - that is, clinical or commonly understood connotations – to a PROM's quantitative scores or change in scores.

† *The word 'true' must be seen in the context of the CTT, which states that any observation is composed of two components – a true score and error associated with the observation. 'True' is the average score that would be obtained if the scale were given an infinite number of times. It refers only to the consistency of the score, and not to its accuracy.*

* *Interpretability is not considered a measurement property, but an important characteristic of a measurement instrument*

Appendix 4.

Criteria and Guidelines used to Determine the Ratings for Relevance, Comprehensiveness and Comprehensibility

Criteria	Rating (+ / - / ? / ±)	
Relevance:		
1. Are the included items relevant for the construct of interest? 2. Are the included items relevant for the target population of interest? 3. Are the included items relevant for the context of use of interest? 4. Are the response options appropriate? 5. Is the recall period appropriate?	(+) At least criteria 1 and 2 are rated '+' AND at least two of the other criteria on relevance are rated '+' NB. A maximum of 1 criterion rated '–' is allowed, but reviewers are also permitted to rate ± in that case. (-) At least criteria 1 and 2 are rated '–' AND at least two of the other three criteria on relevance are rated '-' (?) At least two of the criteria are '?' (±) All other situations	
Comprehensibility:		
6. Are all key concepts included?	(+ / - / ? / ±) – Rating of criterion 6	
	process/outcome measures development:	**Reviewers rating:**
Comprehensibility:		
7. Are the process/outcome measures instructions understood by the population of interest as intended? 8. Are the process/outcome measures items and response options understood by the population of interest as intended? 9. Are the process/outcome measures items appropriately worded? 10. Do the response options match the questions?	(+) At least criterion 8 is rated '+' and criterion 7 is NOT rated '-' (-) Criterion 8 is rated '–' (independent of the rating for criterion 7) (?) Criterion 8 is rated '?' (independent of the rating for criterion 7) (±) Criterion 8 is rated '+' and criterion 7 is rated '–'	(+) Both criteria 9 and 10 are '+' (-) Both criteria 9 and 10 are '-' (?) At least one of the criteria is rated '?' (±) One criterion is rated '+' and one is rated '–'
Overall Content Validity Rating	(+) The relevance rating is '+', the comprehensiveness rating is '+', and the comprehensibility rating is '+' (-) The relevance rating is '–', the comprehensiveness rating is ' –' . , and the comprehensibility rating is '-' (?) At least one of the ratings is '+' and at least one of the ratings is '–' (±) Two or more of the ratings are rated '?'	

Appendix 5.
Study 1: Cognitive Interviewing Reporting Framework (CIRF)

Ref: Boeije, H., Willis, G. The Cognitive Interviewing Reporting Framework (CIRF): towards the harmonization of cognitive testing reports. Methodology: European Journal of Research Methods for the Behavioral and Social Sciences: 2013, 9(3), 87-95

The CIRF has been developed to encourage researchers to report their cognitive interview projects in a manner that is comprehensive and accountable. The authors state, "in our experience, many researchers refrain from disseminating cognitive interviewing reports in a wide manner" (p. __). The authors following an iterative process have established a framework of 10-points. The authors hope that by developing a framework that it will encourage researchers to report systematically on the cognitive interviewing process and over time encourage the development of best practice. The following table shows the CIRF

Cognitive Interviewing Reporting Framework	Addressed (Yes / Partial / No / N/A)	Page
1. Research objectives		
Define the research objectives • What are the aims of the study? • What is the content that gave rise to pretesting the instrument?	Yes	See '*Aims'*, p.15 See '*Introduction',* p.9-14
Provide a review of the relevant background literature • What is the theoretical perspective for the cognitive interviewing study?	Yes	See '*Introduction'*, p.9-14
2. Research design		
Describe the feature of the overall research design • Wat was the basis for each feature of the design?	Yes	See '*Methodology*', p.16-23

3. Ethics		
Present evidence of thoughtfulness about research contexts and participants • Was the study approved by an ethics committee or IRB? (consent procedures) • How was the research project introduced to settings and participants? • How were people motivated to participate? • How was confidentiality and anonymity of participants/sources protected?	Yes	See '*Ethical Approval',* p.17 See '*Participant'*, p.17 See '*Gatekeeper Letter',* p.92 See '*Participant Information – Adolescent Consultation Phase'*, p.107
4. Participant selection		
Describe the participant selection methods used • What are participants details with respect to demographics and other project-specific items of information? • Did the selection of participants satisfy the study objectives?	Yes	See '*Methodology'*, p.16-23
5. Data collection		
Provide information about the data collection methods • Who conducted the interviews and how many interviews were involved? • How were the interviews trained? • Were sessions recorded and if so, was audio or video used? • Were notes taken and how was employed? • What type of verbal reporting method was employed, that is, think aloud, probing or combination? • Was the interview protocol adjusted during the research process and if so, how? • Was saturation achieved?	Yes	See '*Methodology'*, p.16-23 See '*Discussion'*, p.51-59

6. Data analysis		
Describe methods of data analysis in the research project • How were new data transformed into categories representing problem areas and solutions? • What software programs were used/ • Has reliability been considered, including the repetition (parts of) the analysis by more than one researcher? • How did researchers work together and how were systematic analysis procedures encouraged, especially between testing locations • Were there any efforts for seeking diverse observations, that is triangulation? • Was quantitative evidence used to supplement qualitative evidence?		See '*Data Analysis'*, p.21-23
7. Findings		
Present findings in a systematic and clear way, either per-item, per meaningful part of the questionnaire, or per entire questionnaire • What was observed concerning subject behavior with respect to *each* evaluated item? • To what extent did results differ as a function of subject characteristics, behavior, or status		See '*Results*, p.24-38 & 42-50
8. Conclusions, implications, and discussion		
Address the realization of the objectives • If possible, include a copy of the modified questions if one was produced as a product of testing? • How do findings and solutions relate to previous evidence?	Yes	See '*Discussion'*, p.51-59

9. Strengths and limitations of the study		
Discuss strengths and limitations of the design and employment of the study and how these could have affected the findings • What were relevant a priori expectations or previous experiences? • What are the implications of findings for generalization to the wider population from which the participants were drawn, or applicability to other settings? • What is the study's contribution to methodological development and future practice?		See '*Discussion'*, p.51-59
10. Report format		
Use a structured and accepted format for organizing the report • Include main study documents that are relevant for independent inspection by others as appendix or online materials		Study written in line with APA 6th Ed.

Appendix 6.
Study 1: Gatekeeper Letter

School Address

Dear _____ (Headteacher)

I am writing regarding a research project we are conducting. It is aimed at developing a new questionnaire for assessing a set of psychological coping skills associated with wellbeing and resilience. These skills fall under a construct called 'Psychological Flexibility'.

We are looking to recruit students aged 11-18 years. I am writing to enquire whether you would be interested in involving students from your school in the research project.

Further details can be found below, and we are happy to answer any questions you might have:

The Development and Validation of the Comprehensive Assessment of Acceptance and commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Background context:

One of the challenges facing the education sector is being able to easily identify those individuals who are or who may potentially be at risk of developing mental health difficulties.

Description of the project:

As you'll be only too aware, there is increasing evidence and reports highlighting the struggles that young people face in dealing with difficult thoughts and feelings. To be able to identify those at risk of developing mental health difficulties, monitor their progress, and evaluate preventive interventions, we need suitable questionnaires which assess the processes that are theorised to underpin mental health and well-being.

Research has identified a distinct set of ways of relating to thoughts and feelings which seems to be protective for wellbeing. These skills are termed "Psychological Flexibility". Individuals high in Psychological Flexibility seem to be buffered against difficult life events and are able to keep going with things that matter, even when difficult thoughts and feelings are present. People

with high Psychological Flexibility experience less mental health difficulties and feel more satisfied with their life.

At the moment there is a measure of Psychological Flexibility for adults, but not for young people. This research project hopes to develop a new measure of Psychological Flexibility by adapting the existing adult measure and making a shortened version for young people.

The research will be completed in 3 Stages and I am inviting your school to be involved in both Stage 1 and Stage 3:

- **<u>Stage 1 – Adolescent Consultation Phase</u>:**
  Aim: To ensure that the questionnaire items make sense to young people aged 11-18yrs.

  We will ask for student volunteers (n≤20) to look at the questions on the adult questionnaire. We will then ask a series of open questions (you will receive a full list of these question prior to this phase commencing) to clarify their understanding and to enable us to make age-specific alteration

  For example:
  A question from the questionnaire is:
    - I *can keep going with something when it's important to me?*

  Some of the types of questions the researcher might ask are as follows:
    - What do you think that question means?
    - How would you say this question in your own words?
    - Did you feel that question was easy or not easy to answer?
    - Was there something in that question that was difficult?

- **<u>Stage 3 – Validation phase</u>:**
  Aim: Validation of the new Psychological Flexibility measure – Checking the new questionnaire measures what we are intending, by comparing students' answers on the new measure with responses on questionnaires measuring similar constructs

  We will be asking students in schools to complete the new questionnaire and some other questionnaires to check that the new questionnaire of Psychological Flexibility is valid.

  This will involve student's answering a number of questionnaires online. The questions will be about their well-being, mood and behaviours and how they tend to respond to potentially difficult thoughts and feelings.

What benefits are available to the students and the school:

We hope your students may be interested to be involved in contemporary research related to wellbeing. In addition, once the data collection phase has been completed the research team members would be happy to:

- For the students.
    - Every student who agrees to take part will be entered into a draw to receive a number of cash prizes, as well as sports tickets.
    - discuss (my journey into) psychology and clinical psychology for any students in Years 11, 12 and 13, who might be interested.
- For the school:
    - offer a workshop to staff on strategies for increasing psychological flexibility.

I would be grateful if you could let me know whether this project is something that might be of interest to your school. I would be happy to provide further details about the project either in person or by phone, in order to help you decide if you would like to be involved. My contact details can be found below, many thanks in advance for consideration of this project.

Appendix 7.
Study 1: Parents/Carer Supporting Information sheet (Key Stages 3, 4 and 5)

The Development and Validation of the Comprehensive Assessment of Acceptance and commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Parent/Carer Supporting Information Sheet (Key Stages 3 & 4)

Dear Parent / Carer / Guardian,

I am writing to make you aware of a research project based at The University of Cardiff, which will involve recruiting students at _____ Secondary School.

What is the Aim of the Study?

The aim of this research study is to develop a new wellbeing questionnaire for adolescents measuring a concept called 'psychological flexibility'.

What is The Study About?

'Psychological flexibility' is a set of skills which help young people do what matters, guided by personal values, even when they have difficult thoughts and feelings. Higher levels of psychological flexibility are associated with better resilience and coping, and higher levels of well-being.

We intend developing a new questionnaire measuring psychological flexibility for young people. In this current stage, we need to check whether the questions on the adult measure of Psychological Flexibility make sense to young people (11-18 years of age), and if required make any age-specific adaptations.

There are three stages to this study, and this is stage 1. Once our study is complete, we will make the new questionnaire freely available so that researchers, teachers and health professionals can use the questionnaire to get an overview of a young person's coping skills and to monitor change after interventions.

What Would the Study Involve for My Child if They Took Part?

The school have selected 12 students from across Key Stage's 3 & 4 to participate in this stage. Each student will be asked individually whether they wish to participate. If a student agrees to participate in the study (in addition to

parental consent), they will be provided with a copy of the current adult measure and asked to read each question. Following each question, a member of the research team will ask the student a series of questions (pre-agreed with the school) related to how easily they believe the question could be understood by young people.

This process will be audio recorded so that the answers can be analysed. No personal identifiable information will be disclosed during this process as each student will be provided with a unique identifiable number (supplied by and only known to the school). Once the transcriptions have been completed and analysed, the date recording will be destroyed, as agreed during the ethics application for this research.

Can I Find out More?

I have enclosed the information sheet that we will be providing to each student, in order to help them make an informed choice about taking part. The information sheet outlines how information a student provides will be used and stored. Please read this and do not hesitate to contact us if you have any questions.

Can I Choose if My Child Takes Part?

Your child's participation in this research project is completely voluntary. If after reading the information sheet you decide you would prefer that your child did not complete the questionnaires, please could you let the research team know by completing the attached slip by dd/mm/2019 and returning it to _____, so we can ensure your child is not included.

Yours sincerely,

Matthew Lewis
Trainee Clinical Psychologist
South Wales Doctoral Programme in Clinical Psychology.

Supervised by:
Dr Victoria Samuel
Senior Research Tutor
South Wales DClinPsy
Dr Nima Golijani-Moghaddam
Research Clinical Psychologist
Trent DClinPsy Programme

I would prefer that my child _____,

Year_____,

does / does not (please delete as applicable) participate in the research project, '*The Development and Validation of the Comprehensive Assessment of Acceptance and Commitment Therapy – Youth (CompACT-Y) in an Adolescent Population'.*

I understand that by completing this form, my child **will** or **will not** be able to complete the questionnaires depending on my decision.

Signed: _____ Name:

_____

Date: _____

The Development and Validation of the Comprehensive Assessment of Acceptance and commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Parent/Carer Supporting Information Sheet (Key Stage 5)

Dear Parent / Carer / Guardian,

I am writing to make you aware of a research project based at The University of Cardiff, which will involve recruiting students at _____ Secondary School.

What is the Aim of the Study?

The aim of this research study is to develop a new wellbeing questionnaire for adolescents measuring a concept called 'psychological flexibility'.

What is The Study About?

'Psychological flexibility' is a set of skills which help young people do what matters, guided by personal values, even when they have difficult thoughts and feelings. Higher levels of psychological flexibility are associated with better resilience and coping, and higher levels of well-being.

We intend developing a new questionnaire measuring psychological flexibility for young people. In this current stage, we need to check the questions on the adult measure of Psychological Flexibility make sense to young people (11-18 years of age), and if required make any age-specific adaptions.

There are three stages to this study, and this is stage 1. Once our study is complete, we will make the new questionnaire freely available so that researchers, teachers and health professionals can use the questionnaire to get an overview of a young person's coping skills and to monitor change after interventions.

What Would the Study Involve for My Child if They Took Part?

The school have selected 8 students from across Key Stage 5 to participate in this stage. Each student will be asked individually whether they wish to participate. If a student agrees to participate in the study, they will be provided with a copy of the current adult measure and asked to read each question. Following each question, a member of the research team will ask the student

a series of questions (pre-agreed with the school) related to how easily they believe the question could be understood by young people.

This process will be audio recorded so that the answers can be analysed. No personal identifiable information will be disclosed during this process as each student will be provided with a unique identifiable number (supplied by and only known to the school). Once the transcriptions have been completed and analysed, the date recording will be destroyed, as agreed during the ethics application for this research.

Can I Find out More?

I have enclosed the information sheet that we will be providing to each student, in order to help them make an informed choice about taking part. The information sheet outlines how information a student provides will be used and stored. Please read this and do not hesitate to contact us if you have any questions.

Can I Choose if My Child Takes Part?

Your child's participation in this research project is completely voluntary. If after reading the information sheet you decide you would prefer that your child did not complete the questionnaires, please could you let the research team know by completing the attached slip by dd/mm/2019 and returning it to _____, so we can ensure your child is not included.

Yours sincerely,

Matthew Lewis
Trainee Clinical Psychologist
South Wales Doctoral Programme in Clinical Psychology.

Supervised by:

Dr Victoria Samuel
Senior Research Tutor
South Wales DClinPsy

Dr Nima Golijani-Moghaddam
Research Clinical Psychologist
Trent DClinPsy Programme

I would prefer that my child _____,

Year_____, **does not** participate in the research project, '*The Development and Validation of the Comprehensive Assessment of Acceptance and Commitment Therapy – Youth (CompACT-Y) in an Adolescent Population'.*

I understand that by completing this form, my child **will not** be able to complete the questionnaires.

Signed: _____ Name:

_____

Date: _____

Appendix 8.
Study 1: Participation Information 'Easy Read' – Adolescent Consultation Phase

The Development and Validation of the Comprehensive Assessment of Acceptance and commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Participant Information (Easy Read) – Adolescent Consultation Phase

What is a research study?

A research study is what we do when we want to find out new things. This sheet is to help you choose if you want to take part in this study.

Why is this research being done?

Young people at times fin
d their thoughts and feelings upsetting or confusing. Acceptance and Commitment Therapy (ACT) is a theory that explains how we can cope differently with difficult thoughts and feelings to make them easier to manage. A lot of young people from across the world are already using ACT.

What will I be asked to do?

We are developing a new questionnaire about ACT. To check it makes sense, we need your help. We will ask you to read and check that the list of questions makes sense to you.

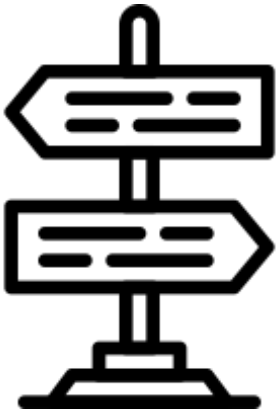
We want to know if you think young people, between 11-18 years of age will understand what each question means.

An example of one of the questions is:

- *I can keep going with something when it's important to me?*

After you have read the question, a person from the study might ask you:

- *What do you think that question means?*
- *How would you say this question in your own words?*
- *Did you feel that question was easy or not easy to answer*?



Why me? Do I have to say yes?

You have been invited as you are in school and between 11-18 years old.

Can I change my mind?

Yes, at any time. It is up to you!! Just say you don't want to join in, and nobody will mind or ask you why.

Do I get anything?

Each student who takes part in **Stage 1** will be offered the choice of entering a prize draw to win one of the following prizes:

- a £45 Gift Voucher; or
- a £25 Gift Voucher; or
- a £20 Gift Voucher; or
- a £10 Gift Voucher; or
- Tickets (Two) Wales Rugby Union Autumn International Series (2020).

The winner will be chosen randomly by computer. The research team will contact the winner's school to alert each of the winners, when the study has finished (2020).

What will you do with my answers?

There is a group of people, as well as your Head Teacher who have checked everything we are doing, to make sure what we are doing is ok. There are also lots of laws and rules about what we must do to keep everything you tell us safe.

We will be using your answers and other young people's answers to try and make a new survey, that can be used in schools, like yours, to check in on how a young person is doing.

Can I ask people about the study?

You can ask your parents (or carer) or your teachers. They have been sent lots of other information. You can also ask the research team, who are called Matt, Victoria and Nima. You can email us at LewisMJ7@Cardiff.ac.uk

Anything else?

Thank you very much for taking the time to read this sheet. If you want more information on anything then you can either ask or there is a longer sheet that you can have to read.

Appendix 9.
Study 1: Participant Information – Adolescent Consultation Phase

The Development and Validation of the Comprehensive Assessment of Acceptance and commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Participant Information – Adolescent Consultation Phase

Thank you for your interest in taking part in this research study. The following sheet aims to provide you with information about why we are doing this study and what it involves for you.

What is the research about?

Young people can sometimes find it difficult to cope with difficult thoughts and feelings and the pressures they face appear to be increasing. Acceptance and Commitment Therapy (ACT) is a theory that explains how the way we respond to thoughts and feelings affects the impact they have. ACT helps people to learn various skills to become freer to do what matters, even if difficult thoughts and feelings are there – this is known as Psychological Flexibility.

Therapists across the UK and internationally are using ACT more and more to help young people manage difficult challenges.

Why are you doing the research project?

Researchers and therapists use questionnaires (surveys) to gain an overview and understanding of how people cope with difficult thoughts and feelings and to track change over time. At the moment there is a questionnaire of Psychological Flexibility for adults, but not for young people. This research project hopes to develop a new questionnaire of Psychological Flexibility just for young people.

We will be conducting this research project as the first stage of a bigger research project. The information we collect now will be used to develop further research projects to hopefully validate (confirm) that the new questionnaire is measuring what we want it to. We do this by comparing the new questionnaire with existing questionnaires that measure similar things.

What will I be doing if I decide to take part?

The research project will be completed in 3 stages and you are being asked if you would like to volunteer for Stage 1 (see below). If you wish to volunteer for Stage 3, please make that known to the research team and you will be invited separately:

- **Stage 1 – Adolescent Consultation Phase: We will ask young people to check that the wording on the suggested questionnaire makes sense to them. We want to know if they think young people between 11-18 years of age will understand what each question means.**

An example of one of the questions from the questionnaire is:

- **I can keep going with something when it's important to me?**

Following the young person reading the question, some of the questions the researcher might ask are as follows:

- **What do you think that question means?**
- **How would you say this question in your own words?**
- **Did you feel that question was easy or not easy to answer?**

- Stage 2 – Expert Consultation Phase: ACT researchers and therapists will confirm that any changes have not made the questions invalid.

- Stage 3 – Validation Phase: We will ask young people in schools to complete the new questionnaire along with some other questionnaires to check that the new questionnaire is valid.

Who are the researchers?

The research team consists of:

- Matthew Lewis, Trainee Clinical Psychologist – South Wales Doctoral Programme in Clinical Psychology at Cardiff University.

Under the supervision of:

- Dr. Victoria Samuel, Senior Research Tutor, South Wales Doctoral Programme in Clinical Psychology
- Dr. Nima Golijani-Moghaddam, Research Clinical Psychologist, Lincoln Doctoral Programme in Clinical Psychology, Psychologist, Lincoln Doctoral Programme in Clinical Psychology

Why have I been invited to take part?

You have been invited to take part as you are aged between 11-18 years of age and are attending a secondary school on a full-time basis.

Do I get anything for taking part?

Each student who participates in Stage 1 will be offered the choice of entering a competition to win one of the following prizes

- 1 x £45 Gift Voucher;
- 1 x £25 Gift Voucher;
- 1 x £20 Gift Voucher;
- 1 x £10 Gift Voucher;
- 2 x Tickets Wales Rugby Union Autumn International Series (2020)he winner will be selected at random by a computer programme. The research team will contact the winner's school to alert each of the winners, following completion of Stage 3.

Do I have to take part?

No, it is completely up to you whether you want to take part or not. Read this sheet and if you have any questions please email or ask a teacher or parent to email Matthew Lewis (email at the end).

Every student will have the option to complete the questionnaires and having completed the questionnaires choose whether they want to be entered into the competition.

What if I change my mind later on?

This is not a problem, you can stop taking part in the research project at any point. If you decide to stop, you can do so immediately (no notice is required) and you will not be asked to provide a reason.

As all of the data is anonymised, if you have completed the questionnaires then this data will be used for the research (but will not be identifiable as your information).

With respect to your unique identifying number, this is held by the school and will be retained by them as this remains their/your unique identifier within the school.

How will my information be used?

The adolescent consultation phase involves the research team completing a semi-structured interview, with students about the questions on the existing questionnaire. This will be recorded on a voice recorder, which is password protected (this password is held by the research team on a file that is secured

within a locked cabinet). The details of the interview will be kept confidential (only shared with the research team and transcriber), unless something is said which makes the research team believe you or someone else may be at risk. If this situation arises then we will contact the Head of Pastoral Care at school about our concerns. We will be asking somebody who is not part of the research team to transcribe (write down what was said word for word) the interviews. The recording will be sent to them in a password protected electronic file to keep the information confidential.

The research team will not store any information which could identify you. All information (interview recordings, transcriptions and questionnaire data) will be kept on electronic files/databases or locked filing cabinets at Cardiff University, which can only be accessed by the research team.

The research project is being completed as part of a Doctoral of Clinical Psychology. the information will be used in a written report (which may be later published or presented to wider audiences, but it will not be possible to identify which students took part or to link any individual with their questionnaire responses.

How will my information be stored (GDPR Specific)?

Cardiff University is the Sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study and will act as the Data Controller for this study. This means that we are responsible for looking after your information and using it properly. Cardiff University will keep identifiable information about you for 5 years after the study has finished. The legal basis we will rely upon to collect and store your information is called 'public task'.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained.

To safeguard your rights, we will use the minimum personally-identifiable information possible. You can find out more about how we use your information at https://www.cardiff.ac.uk/public-information/policies-and-procedures/data-protection The University's Data Protection Officer can be contacted at inforequest@cardiff.ac.uk All information is kept for 5 years and deleted after this period.

Are there any benefits or disadvantages to taking part?

The nature of this type of questionnaire means that we will be asking you about you, your feelings and mood. It is possible this may be upsetting, and we would encourage you to talk to somebody if this is the case (a member of the research team, teacher, parent/carer).

We also hope that you will learn some things about yourself through this process and may potentially become interested in psychology, research or indeed both.

What can I do if I have concerns about the research project?

You can speak directly to a member of the research team, and they can be contacted using the information below. You can also tell a member of the school staff or your parent/carer if you have any worries about the research project, and they will then be able to let us know.

Alternatively, you can contact Dr. Reg Morris (Director of the Doctoral Programme in Clinical Psychology). Address: 11th Floor, School of Psychology, Tower Building, 70 Park Place, Cardiff, CF10 3AT. Telephone: 02920 870582

Who has reviewed the research project?

The research project has been approved by Cardiff University School of Psychology Ethics Committee. They have reviewed the study to ensure we are running it in a way which protects your rights and your safety.

If you have any questions relating to ethical issues and how this study is reviewed, please contact Cardiff University School of Psychology Ethics Committee: Email: psychethics@cardiff.ac.uk Telephone: 02920 870360

If you have any questions?
You can contact us by telephone, email or post. Our contact details are:
Mr Matthew Lewis
Trainee Clinical Psychologist
School of Psychology
Cardiff University
57 Park Place
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Dr Victoria Samuel **Senior Research Tutor**

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Brayford Pool
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Appendix 10.
Study 1: Adolescent Consultation Phase – Informed Consent

The Development and Validation of the Comprehensive Assessment of Acceptance and commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Stage 1: Adolescent Consultation Phase – Informed Consent Form

Please read the following statements and initial the boxes:

[ ] I have read the information sheet and have had the opportunity to ask questions.

[ ] I understand that I am free to withdraw from the interview at any time without explanation.

[ ] I am happy to participate in a semi-structured interview.

[ ] I understand that the interview will be recorded and understand how the recording will be used and stored.

[ ] I understand that the information I share will be confidential (only shared with the research team) and made anonymous when it is used to write up the findings of the research project.

[ ] I understand that in order to enter the competition, I need to initial this box

I have read the above statements and I am happy to put my initials in each of the boxes.

Signed: _____ Date: _____

Unique identifying number: _____

Appendix 11.
Study 1: Young Person Debrief Sheet

The Development and Validation of the Comprehensive Assessment of Acceptance and commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Young Person Debrief Sheet

Study
The Development and Validation of the Comprehensive Assessment of Acceptance and commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Thank you
Thank you for participating in this research project. The information you have provided will help us to evaluate and hopefully finalise a new measure of coping or 'Psychological Flexibility' for adolescents.

We hope that this new questionnaire, once completed, will helpful for school staff, researchers and health professionals to measure coping skills and to track changes after interventions. We appreciate the time you have given to the research project.

Data protection
The school will continue to keep a record of your unique identifying number. This allows us to inform the school if your responses lead us to think that you are experiencing distress. After a 6-month period the research team will delete the unique identifying number, but we will continue to store a record of your responses from the questionnaires (and the recordings from the consultation interviews). This information will be anonymous and confidential and will be stored on password protected databases or in locked filing cabinets at Cardiff University. After 5 years this information will be deleted.

Prize draw competition
If you have entered the prize draw competition this will be drawn at the end of Stage 3. If you have won one of the prizes you will be notified through your school. Good luck!!

What If you have any questions?
You can contact us by telephone, email or post. Our contact details are:

Mr Matthew Lewis
Trainee Clinical Psychologist

School of Psychology
Cardiff University
57 Park Place
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CF10 3AT
Email: LewisMJ7@cardiff.ac.uk

Dr Victoria Samuel
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Appendix 12.
Study 1: Cognitive Interview (CI) Protocol

Doctorate in Clinical Psychology (DClinPsy)

Cognitive Interviewing (CI) Protocol

Project Title:

The Development and Validation of the Comprehensive Assessment of Acceptance and Commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Matthew Lewis

supervised by

Dr Victoria Samuel
Senior Research Tutor
South Wales DClinPsy Programme, Cardiff University

Dr Nima Golijani-Moghaddam
Research Clinical Psychologist
Trent DClinPsy Programme, University of Lincoln

Title	Using cognitive interviewing (CI), assess whether age-specific adaptations to the CompACT (Comprehensive assessment of Acceptance and Commitment Therapy processes; Francis, Dawson, & Golijani-Moghaddam, 2016) measure, are required to enable accessibility by an adolescent population.
Study Aims	To explore how adolescent students: understand, interpret, retrieve relevant information and respond to items of the CompACT.
Methodology	Individual and group CI probing (concurrent, 'think aloud' with probing) will be utilised to provide different mediums for eliciting cognitive processes involved in responding to statements on the CompACT. CI will be conducted with a non-clinical sample whilst they complete the CompACT. Participants will be volunteers from two secondary schools within Wales and/or England: • School 1 – participants will take part in individual and focus group cognitive interview (2 x group of 5 individuals and 10 individual interviews) • School 2 – participants will take part in individual and focus group cognitive interview (1 x group of 5 individuals and 5 individual interviews)
Number of participants	n≤30 male and female The following age range and breakdown will be attempted: KS3 = 12 students; KS4 = 12 students and KS5 = 16 students)
Eligibility criteria	*Inclusion Criteria:* • Students aged11-18 years (school years 7-13) • Able to communicate fluently in English • Individuals requiring additional support will be supported through school established supports plans (i.e. a teaching learning assistant) *Exclusion Criteria:* • Reading and writing ≤Level 3 National Curriculum Scale
Description of interventions	*Hybrid Consent:* • Key Stage 3 and 4 – Parental Opt-in, Child Opt-in • Key Stage 5 – Parental Opt-out, Child Opt-in *Cognitive interview:* • lasting approximately 45mins to 1 hour
Methods of analysis	Qualitative analysis using a cognitive coding approach following a cognitive model.
Duration of study Phase	This is Stage 1 of 3. End date for the research study in May 20th, 2020. Stage 1 – Timeline April – August 2019.

Main Research Study Background

For information on the main research study, please see: C1115801-Lewis-Supporting_Material-Accepted_Version for information on the:

- Purpose of project and its academic rationale.
- Brief Description of methods and measurements.
- Participants: recruitment methods, numbers, age, gender, exclusion/inclusion criteria.
- A statement of the ethical considerations raised by the project and proposals for dealing with them.

Cognitive Interview protocol - Concurrent think aloud with pre-prepared and spontaneous think aloud probes

Pre CI process:

DEMOGRAPHIC questionnaire to be answered prior to CI.

My name is Matt and I am a Trainee Clinical Psychologist. Have you had an opportunity to read the information that I left with the school and that was given to you parents? Do you have any questions? Are you happy to participate in this study and for me to record our conversation? (Remind about remaining anonymous, toilets, breaks and their option to terminate)

Before we start, I just want to explain what we are doing today. As it said in the information sheet, we are preparing to develop a new questionnaire for adolescents and before we can do that, we need to get the expert opinions of people like you on some questions. In order to do this, I am going to ask you to read aloud a series of statements, one at a time, and after each statement I will want you to tell me whatever comes into your mind. This is known as 'thinking out loud'. We've found that it helps to have some practice at doing this, so I am going to give you an example and then I am going to get you to have two practices before we start the real thing. Is that ok?

Example:

I am going to demonstrate, 'thinking out loud' using the following picture.

Practice 1:

I am going to show you a different picture to the one I just used. I would like you talk out loud in the same way that I just did

Practice 2:

AFQ-Y8 – Sample statement: "If my heart beats fast, there must be something wrong with me?"

Cognitive Interview:

"Please look at item number ___ and read it out loud. Once you have read it please tell me, out loud, whatever comes into your mind"

Q	CompACT measure	Pre-prepared / Scripted Probes	Spontaneous Probes
1	I can identify the things that really matter to me in life and pursue them	Do you know what that statement means? How might you re-word that statement so it makes better sense to you? You chose (quote student's choice) as your answer, what does that choice mean to you?	I noticed that you hesitated when you read that statements, can you tell me what you were thinking? I noticed you were spending some time with that question – can you tell me what you were thinking about? Can you tell me a bit more about that?
2	One of my big goals is to be free from painful emotions	As above	How did you arrive at that answer?
3	Ii rush through meaningful activities without being really attentive to them	As above	What does'_____' mean to you?
4	I try to stay busy to keep my thoughts or feelings from coming	As above	In your words, what is '_____'?
5	I act in ways that are consistent with how I wish to live my life	As above	What would you say that question is asking of you?
6	I get so caught up in my thoughts that I am unable to do things that I most want to do	As above	What brought that to mind?
7	I make choices based on what is important to me, even if it is stressful	As above	What time period, where you thinking of?
8	I tell myself that I shouldn't have certain thoughts	As above	How did you feel about answering that question?
9	I find it difficult to stay focused on what's happening in the present	As above	What are you thinking about now? I noticed that you hesitated when you went to answer that statements, can you tell me why that was?

Q	CompACT measure	Pre-prepared / Scripted Probes	Spontaneous Probes
10	I behave in line with my personal values	As above	I noticed that you hesitated when you read that statements, can you tell me what you were thinking?
11	I go out of my way to avoid situations that might bring difficult thoughts, feelings or sensations	As above	
12	Even when doing the things that matter to me, I find myself doing them without paying attention	As above	I noticed you were spending some time with that question – can you tell me what you were thinking about?
13	I am willing to fully experience whatever thoughts, feelings and sensations come up for me, without trying to change or defend against them	As above	Can you tell me a bit more about that?
			How did you arrive at that answer?
14	I understand things that are meaningful to me, even when I find it hard to do so	As above	What does'_____' mean to you?
15	I work hard to keep out upsetting feelings	As above	In your words, what is '_____'?
16	I do jobs or tasks automatically, without being aware of what I'm doing	As above	What would you say that question is asking of you?
17	I am able to follow my long-term plans including times when progress is slow	As above	What brought that to mind?
			What time period, where you thinking of?
18	Even when something is important to me, I'll rarely do it if there is a chance it will upset me	As above	How did you feel about answering that question?
19	It seems I am "running on automatic" without much awareness of what I'm doing	As above	What are you thinking about now?
20	Thoughts are just thoughts – they don't control what I do	As above	I noticed that you hesitated when you went to answer that statements, can you tell me why that was?
21	My values are really reflected in my behaviour	As above	
22	I can take thoughts and feelings as they come, without attempting to control or avoid them	As above	
23	I can keep going with something when it's important to me	As above	

1. Following answering each statement:

What were you thinking about when you answered that statement?

- Can I ask whether you are thinking of specific examples to help you answer that statement?
- ("Yes" response) Could I ask whether they are recent examples from this week or this month or more distant memories/examples?

2. Following completion of all the CompACT statements:

"The current response scale is based on a scale of disagreement to agreement."

- Do you think you and other students aged 11-18 will be able to understand (make sense of) this scale?
- Is there enough choice, too little or too much choice?
- How might you explain:
  - Strongly agree/disagree
  - Moderately agree/disagree
  - slightly agree/disagree
  - Neither agree nor disagree
- How might you re-word this scale, so it makes better sense to you?
- Could I ask what you think of the questionnaire?
  - (prompting further elaboration on short answers) Could you say some more?
- What were your thoughts about:
  - The length and the amount of questions?
  - The fact that there are limited instructions provided before completing the items, is this okay or would you like an introduction statement?
    - What should be included in any instructions?
    - Is there a need to provide a stated recall period?
  - What do you feel the questions are trying to find out?

Appendix 13.
CompACT (Francis et al., 2016)

CompACT

Name:	Date:

Please rate the following 23 statements using the scale below:

0	1	2	3	4	5	6
Strongly disagree	Moderately disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Moderately agree	Strongly agree

1. I can identify the things that really matter to me in life and pursue them	0	1	2	3	4	5	6
2. One of my big goals is to be free from painful emotions	0	1	2	3	4	5	6
3. I rush through meaningful activities without being really attentive to them	0	1	2	3	4	5	6
4. I try to stay busy to keep thoughts or feelings from coming	0	1	2	3	4	5	6
5. I act in ways that are consistent with how I wish to live my life	0	1	2	3	4	5	6
6. I get so caught up in my thoughts that I am unable to do the things that I most want to do	0	1	2	3	4	5	6
7. I make choices based on what is important to me, even if it is stressful	0	1	2	3	4	5	6
8. I tell myself that I shouldn't have certain thoughts	0	1	2	3	4	5	6
9. I find it difficult to stay focused on what's happening in the present	0	1	2	3	4	5	6
10. I behave in line with my personal values	0	1	2	3	4	5	6
11. I go out of my way to avoid situations that might bring difficult thoughts, feelings, or sensations	0	1	2	3	4	5	6
12. Even when doing the things that matter to me, I find myself doing them without paying attention	0	1	2	3	4	5	6
13. I am willing to fully experience whatever thoughts, feelings and sensations come up for me, without trying to change or defend against them	0	1	2	3	4	5	6
14. I undertake things that are meaningful to me, even when I find it hard to do so	0	1	2	3	4	5	6
15. I work hard to keep out upsetting feelings	0	1	2	3	4	5	6
16. I do jobs or tasks automatically, without being aware of what I'm doing	0	1	2	3	4	5	6
17. I am able to follow my long terms plans including times when progress is slow	0	1	2	3	4	5	6
18. Even when something is important to me, I'll rarely do it if there is a chance it will upset me	0	1	2	3	4	5	6
19. It seems I am "running on automatic" without much awareness of what I'm doing	0	1	2	3	4	5	6
20. Thoughts are just thoughts – they don't control what I do	0	1	2	3	4	5	6
21. My values are really reflected in my behaviour	0	1	2	3	4	5	6
22. I can take thoughts and feelings as they come, without attempting to control or avoid them	0	1	2	3	4	5	6
23. I can keep going with something when it's important to me	0	1	2	3	4	5	6

Scoring instructions (administrative use only)

- Scores are derived by summing responses for each of the three subscales (Openness to Experience; Behavioral Awareness; Valued Action) or the scale as a whole (CompACT Total score).
- Twelve items are reverse-scored before summation (items 2, 3, 4, 6, 8, 9, 11, 12, 15, 16, 18, and 19).

Openness to Experience (OE) subscale

Calculated as the sum of scores for items: 2 (reversed), 4 (reversed), 6 (reversed), 8 (reversed), 11 (reversed), 13, 15 (reversed), 18 (reversed), 20, and 22.

Subscale scores range from 0-60, with higher scores indicating greater openness to experience (willingness to experience internal events [thoughts, feelings, sensations, etc.] without trying to control or avoid them)

Behavioral Awareness (BA) subscale

Calculated as the sum of scores for items: 3 (reversed), 9 (reversed), 12 (reversed), 16 (reversed), and 19 (reversed).

Subscale scores range from 0-30 with higher scores indicating greater behavioral awareness (mindful attention to current actions)

Valued Action (VA) subscale

Calculated as the sum of scores for items: 1, 5, 7, 10, 14, 17, 21, and 23.

Subscale scores range from 0-48 with higher scores indicating greater engagement in valued actions (meaningful activity)

CompACT Total

Calculated as the sum of the three subscale scores, the full-scale CompACT Total score ranges from 0-138, with higher scores indicating greater psychological flexibility.

Appendix 14.

Study 1: Reflexivity – Inter-rater Reliability Results Following Cognitive Interviews

Matthew	Second Rater (AS)	Agreement in Identification of a problem	Agreement in identifying problem and category
P1 – Q1 Omission / Task performance	P1 – Q1 Omission / Understanding	Yes	**No**
P1 – Q2 Omission / Task performance	Problem free	**No**	**No**
P1 – Q3 Omission / understanding	P1 – Q3 Omission / understanding	**Yes**	**Yes**
P1 – Q4 Omission / Understanding	P1 – Q4 Omission / Understanding	**Yes**	**Yes**
P1 – Q6 Omission / Understanding	P1 – Q6 Omission / Understanding	**Yes**	**Yes**
P1 – Q9 Lexical / Understanding	P1 – Q9 Temporal / Understanding	Yes	**No**
P1 – Q11 Computational / Understanding	P1 – Q11 Computational / Understanding	**Yes**	**Yes**
P1 – Q13 Computational / Response Formatting	P1 – Q13 Computational / Understanding	Yes	**No**
P3 – Q1 Lexical / Understanding	P3 – Q1 Lexical / Understanding	**Yes**	**Yes**
P3 – Q3 Lexical / Understanding	P3 – Q3 Lexical / Understanding	**Yes**	**Yes**
P3 – Q5 Lexical / Understanding	P3 – Q5 Lexical / Understanding	**Yes**	**Yes**
P3 – Q6 Omission / Understanding	P3 – Q6 Omission / Understanding	**Yes**	**Yes**
P3 – Q8 Computational / Understanding	P3 – Q8 Omission / Understanding	Yes	**No**
P3 – Q9 Lexical / Understanding	P3 – Q9 Temporal / Understanding	Yes	**No**
P3 – Q12 Computational / Understanding	Problem Free	**No**	**No**
P3 – Q15 Computational / Understanding	P3 – Q15 Computational / Understanding	**Yes**	**Yes**
P4 – Q3 Lexical / Understanding	P4 – Q3 Lexical / Understanding	**Yes**	**Yes**
P4 – Q10 Lexical / Understanding	P4 – Q10 Lexical / Understanding	**Yes**	**Yes**
P4 – Q17 Lexical / Understanding	P4 – Q17 Lexical / Understanding	**Yes**	**Yes**
P4 – Q21 Lexical / Understanding	P4 – Q21 Lexical / Understanding	**Yes**	**Yes**
	totals	18/20 agreements	**13/20 agreements**

Matthew	Second Rater (AS)	Agreement in Identification of a problem	Agreement in identifying problem and category
P9 – Q1 Lexical / Task Performance	P9 – Q1 Lexical / Understanding	**Yes**	**Yes**
P9 – Q3 Lexical / Understanding	P9 – Q3 Lexical / Understanding	**Yes**	**Yes**
P9 – Q5 Lexical / Understanding	P9 – Q5 Omission / Understanding	Yes	**No**
P9 – Q11 Lexical / Understanding	P9 – Q11 Lexical / Understanding	**Yes**	**Yes**
P9 – Q13 Computational / Response Formatting	P9 – Q13 Computational / Response Formatting	**Yes**	**Yes**
Problem Free	P9 – Q14 Computational / Understanding	**No**	**No**
P9 – Q15 Computational / Understanding	P9 – Q15 Computational / Understanding	**Yes**	**Yes**
P9 – Q16 Computational / Understanding	P9 – Q16 Computational / Understanding	**Yes**	**Yes**
P9 – Q23 Computational / Task Performance	P9 – Q23 Computational / Task Performance	**Yes**	**Yes**
P12 – Q1 Lexical / Understanding	P12 – Q1 Lexical / Understanding	**Yes**	**Yes**
P12 – Q2 Omission / Understanding	P12 – Q2 Omission / Understanding	**Yes**	**Yes**
P12 – Q5 Omission / Understanding	P12 – Q5 Omission / Understanding	**Yes**	**Yes**
P12 – Q10 Lexical / Understanding	P12 – Q10 Lexical / Understanding	**Yes**	**Yes**
P12 – Q11 Lexical / Understanding	Problem Free	**No**	**No**
P12 – Q14 Lexical / Understanding	P12 – Q14 Computational / Understanding	Yes	**No**
P12 – Q15 Computational / Response Formatting	P12 – Q15 Computational / Understanding	Yes	**No**
P12 – Q17 Lexical / Understanding	P12 – Q17 Lexical / Understanding	**Yes**	**Yes**
P12 – Q19 Lexical / Understanding	P12 – Q19 Lexical / Understanding	**Yes**	**Yes**
P12 – Q20 Lexical / Understanding	P12 – Q20 Temporal / Understanding	Yes	**No**
P12 – Q21 Lexical / Understanding	Problem Free	**No**	**No**
	totals	17/20 agreements	**13/20 agreements**
	totals	35/40 agreements	**26/40 agreements**

Appendix 15.
Study 2: Professional's Information – Expert Consultation Phase

The Development and Validation of the Comprehensive Assessment of Acceptance and commitment Therapy – Youth (CompACT-Y) in an Adolescent Population

Professional's Information – Expert Consultation Phase

Thank you for your interest in taking part in this research study. Joining this study is completely voluntary, and you are free to withdraw at any point, without explanation. The following sheet aims to provide you with information about why we are doing this study and what it involves for you. Please take time to read through this information sheet and if you have any questions about this sheet or the study, please do not hesitate to contact us.

What is the purpose of the study?

There have been recent advances in our ability to measure PF within the adult population. The recently developed *Comprehensive Assessment of ACT processes* (CompACT) enables measurement of all aspects of PF, which has been theorised to consist of three broad sub-processes (Hayes et al., 2011). However, the CompACT was not intended for an adolescent population and its suitability for this population is unknown.

Currently, a number of assessment tools are used, which measure different individual sub-processes of PF. However, no single measure exists for measuring all processes. This has resulted in a disparity of measures being used, restricting potentially valuable pooling of data (e.g. between research studies), as well as, placing a burden on young people to complete multiple measures.

The principal aim of the present research is to develop and validate an adolescent version of the CompACT and thereby provide an appropriate measure of PF in this population.

An adolescent version of the CompACT, would provide a comprehensive measure (which we intend to make freely available) to assess adolescents levels of PF. This could be used to track ACT consistent process change during clinical intervention with clients, both individually and within groups, provide a valid and reliable measure for evaluating change in research studies, as well as providing a screening measure for identifying young people who might require additional support.

Why have I been invited?

You have been asked to take part as you have been identified by our research team as having expertise in working clinically with children and young people using Acceptance and Commitment Therapy (ACT) as a primary therapeutic model or having completed research using Acceptance and Commitment Therapy with young people.

Do I have to take part?

The study is completely voluntary. If you decide to take part, continue with the online questionnaire and read through and complete the consent sheet on the following page. By ticking the 'consent' box and completing the first questionnaire you are consenting to taking part in this research. You are still free to withdraw at any time and without giving a reason. Due to the process involved, however, we will be unable to withdraw data that you have already contributed. Withdrawing will not affect your legal rights.

The inclusion/exclusion criteria are as follows and you will be required to tick (one or more) on the consent page of the Qualtrics Online Survey:

- researchers with >3 publications relating to ACT for children and adolescents;
- authors of published books on ACT for children and adolescents / families;
- clinicians who have undertaken specialist ACT training in addition to their core professional training and who have been using ACT as their primary model working with children and young people in supervised clinical practice for >5 years.
- professionals who are recognised as a peer reviewed ACT trainer by the ACBS.

What will I be asked to do if I take part?

The research project will be completed in 3 stages and you are being asked if you would like to volunteer for **Stage 2**:

- Stage 1 – Adolescent Consultation Phase: We used a cognitive coding approach (Blair and Brick, 2010) with young people to check that the wording on the suggested questionnaire made sense to them. We wanted to know if they thought young people between 11-18 years of age would understand what each question means.

- **Stage 2 – Expert Consultation Phase: ACT researchers and clinicians will confirm that any changes have not made the questions invalid.**

Following each question/statement, you will be required to select a response (i.e., 'satisfactory', 'the same', 'unsatisfactory') on whether the age-specific adaptations remain consistent with the theoretical underpinnings of ACT (retaining the essential meaning and content validity of the original measure).

Professionals will also be required to indicate whether the question/statement still measures the same ACT process as the previous question/statement. In addition, there will also be the option to provide supplementary qualitative information to support your response.

It is hoped that the survey will take no longer than 30 minutes to complete. After this time, it is hoped that a consensus will be reached that will allow the study to progress into Stage 3 (Validation Phase). Following Stage 3, it is hoped that a shortened (age-specific) version of the CompACT will be validated and made freely available.

- Stage 3 – Validation Phase: Following the contribution of ACT professionals in stage 2, we will ask young people in schools to complete the new questionnaire along with some other questionnaires to check the validity of the new questionnaire.

The product of Stage 1 is a revised questionnaire, with age-specific adaptations, which can be accessed via the hyperlink (see below

Expenses and payments

Participants will not be paid to participate in this study.

What are the advantages and disadvantages of taking part?

Whilst there are no direct advantages to participating in this study, we hope that this research offers the opportunity for experts to share their knowledge and experience in a way that could help clinicians/adolescents gain a better understanding of PF, and which may potentially inform therapeutic work. On complete, the new measure will be made freely available, which will hopefully benefit the ACT and wider psychology community.

There are some disadvantages to taking part in this study, most notably, we are asking a commitment of your time.

Will my data be confidential?

All the information you give us will be confidential, in that only the research team will have information that could be used to identify you. Other members of the panel will

not know who you are, or know which comments belong to you. The research team will know which comments and responses belong to you in order to make sure the research is run smoothly and also so that we can request clarification of any points/answers if required.

The information we have that could be used to identify you is saved securely on encrypted computers. Further information about how your data is used and saved can be found under the **privacy notice** section of this information sheet. The information shared by participants in this research will be collected and presented as part of a doctorate thesis and the results may be used in teaching and submitted for publication. Your information will not be presented in a way that others would be able to identify you.

Privacy notice

Cardiff University is the Sponsor for this study based in the United Kingdom. We will be using information from you in order to undertake this study and will act as the Data Controller for this study. This means that we are responsible for looking after your information and using it properly. Cardiff University will keep identifiable information about you for 5 years after the study has finished. The legal basis we will rely upon to collect and store your information is called 'public task'.

Your rights to access, change or move your information are limited, as we need to manage your information in specific ways in order for the research to be reliable and accurate. If you withdraw from the study, we will keep the information about you that we have already obtained.

To safeguard your rights, we will use the minimum personally-identifiable information possible. You can find out more about how we use your information at https://www.cardiff.ac.uk/public-information/policies-and-procedures/data-protection The University's Data Protection Officer can be contacted at: inforequest@cardiff.ac.uk

For this research study, the research team will not store any information which could identify you. All information (questionnaire data) will be kept on electronic files/databases or locked filing cabinets at Cardiff University, which can only be accessed by the research team. All questionnaire information will be kept for 5 years and deleted after this period.

What will happen if I don't want to carry on with the study?

Your participation is voluntary, you are free to withdraw at any time, without giving any reason, and without your legal rights being affected. If you withdraw from the

study, we will keep the information that you have provided. To safeguard your rights, we will use the minimum personally-identifiable information possible.

What will happen to the results of the research study?

The results of the research will be used as part of a thesis project for a Doctorate in Clinical Psychology. It is hoped that the results of which will also be published. You will not be identified in any report or publication. If you would like a copy of the final report, please contact the research team.

Who is organising and funding the research?

This research is being organised and funded by the University of Cardiff and South Wales Doctorate in Clinical Psychology.

What can I do if I have concerns about the research project?

You can speak directly to a member of the research team, and they can be contacted using the information below. You can also tell a member of the school staff or your parent/carer if you have any worries about the research project, and they will then be able to let us know.

Alternatively, you can contact Dr Reg Morris (Director of the Doctoral Programme in Clinical Psychology). Address: 11th Floor, School of Psychology, Tower Building, 70 Park Place, Cardiff, CF10 3AT. Telephone: 02920 870582

Who has reviewed the research project?

The research project has been approved by Cardiff University School of Psychology Ethics Committee. They have reviewed the study to ensure we are running it in a way which protects your rights and your safety.

If you have any questions relating to ethical issues and how this study is reviewed, please contact Cardiff University School of Psychology Ethics Committee: Email: psychethics@cardiff.ac.uk Telephone: 02920 870360

What If you have any questions?
You can contact us by telephone, email or post. Our contact details are:

Survey Access?

If you wish to access and participate in this study, please use the following hyperlink:
_____HYPERLINK_____

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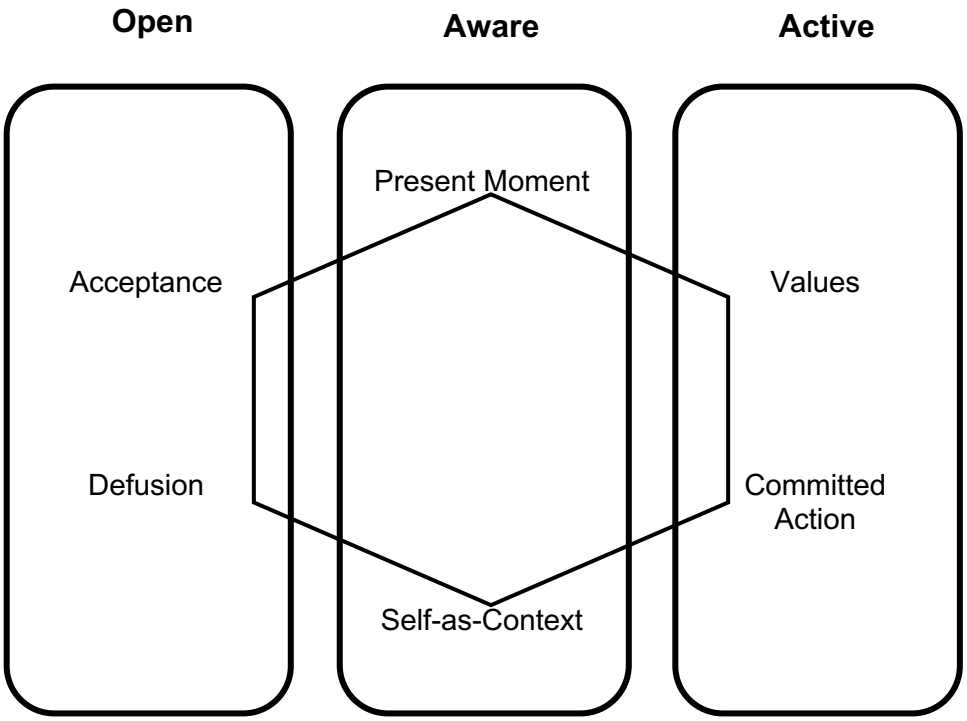
Appendix 16
Adapted version of Russ Harris (2008) Triflex Model of Psychological Flexibility



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