Preliminary psychometric properties of the Everyday Psychological Inflexibility Checklist

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Abstract

This paper provides preliminary data on a new questionnaire known as the Everyday Psychological Inflexibility Checklist (EPIC). Contextual Behavioural Science seeks to have application to human behaviour generally, not just to "psychopathology" in isolation. The field also aspires to meet some wider challenges of the human condition such as poverty, inequality, climate change and environmental destruction. It is possible that current measures, such as the AAQ-II, are not ideally suited to these wider challenges and more general measures of psychological inflexibility with different item wording may be a useful addition. As such, an initial item pool was devised which described how an individual might deal with private internal events and social interactions in a psychologically inflexible way. In the first study, data from this item pool was entered into exploratory factor analysis (EFA). This resulted in a ten item measure spread over two factors. One further item was added to bolster the second factor. In a second study, a small number of items underwent slight word changes and both old and revised versions of the measure went through further EFA. In the third study, confirmatory factor analysis (CFA) was carried out across three separate samples and a number of items were deleted, leaving seven items. The final measure produced a relativity good set of CFA fit indices. To begin to establish the contribution of the EPIC, the final study explores relationships between the EPIC, the AAQ-II and a small number of broadly prosocial measures. The discussion explores a number of issues pertinent to the current and future development of this and other measures.

Acceptance and Commitment Therapy (ACT) is a contextual cognitive behavioural therapy. In common with other third wave or contextual approaches, such as Mindfulness (Kabat-Zinn, 1990) and Dialectical Behaviour Therapy (Linehan, 1993), ACT focuses on changing our relationship with private internal events (e.g. thoughts, feelings, memories, bodily sensations) especially the influence they have on our behaviour. In other words it aims to alter their function rather than trying to change their form or frequency. In this way, ACT allows individuals to do more of what is important to them by strengthening or loosening the influence that private internal events have on actions, rather than focusing on psychological symptom reduction per se (Hayes, Villatte, Levin, & Hildebrandt, 2011). Although much of the evidence for ACT is in mental and physical health disorders (see A-Tjak et al., 2015; Smout, Hayes, Atkins, Klausen, & Duguid, 2012 for reviews), in many ways the ACT model is not just applicable to "psychopathology", but is a more broad model of human behaviour (Vowles & Thompson, 2012, p.136). In particular, ACT is one part of Contextual Behavioural Science (CBS), a comprehensive view of behaviour, writ large. As noted by Hayes, Barnes-Holmes and Wilson (2012), the wider mission of CBS is to: "create a behavioral science more adequate to the challenges of the human condition" (p.2). Indeed, Hayes et al. (2012) state that future CBS research could focus on: "social disparities, environmental degradation, global climate change, poverty, child deprivation, and similar matters" (p.11).

Central to ACT, is the promotion of psychological flexibility. Psychological flexibility refers to a set of skills that involves both being fully aware of private internal events in the present moment, in a willing and open way, and to either maintain or modify behaviour in the direction of our personal values. (Hayes, Luoma, Bond, Masuda, & Lillis, 2006; Bond et al., 2011; Thompson & McCracken, 2011). The reverse of psychological flexibility, psychological inflexibility, occurs when we are either pre-occupied with avoiding private internal events or our behaviour is being dictated by those events, at the expense of taking meaningful action. In other words, psychologically inflexible behaviour occurs when private internal events dominate our present moment to the detriment of acting in a way that is consistent with our personal values.

The most common measure of psychological inflexibility is the Acceptance and Action Questionnaire (AAQ). The first version of this measure was published in 2004 (Hayes et al., 2004). However, as noted by Bond et al. (2011), the measure had issues with comprehension and reliability (p. 677). As a result, the AAQ-II was designed, validated and published in 2011. The revised measure is widely used, uni-dimensional, 7 items in length

and demonstrates much better reliability. Successful as the AAQ-II is, a closer examination of the item content (below) may reveal a potential problem in terms of its ability to capture psychological inflexible behaviour relevant to all of the wider challenges of the human condition noted earlier. Specifically, the AAQ-II items are:

1. My painful experiences and memories make it difficult for me to live a life that I would value
2. I'm afraid of my feelings
3. I worry about not being able to control my worries and feelings
4. My painful memories prevent me from having a fulfilling life
5. Emotions cause problems in my life
6 .It seems like most people are handling their lives better than I am
7. Worries get in the way of my success

Notice how items 1 and 4 contains the word painful; item 2 uses the word afraid, and items 3 and 7 contain the words: worry or worries. Pain, fear and worry suggest related clusters of private internal events.

It is also worth noting that in the confirmatory factor analysis stage of the validation paper on the AAQ-II, Bond et al. (2011) added an error covariance between two items (items 1 & 4 above) in order to improve measure performance. Notice that both of these items include the word painful (and also memories). Furthermore in recent work by Monestès et al. (2016), in addition to the original error covariance pairing (above), an additional error covariance was added between item 2 (afraid, feelings) and item 3 (worry, worries and feelings). It seems possible that the repetition of these terms creates additional covariation within the AAQ-II.

While it seems clear that item content related to pain, fear and worry may be central to clinical, health and well-being contexts, it also seems possible that these terms may not be as relevant for CBS research in other contexts including broadly prosocial areas such as those noted above (i.e. poverty, inequality, climate change and environmental destruction). Of course the actual role of the AAQ-II and other measures in these areas is an empirical question. At the very least, it may be useful to call upon a variety of tools to measure the potential of CBS both in more prosocial areas, and in more everyday contexts where pain, fear and worry may be less of an obvious issue.

One option, of course, is to construct different, specific measures of psychological inflexibility for each individual research context. Precedent for this exists. For example, the 20 item Chronic Pain Acceptance Questionnaire (CPAQ; McCracken, Vowles, & Eccleston,

2004), has been widely used in the field for so long, that shorter versions of the measure have been published and validated (CPAQ-8; Fish, McGuire, Hogan, Morrison, & Stewart, 2010; Rovner, Årestedt, Gerdle, Börsbo, & McCracken, 2014). Other measures have been more recently developed. For example the Body Image-Acceptance and Action Questionnaire (BI-AAQ; Sandoz, Wilson, Merwin, & Kellum (2013) and the Acceptance and Action Questionnaire – Stigma (AAQ-S; Levin, Luoma, Lillis, Hayes, & Vilardaga, 2014). The Work-related Acceptance and Action Questionnaire has also been developed to be used in occupational contexts (Bond, Lloyd, & Guenole, 2013).

While condition and context specific measures undoubtedly have an important role to play, there may also be a role for more general, more everyday measures of psychological inflexibility which may have applicability across a number of areas – including more prosocial ones. Specifically, measures which do not focus on pain, fear and worry, but which attempt to capture more everyday aspects of psychological inflexibility as it may occur in daily life, within the general population. New measures of this kind may be useful for a number of reasons. Firstly they may allow us to further examine the extent to which ideas from CBS, ACT and psychological flexibility are applicable outside of more traditional clinical, health and well-being contexts. For example, in more everyday situations generally or in more broadly prosocial areas specifically. Secondly, they may allow us to compare the contribution of psychological inflexibility measures with item content focused on pain, fear and worry to measures less related to these areas. Thirdly, the above two points in combination may allow us to expand the reach of CBS and ACT theory by assessing the extent to which data allows us to support the wider aims and aspirations of our field discussed earlier.

The studies in this paper describe the first steps in the scale development process of the Everyday Psychology Inflexibility Checklist (EPIC). Noting that the AAQ-II is only 7 items long, the goal of this scale development process was to produce a brief measure that will not be too onerous on participants to complete either in isolation or, more likely, in conjunction with other psychometric measures. Of course, scale development is an ongoing process (Clark & Watson, 1995, p. 318; Holmbeck & Devine, 2009, p. 692) of which this paper can only capture the first steps. As such, this paper will primarily be concerned with starting to establish content and factorial validity (DeVellis, 2012). The final study will also explore the relationship between the EPIC, the AAQ-II and a small number of broadly prosocial measures. Following arguments by Chiesa (1994), the authors did not formulate any a priori formal hypotheses. In short, Chiesa argues that despite the dominance of the

hypothetico-deductive approach in psychology today, radical behaviourists can opt to take a more inductive approach that is based on and driven by observations from data. Chiesa notes that the need to rely on strict hypothesis testing stems from more deductive approaches to science that tend to prioritise theories that can be based on unseen “mediating entities” or hypothetical constructs - an approach that radical behaviourists may well reject (see Chiesa, 1994, Chapter 4, or pages 18-19 for a summary of her argument).

Study 1: Exploratory factor analysis

The authors, all ACT experts, produced an initial long list of items, written as statements describing how an individual might deal with private internal events and social interactions in a psychologically inflexible way. For example, some items described being avoidant of private internal events (e.g. "When awkward thoughts occur I try and block them out"), others described being generally fused with or pushed around by private internal events (e.g. "My emotions guide my actions"). Effort was made to phrase items in a general way and to try and avoid limiting responses to any particular form of emotion. In this way, any direct use of the terms pain, fear and worry was avoided. No item made direct reference to an impact on values or valued living. This content was avoided to avoid potential confusion between different valued areas (e.g. success in family, personal, work life on the one hand and prosocial values on the other). The initial list was checked, added to and revised by all authors of this paper. A final list of 50 items was produced. The list was piloted online by seven members of the public less familiar with ACT; no item was changed as a result of this process. The instructions for the measure were: "Please rate how true each statement is for you in your everyday life by clicking on a number next to it". Participants answered items on a 7 point Likert-type scale, ranging from (1) never true to (7) always true. In this way, higher scores indicate higher levels of psychological inflexibility.

In order to determine possible latent structures within the data, and in keeping with other ACT measures (Bond et al., 2011; Bond et al., 2013), principal axis factor analyses was planned using oblique rotation (direct oblimin). A sample size in excess of 250 was sought.

Method

Procedure

In terms of data screening and patterns of missing data – across all studies and samples – data were initially screened and participants were deleted if they had 50% or greater missing data across the entire data set, or if they had not entered any data for a relevant questionnaire. This removed participants who had clicked on the online questionnaire but not started or not attempted relevant sections. Patterns of missing data were then examined across relevant questionnaires using Missing Value Analysis within SPSS. After the initial deletion (above), all samples had less than 10% missing data for items and measures, often less than 5%. As all final sample sizes across all studies were anticipated at being N=250 or greater in size, listwise deletion was then applied to remove any cases with any missing data on relevant questionnaires.

Sample 1. Data was collected for the EPIC items and a number of other measures

using the Bristol Online Survey platform. Participants were recruited through a number of different sources including: e-mails to departments within UK universities and other educational establishments; websites that advertise online psychological studies; and through the personal contacts of the lead author. University ethical permission was sought and received for this study. In total 755 participants entered at least some data. Thirty three participants had their data removed as they had 50% or more missing data. The remaining sample of 722 participants was evenly and randomly divided into two samples of n=361. One half (Sample 1a) is used below, the other half (Sample 1b) is used for the third CFA in study 3.

Participants

After applying listwise deletion to sample 1a, 274 participants provided complete data for all 50 items. Of these 67% were female, with an average age of 30 years (SD 11.8). In terms of further demographic data, for this and future studies, information related to different categories are presented if more than 5% of participants fall into that category. In terms of geographical location: UK (75%), rest of Europe (11%), North America (10%). Regarding ethnicity: White (82%), Mixed (7%), Asian (6%). In terms of highest level of education: GCSE's or A levels (39%), postgraduate degree (29%), undergraduate degree (28%).

Results

The initial Kaiser–Meyer–Olkin (KMO) index of sampling adequacy was .895, indicating that the correlation matrix was suitable for factor analysis. The number of factors with eigenvalues above 1.0 was 10. The scree plot was hard to interpret but suggested extracting between 4 and 12 factors. Parallel analysis, using principal axis factoring, suggested extracting 10 factors, while parallel analysis using principal components analysis suggested extracting 7. Although no clear pattern emerged, 10 factors were initially extracted. Following this, in keeping with the construction of the AAQ-II, and in order to produce a brief measure, items were removed through several further rounds of exploratory factor analysis based on guidelines adapted from Ferguson and Cox (1993). Here items were removed and factors deleted depending on the extent to which items loaded on main factors and cross loaded on other factors.

The final measure consisted of 10 items across 2 factors, named Avoidance (A) and Behavioural Rigidity (BR). In total the 2 factors accounted for 59.18% of the variance. The full scale had an overall Cronbach α coefficient of .86. In terms of the make-up of the 2 factors individually, Avoidance (A: 42.12% of the variance, alpha .90), included 7 items describing the avoidance of private internal events or difficult situations that might occasion

them (e.g. “When awkward thoughts occur I try and block them out”). The second factor, Behavioural Rigidity (BR: 17.06% of the variance, alpha .81), included 3 items, describing doing tasks in a particular order or set pattern (e.g. “I notice I do certain everyday tasks in a particular order”). The factor correlation matrix reported a relationship of .26 between the two factors.

Knowing that the measure development process would include confirmatory factor analysis, one item “I am aware I have certain ways of doing things” was added to the three item, second factor (BR). This item was found in the original EFA of the second factor but was later excluded due to its loading on the factor. The final factor analysis was run again with this item included to see how it performed (it might not have loaded on either factor). In total the 2 factors accounted for 63.38% of the variance. The full scale had an overall Cronbach α coefficient of .85; Avoidance (A: 42.22% of the variance, alpha .90); Behavioural Rigidity (BR: 21.16% of the variance, alpha .82), and a correlation between factors of .22. Table 1 shows the factor loadings for both the 10 and 11 item versions of the Everyday Psychological Inflexibility Checklist (EPIC), it also includes information on variance explained and reliability.

Table 1. Factor loadings for exploratory factor analysis with oblique rotation of two initial variations of the Everyday Psychological Inflexibility Checklist (EPIC), also including information on variance explained and reliability (N=274).

	10 item		11 item	
	A	**BR**	**A**	**BR**
I try to avoid thinking about difficult topics	**.87**	-.02	**.88**	-.04
When awkward thoughts occur I try and block them out	**.82**	.05	**.82**	.06
If difficult situations come to mind I think about something else	**.78**	.01	**.78**	.01
If my mind starts thinking about something difficult I try to distract myself	**.76**	-.02	**.76**	-.04
In my personal life I steer clear of conversations that I find difficult	**.68**	.05	**.68**	.07
I try and avoid having to make difficult decisions	**.67**	-.09	**.66**	-.08
I try not to bring up topics that might be awkward	**.66**	.05	**.66**	.06
Although I have never been told to I find I perform certain tasks in a set order	-.05	**.93**	.01	**.86**
I notice I do certain everyday tasks in a particular order	-.07	**.87**	-.03	**.86**
I find I follow rigid patterns when doing some tasks	.13	**.54**	.15	**.59**
I am aware I have certain ways of doing things	-	-	-.07	**.54**
% explained variance	42.12	17.06	42.22	21.16
Coefficient alpha for factors	.90	.81	.90	.82
Coefficient alpha for total scale	.86		.85	

Note. A, Avoidance; BR, Behavioural Rigidity.

Study 2: Examining the influence of word changes

On examining the 11 items from study 1, of the 7 items in the avoidance factor: 5 use the word “difficult”, while the other 2 use the word “awkward”. Similarly, of the 4 items in the behavioural rigidity factor, 3 use the word “tasks”. This word repetition could be both noticed by and distracting for people completing the questionnaire or lead to a “method effect” (Brown, 2006, p. 3). Furthermore such word repetition is present within the items of of the AAQ-II and may have an influence on CFA performance (see introduction). Accordingly, the decision was taken to try and dilute the potential influence of these repeated terms. Specifically, three of the instances of the word difficult were changed to: uncomfortable, unpleasant and disagreeable. Similarly, one of the three instances of the word tasks was changed to activities. It seemed important to explore the influence of these changes. As this took place prior to confirmatory factor analysis, exploratory factor analyses were re-examined.

Method

Procedure

Sample 2. Data was collected using the online survey platform Limesurvey. Data was collected as part of a number of different final year psychology research projects, supervised by the first author. The different projects involved other questionnaires, but all began and ended with two different versions of the EPIC (i.e. original and revised wording). Whether the original or revised version appeared at the beginning or end of the questionnaires varied from project to project in order to counter balance potential order effects across the entire data set. Ethical permission was sought and received for each of the projects. Data was carefully screened to remove duplicate data from participants who had taken part in more than one of the research projects.

Participants

After listwise deletion, 523 participants had complete data for both versions of the EPIC. Of these: 66% were female, with an average age of: 27 years (SD 10.64). In terms of geographical location: UK (76%), rest of Europe (19%). Regarding ethnicity: White (92%). In terms of highest level of education: GCSE's or A levels (64%), undergraduate degree (24%), postgraduate degree (10%).

Measures

This study focuses on two versions of the EPIC (original and revised wording); currently an 11 item, two factor measure. The two versions differ only in terms of single words across 4 items (see above).

Results

Two separate principal axis factor analyses were carried out in SPSS using oblique (direct oblimin) rotation examining: the original items and the revised items.

In terms of the original worded items, the solution replicates the final EFA results from study 1. In more detail: the KMO index of sampling adequacy was .876, indicating that the correlation matrix was suitable for factor analysis. The number of eigenvalues above 1 was 2, the scree plot also suggested extracting 2 factors. The final measure derived from the EFA consisted of 11 items across 2 factors that were identical to study one. In total the 2 factors accounted for 65.2% of the variance (A: 45.3%, RB: 19.9%). The full scale measure had an overall Cronbach α coefficient of .88 (A: .90, BR: .85).

In terms of the revised worded items, the solution also replicates the results from study 1. In more detail: the KMO index of sampling adequacy was .889, indicating that the correlation matrix was suitable for factor analysis. Again, the number of eigenvalues above 1 was 2, the scree plot also suggested extracting 2 factors. Again, the final solution consisted of 11 items split across 2 factors, identical to study one. In total the 2 factors accounted for 62.5% of the variance (A: 42.9%, BR: 19.6%). The full scale also had an overall Cronbach α coefficient of .86 (A: .89, BR: .84).

From the above results, it seems that the limited changes to the wording of 4 items does not result in substantial changes to the factor structure of the EPIC. As such the revised items were carried forward.

Study 3: Confirmatory factor analysis

Study 3 involved confirmatory factor analysis (CFA). In terms of measures of fit; the overall model fit index for CFA is Chi-square (χ^2). Ideally this result should be non-significant. However Tabachnick and Fidell note that a good fit between data and model is generally found if the ratio between overall Chi-square score and the degrees of freedom (df) in the model is less than 2 (Tabachnick & Fidell, 2007, p. 715). Although in other places in the literature, ratios below 3 are also considered acceptable (e.g. Bond et al., 2011). In addition, due to criticisms (see Brown, 2006, p. 81), Chi-square tends not to be used in isolation and alternative fit indices are also used. Based on Hu and Bentler (1998) and previous CFA work in the ACT literature (Bond et al., 2011, 2013), three alternative fit indices were used: CFI (comparative fit index; a baseline comparison), RMSEA (root mean square error of approximation; parsimony corrected) and SRMR (standardised root mean square residual; absolute / residual based). The CFI falls on a range from 0-1. A good fit is indicated by larger figures. Figures at or above .95 are desired (Brown, 2006; Harrington, 2009; Kline, 2011). For the RMSEA, smaller figures are desired and figures of .05 or less (Kline, 2011), or .06 or less (Harrington, 2009) are ideal. It is also recommended to report the confidence intervals (CIs) for the RMSEA. Some note that the higher CI should, ideally, be less than .10 (Kline, 2011). Finally, the SRMR falls on a range of 0 to 1. Here, smaller values indicate better fit. Ideally figures that are =< .08 (Harrington, 2009) or =< .10 (Kline, 2011, p. 140) are desired.

Method

Procedure

Confirmatory factor analysis (CFA) was performed using AMOS version 24 (Arbuckle, 2016) on three separate samples. Strategically, revisions to the model could be made following the CFA on the first sample, while further samples would be used to re-test the performance of the revised model. In more detail, an initial CFA was performed to both test the fit of new data to the model from study 2, and to revise the model as necessary. Afterwards a second CFA, using the revised model, was performed on a new sample of data. Finally a third CFA, re-testing the revised model, was performed on another separate sample.

Data for the first CFA (1.0 & 1.1) uses sample 3 and was collected using Limesurvey. Participants were recruited through e-mails to departments within UK universities and other educational establishments asking for the questionnaire to be distributed to staff and students. Ethical permission was sought and received for this study. Sample 3 is also used in study 4.

Data for the second CFA was collected by the first author using Limesurvey and

comprises sample 4. It comes from a number of different final year psychology research projects, supervised by the first author. These projects are all different data sets from those used in study 2 (sample 2), and were collected during a different academic year. Ethical permission was sought and received for each of the projects and data was carefully screened to remove participants who contributed data to more than one project.

Data for the third and final CFA is the unanalysed half of sample 1 from study 1 (i.e. sample 1b). It should be noted that after study 1, study 2 made a small number of changes to the item content of the EPIC (see study 2). Comparing the item content of the EPIC at the start of the CFA process (11 items) between sample 1b and samples 3 and 4: the wording of three out of seven items are identical. Four further items have single word differences (specifically: difficult to uncomfortable; difficult to unpleasant; difficult to disagreeable; and tasks to activities). In total, four words across 11 items have changed (4 words out of 123). We acknowledge the potential difference this may make. However we still include the CFA results from the sample for completeness.

Participants

CFA 1.0 and 1.1 (sample 3). This sample included 280 participants who provided complete data for the EPIC items. Of these, 61% were female, with an average age of 29.2 years (SD 12.1). In terms of geographical location: UK (89%), rest of Europe (6%). Regarding ethnicity: White (93%). In terms of highest level of education: GCSE's or A-levels (38%), undergraduate degree (26%), postgraduate degree (25%). Before conducting the CFA, the data were tested for multivariate normality. After examining for multivariate normality (using Mahalanobis distance), data from 8 participants was removed, leaving N=272.

CFA 2 (sample 4). This sample included 396 participants who provided complete data for the EPIC items. Of these, 56% were female, with an average age of 26 years (SD 11.3). In terms of geographical location: UK (94%), rest of Europe (5%). Regarding ethnicity: White (88%), Mixed (5%). In terms of highest level of education: GCSE's or A-levels (76%), undergraduate degree (11%), postgraduate degree (7%). As a result of this process, data from 9 participants were removed due to participants having high Mahalanobis distance scores (Harrington, 2009, p. 43; Kline, 2011, p. 60). This left N=387 participants.

CFA 3 (sample 1b): This sample includes 343 participants who provided complete data for the EPIC items. Of these, 72% were female, with an average age of 30.9 years (SD 13.7). In terms of geographical location: UK (72%), North America (13%), rest of Europe (9%). Regarding ethnicity: White (84%), Asian (7%). In terms of highest level of education: GCSE's or A' levels (43%), undergraduate degree (25%), postgraduate degree (26%). After

examining for multivariate normality (using Mahalanobis distance), data from 15 participants was removed, leaving N=328.

Results

The initial fit of sample 3 to the 11 item model from study 2 was unsatisfactory and required modification (see Table 2, CFA 1.0). Further examination revealed that a number of items had problems with standardised residual covariances and relatively poor factor loadings. As a result, four items were removed: three from the avoidance factor (leaving four items) and one from the behavioural rigidity factor (leaving three items). It should be noted that the item removed from the behavioural rigidity factor was the item added after the initial results of study 1.

Following these modifications, the fit of the revised two-factor model was tested again in both the original CFA sample (CFA 1.1) and two further samples (CFA 2 and 3). As planned, no further modifications were made to the model in CFAs 2 and 3.

Table 2. Confirmatory factor analysis results for the 11 and 7 item versions of the EPIC

Model	X^2 (p)	DF	X^2 ratio	CFI	RMSEA	RMSEA – CI	SRMR
CFA 1.0 (sample 3 – 11 items)	132.65 (.001)	43	3.09	.910	.088	.071 / .105	.0600
CFA 1.1 (sample 3 – 7 items)	23.31 (.038)	13	1.79	.990	.045	.011 / .075	.0244
CFA 2 (sample 4 – 7 items)	28.10 (.009)	13	2.16	.973	.065	.032 / .099	.0504
CFA 3 (sample 1b – 7 items)	21.71 (.060)	13	1.68	.994	.045	.000 / .078	.0491

Note. X^2 ratio: X^2 / df; CFI, comparative fit index; RMSEA, root-mean-square error of approximation, CI 90%; SRMR, standardised root-mean-square residual. CFA 3 (sample 1b) has slight differences in item wording to other CFAs, see procedure section of method.

The results shown in Table 2 indicate that the modified two factor model of the EPIC fits the data relatively well (CFAs 1.1, 2 & 3). The X^2 ratio is below 2 in two of three samples, the CFI is greater than .95 and the SRMR is less than .08 in all samples. However, the X^2 score is significant in CFA 1.1 and 2, and the RMSEA exceeds .05 in CFA 2. Although it should be noted that the upper RMSEA confidence intervals are below .10 in all CFAs. Finally, Table 3 shows the inter-correlations between the total scores and the factors of the EPIC across all three samples. It can also be noted that the standardized latent correlations

between the two factors of the EPIC are: .28 (CFA 1.1 and 2) and .25 (CFA 3). Consideration of these relationships will be highlighted in the final discussion.

Table 3. Summary of the inter scale correlations of the Everyday Psychological Inflexibility Checklist (EPIC).

Measure	EPIC Total	EPIC Avoidance	EPIC Behavioural rigidity
EPIC Avoidance			
CFA 1.1 (sample 3)	.84*** [.80, .87]	-	
CFA 2 (sample 4)	.83*** [.80, .86]	-	
CFA 3 (sample 1b)	.82*** [.78, .86]	-	
EPIC Behavioural Rigidity			
CFA 1.1 (sample 3)	.74*** [.68, .79.]	.25*** [.13, .38]	-
CFA 2 (sample 4)	.73*** [.67, .78]	.23*** [.10, .34]	-
CFA 3 (sample 1b)	..77*** [.72, .81.]	.27*** [.16, .38]	-

Note. * p<.05, ** p<.01, *** p<.001. BCa bootstrap 95%, 1000 samples, CIs reported in brackets.

Study 4: Performance of the EPIC against the AAQ and other measures

Following EFA and CFA, new measures are typically compared against more established measures to examine convergent and discriminant validity (Kline, 2000). From the introduction you may recall the intention to both: 1. produce a brief measure of psychological inflexibility less tied to item content related to pain, fear and worry and 2. to produce a measure that may further help CBS investigate its role in areas other than clinical, health and well-being contexts, including more prosocial areas such as tackling wider challenges including: "social disparities, environmental degradation, global climate change, poverty, child deprivation, and similar matters" (Hayes et al., 2012; p.11).

As a result, it seems important to collect initial, preliminary data on the relationship between the EPIC and the AAQ-II. It also seems useful to compare the performance of these two measures with questionnaires from other broadly prosocial areas. Related CBS research has made preliminary steps in this area highlighting the role of empathy. For example, in 2012, Vilardaga, Estévez, Levin and Hayes, proposed a three-step model of social anhedonia which included: i. perspective-taking, ii. empathic concern, iii. experiential avoidance. However, in comparison to clinical, health and well-being contexts, data collection in prosocial areas is in its infancy.

Aspiring to the ambition of the quote above from Hayes et al. (2012) and building on the work of Vilardaga et al. 2012 this study will explore the relationship between the measures of psychological inflexibility (EPIC and AAQ-II) and their relationship to questionnaires measuring empathy, attitudes towards helping others and self-reported helping behaviour.

Method

Participants

This study reuses sample 3 (also used for CFA 1.0 & 1.1 in study 3). In study 3, this included N=272 participants with complete data for the EPIC items. This study uses the data from the 247 participants who, after listwise deletion, had complete data for all the measures reported below.

Measures

The Everyday Psychological Inflexibility Checklist (EPIC) is a seven item, two factor measure that assesses psychological inflexibility in an everyday context. The two factors measure: A. avoidance and BR. behavioural rigidity. Participants are asked to rate how true each item is for them in their everyday life (no time frame given). Items are rated on a 7 point Likert-type scale ranging from (1) never true to (7) always true. Higher scores

indicate higher levels of psychological inflexibility. Within the present sample, the EPIC had respectable levels of reliability (DeVellis, 2012, p. 109): EPIC total score = .75, factor A =.76, factor BR = .79.

The Acceptance and Action Questionnaire (AAQ-II) is a seven item, single factor measure that assesses psychological inflexibility (Bond et al., 2011). Participants are asked to rate how true each item is for them (no time frame given). Items are rated on a 7 point Likert-type scale ranging from (1) never true to (7) always true. Higher scores indicate higher levels of psychological inflexibility. Within the present sample, the AAQ-II had very good levels of reliability (.92).

The Toronto Empathy Questionnaire (TEQ) is a sixteen item, single factor, measure of empathy based on factor analyses of other empathy measures (Spreng, McKinnon, Mar, & Levine, 2009). Participants are asked to read each statement carefully and rate how frequently they feel or act in the manner described (no time frame given). Items are rated on a 5 point Likert-type scale ranging from (0) never to (4) always. Higher scores indicate higher levels of empathy. Within the present sample, the TEQ had very good levels of reliability (.87).

Despite its title, the Self-Report Altruism scale (SRA; Rushton, Chrisjohn, & Fekken, 1981) is a twenty item, single factor, measure of self-reported helping behaviours. Each item measures a different overt helping behaviour (for example: “I have done volunteer work for a charity”). Participants are asked to mark the category that indicates the frequency with which they have carried out the act (no time frame given). Items are rated on a 5 point Likert-type scale ranging from (1) never to (5) very often. Higher scores indicate higher levels of self-reported helping behaviour. Within the present sample, the SRA had very good levels of reliability (.87).

The Attitude towards Helping Others (AHO) and Attitude toward Charitable Organizations (ACO) are two short measures designed by Webb, Green and Brashear (2000). The AHO is four items long, the AHO is five items in length. Participants are asked to indicate their level of disagreement / agreement with the following statements (no time-frame given). Both are rated on a 5 point Likert scales ranging from (1) strongly disagree to (5) strongly agree. Higher scores indicate higher levels of agreement with helping others and / or positive attitudes towards charity. Within the present sample, the AHO (.90) and ACO (.88) both had very good levels of reliability.

Results

Table 4 shows the correlations between the two measures of psychological inflexibility and the other measures described above. The correlation between the EPIC total and AAQ-II

(.32) is medium in size (Cohen, 1992), and the table suggests that the EPIC total score correlates more strongly with the AAQ-II than the smaller individual results for two EPIC subscales (.27 EPIC avoidance; .23 EPIC behavioural rigidity). Together this suggests a degree of relationship between these measures of psychological inflexibility.

In terms of the above measures and their relationships with the more prosocial measures, neither measure of psychological inflexibility or its subscales significantly correlated with the measures of attitudes towards helping others or charity. Only the avoidance subscale of the EPIC, and not the AAQ-II, had a significant negative correlation with the empathy measure (-.20; more psychological inflexibility, less empathy). In terms of self-reported helping behaviours, both the EPIC total score (-.23), and avoidance subscale (-.25) along with the AAQ-II (-.20) had significant negative correlations with self-reported helping behaviours (more psychological inflexibility, less self-reported helping behaviours).

It is worth highlighting the performance of the EPIC behavioural rigidity subscale in isolation. Firstly, it recorded significant, positive but small correlations with both the EPIC avoidance subscale (.26) and with the AAQ-II (.23). However of the four more prosocial measures, it failed to record a single significant result. This would appear to suggest that together the items that make up the behavioural rigidity subscale do not have a relationship with more prosocial measures. This is in contrast with the EPIC avoidance subscale which recorded significant negative correlations with empathy and self-reported helping behaviour (more psychological inflexibility, less prosocial behaviour – see above and Table 4).

Alongside the performances of the measures of psychological inflexibility, it is worth exploring the inter-relationships among the prosocial measures themselves. In all cases, these relationships were significant and positive. They ranged in size from .24 (between attitudes towards charity and self-reported helping behaviour) and .68 (between attitudes towards helping others and empathy), a simple mean across the 6 relationships produced an average correlation of .42.

Table 4: Correlations between EPIC, AAQ-II and other broadly prosocial measures.

	EPIC total	EPIC A	EPIC BR	AAQ-II	Empathy	Helping Behaviours	Attitudes Others	Attitudes Charity
EPIC A	.84***	-						
	[.80, .87]							
EPIC BR	.74***	.26***	-					
	[.68, .80]	[.13, .38]						
AAQ-II	.32***	.27***	.23***	-				
	[.20, .43]	[.15, .39]	[.11, .35]					
Empathy	-.12	-.20**	.03	-.07	-			
	[-.24, .00]	[-.31, -.08]	[-.10, .16]	[-.20, .07]				
Helping Behaviours	-23***	-.25***	-.11	-.20**	.45***	-		
	[-.36, .-09]	[-.37, -.11]	[-.24, .04]	[-.32, -.06]	[.36, .54]			
Attitudes Others	-.02	-.06	.04	-.03	.68***	.37***	-	
	[-.17, 12]	[-.20, .07]	[-.09, .15]	[-.16, .10]	[.58, .75]	[.26, .46]		
Attitudes Charity	.12	.09	.11	-.06	.33***	.24***	.45***	-
	[.00, .25]	[-.04, .20]	[-.01, .24]	[-.18, .09]	[.22, .44]	[.12, .35]	[.34, .54]	

Note. * p<.05, ** p<.01, *** p<.001. BCa bootstrap 95% CIs reported in brackets for significant correlations. N=247.

As noted above, only in terms of self-reported helping behaviours did both the EPIC and the AAQ-II result in significant correlations. As such, this is the only place that allows for any form of comparison to be made between the two measures of psychological inflexibility. To further examine this result, a standard multiple regression was carried out with self-reported helping behaviour as the dependent variable and the two measures of psychological inflexibility as independent variables (EPIC factors A & BR entered separately; see Table 5).

Table 5: Multiple regression of predictors of self-reported helping behaviours (SRA).

	b	BCa 95%	SE B	β	p
Constant	72.26	[65.42, 79.10]	3.48		.001
EPIC A	-.56	[-.90, -.21]	.18	-.21	.002
EPIC BR	-.08	[-.50, .35]	.22	-.02	.725
AAQ-II	-.16	[-.32, .01]	.08	-.13	.041

Note. R = .28, R^2 = .08. BCa bootstrap 95% CIs reported in brackets, N=247

While the ANOVA for this regression model was significantly different to zero, $F(3, 243) = 6.96$, $p=.001$, an overall R of .28, suggests that only 7.9% of the variance of helping behaviours was explained by psychological inflexibility variables (6.8% adjusted R^2). Tabachnick and Fidell (2007; p.170-3) recommend using semi-partial correlations to help estimate the unique and shared contributions of the IVs. With this in mind, of the 7.9% of the self-reported helping behaviour score that was explained by the IVs, only .02 (or 29% of the 7.9%) is shared variance (.06 [the remaining 71%] is unique variance). Looking, more closely at the unique contributions: 49% (.04) comes from the EPIC A, 22% (.02) from the AAQ-II (in total 71%).

Discussion

The four studies above detail the preliminary construction and initial validation of a new measure of aspects of psychological inflexibility: the Everyday Psychological Inflexibility Checklist (EPIC). The measure is designed to be a brief measure of psychological inflexibility without explicit reference to pain, fear and worry in its item content. In summary, an EFA initially resulted in an 11 item two factor measure, with the two subscales, labelled: Avoidance (A) and Behavioural Rigidity (BR). Following CFA, the model was revised to form a measure of 7 items across the same two factors. The fit indices of this revised model across three different data samples produced satisfactory levels of fit.

The items related to the first factor: avoidance, describe occasions when thoughts, memories or events such as conversations that may be difficult are avoided, blocked out or distracted from. The second factor: behavioural rigidity, contains items related to performing tasks in a particular order or rigid pattern. The items were designed to highlight a general inflexibility in behaviour and seem to indicate tasks that are done with a degree of compulsion.

Interestingly, it is worth noting that the reported inter-relationship between the EPIC avoidance and behavioural rigidity factors, while significant and positive, struggled to achieve even a medium effect size (Cohen, 1992; r=.23-.28). Similar results were found between the behavioural rigidity factor of the EPIC and the AAQ-II (.23). It will be interesting to monitor this relationship across future data collection episodes to gain further insights into this relationship.

Whilst exploring relationships, it is worth examining the relationship between the EPIC total score and AAQ-II itself. Overall, a significant and positive relationship of medium size (r=.32) was found. The size of the relationship for the total EPIC score was somewhat greater than the relationship between the AAQ-II and the two individual factors (A, r=.27, BR, r=.23). It must be noted that this does not represent a significant difference (using Fisher's r-to-z transformation), and it is not uncommon for longer scales to have a higher correlations with a criterion, than shorter ones. The size of the correlation between the EPIC total score and the AAQ-II is comparable to that of the correlation between the AAQ-II and the WAAQ (Work-related Acceptance and Action Questionnaire; r=.30 and r=.31, Bond et al., 2013). That said, it is still worth spending a moment considering why the relationship between the EPIC and AAQ-II is not greater. As noted, the EPIC makes no reference to pain, fear and worry, while the AAQ-II does.

This may explain some of the difference. More than this, items 1, 4, 5, 6 and 7 of the AAQ-II suggest that relationships with private events are getting in the way of valued living. The item content of the EPIC deliberately does not make any explicit connection between relationships with private events and problems with valued living generally (e.g. family, personal and work life) as it is trying to measure psychological inflexibility in contexts where the direct impact on valued living may be less (e.g. more prosocial behaviour). These may be some of the reasons why the strength of the EPIC and AAQ-II relationship appears the way it does. And again, as noted earlier, it will be interesting to monitor this relationship across future data collection episodes.

In the final study in this paper, the relationship between the EPIC, AAQ-II and other broadly prosocial measures (empathy, self-reported helping behaviour and attitudes towards helping others and charity) was explored. The total scores for both measures of psychological inflexibility do have significant negative relationships with self-reported helping behaviour in the expected direction (more psychological inflexibility, less self-reported helping behaviour), however the size of these relationship is not large (-.23, -.20) Although both performed roughly equally in zero order correlations, when entered into a regression, the avoidance factor of EPIC appeared to perform more strongly than the AAQ-II. But again, perhaps surprisingly, in combination they accounted for only 7% of the variance in terms of self-reported helping behaviour.

Moreover, in the relationships with other more prosocial measures, only the avoidance factor of the EPIC produced a significant relationship with empathy. Not the behavioural rigidity factor, nor the AAQ-II. It is perhaps interesting to note that non-significant relationships between empathy and measures of psychological inflexibility have been found before. For example Vilardaga et al. (2012) used the AAQ-II and the Interpersonal Reactivity Index - Empathic Concern Sub-scale (IRI-EC; Davis, 1983). They found a non-significant correlation in a sample of N=102 (r=.03, p.418). Similarly, in a 2014 paper by Levin et al., the AAQ-II and IRI-EC produced another non-significant correlation in a sample of 604. However it is worth noting that a relatively new measure of psychological flexibility, specifically targeting stigma (AAQ-S), used in the same study, did produce a significant negative correlation of r=-.35. Perhaps one thing to note from this current paper is that, there may be some worth in deliberately measuring prosocial behaviours more directly (like the self-reported helping behaviours listed in the SRA), in addition to measuring contested (i.e. Spreng et al., 2009, p. 62)

constructs like empathy that are related to helping behaviours. It must also be acknowledged that there may be an important degree of difference between self-reported helping behaviour in a questionnaire and actual helping behaviour in the real world.

It is important to note that the EPIC makes no claim to measure psychological inflexibility in all of its manifestations. For one, as noted in the introduction and earlier in the discussion, definitions of psychological flexibility / inflexibility tend to note a link between current behaviour and values and goals. Such item content is deliberately missing from the EPIC. More modestly, the two factors simply represent those items and factors which performed most strongly in both the exploratory and confirmatory factor analyses.

It has to be noted, that considerably more work needs to be done to establish the convergent validity of the behavioural rigidity factor. As reported in the results, aside from modest significant relationships with the EPIC avoidance factor and the AAQ-II, no significant correlations were found with any of the four more prosocial measures. It may be the case that scores from this factor have limited utility going forward. That said, it might be useful to speculate on the potential usefulness of such items. For example, there seems to be a possibility that content similar to these items may tap into to rule-governed behaviour that shows "less response to changes in the environment" (Hayes & Gifford, 1997, p. 172). It has been shown experimentally that behaviour that is governed by rules is less sensitive to changes in this way (e.g. Hayes, Brownstein, Zettle, Rosenfarb, & Korn, 1986). Indeed it is suggested by Hayes and Gifford (1997) that "overarching verbal rules", might lead to a more general "insensitivity effect" in behaviour (Catania, Shimoff, & Matthews, 1989). Hayes and Gifford (1997) suggest that this effect may help explain why experiential avoidance is maintained despite it potentially causing problems in life (p. 172). From a psychometric point of view, it may be challenging to measure an individual's awareness of the presence of overarching verbal rules in a self-report measure. However it seems important to try – and the items related behavioural rigidity may represent a tentative step in this direction. That said, as noted, considerably more empirical work is needed to assess whether items in the behavioural rigidity factor relate to any form of environmental insensitivity and the usefulness of the factor more generally.

Finally, it may be tempting to describe the AAQ-II as being well suited to "clinical populations" and any new measure like the EPIC as being (potentially) more

suited to “non-clinical populations”. However this is likely a mistake. For example, the AAQ-II shows strong relationships with relevant other variables in non-clinical contexts, for example the workplace (Bond et al., 2013). In this way, a neat clinical / non-clinical division does not seem appropriate. That said, it seems possible that a measure like the EPIC may have a potential contribution to make in situations where pain, fear and worry are potentially less influential.

In terms of further limitations a number more issues must be noted. Firstly, the original EPIC item pool started with 50 items and the final measure consists of just 7. While DeVellis notes that a 10 item scale might evolve from a 40 item pool (DeVellis, 2012, p.80), many items were discarded during our EFA process. Here we followed guidelines adapted from Ferguson and Cox (1993). However any excessive, rule governed, reduction of item content risks the potential loss of relevant factors and items – especially if a uni-dimensional final measure is not produced. Moreover, if EFA and CFA are reported in the same paper, CFA provides a further opportunity to examine and adapt model performance. With this in mind, in hindsight, our experience suggests tending toward more inclusion at the EFA stage, knowing that CFA allows for confirmation and if necessary revision.

Secondly, as noted above, the relatively low level of relationship between the factor and total scores of the EPIC and the AAQ-II was surprising – as, to a degree, was the correlation results between all measures of psychological inflexibility and the broadly prosocial measures. Of course no new measure will have all aspects of validity established after one paper, however the EPIC does have significant issues to address in terms of convergent and divergent validity. For example, what other measures do the EPIC total scores and factor scores have strong relationships with? Equally, despite the EPIC not being designed as a measure for the clinical, health and well-being contexts, do the total or factor scores have significant relationships with measures of functioning and well-being? These questions can hopefully be addressed in future data collection episodes using the EPIC.

Finally, it must be acknowledged that the majority of the samples utilised in this manuscript tend to centre on university environments where participants can tend to be both younger and more educated than the general population. Although samples include friends and relations of undergraduate researchers, it cannot be assumed that these findings will generalise to the population at large, nor to clinical populations. It is also salient to note again that the EPIC was not primarily designed for clinical contexts, and

so clinical populations were not targeted as part of recruitment. Moreover, the clinical status of participants was not assessed as part of these data collection and analysis procedures.

In conclusion, this paper provides preliminary data on a new questionnaire that attempts measures certain aspects of psychological inflexibility in a more everyday context. Measures like the EPIC may be of service as CBS expands its remit of research beyond traditional clinical, health and well-being contexts, into areas of social concern such as poverty, inequality, climate change and human rights. Moreover, it may give those interested in CBS a tool to compare whether the success that psychological flexibility has had in clinical domains can be replicated in areas more associated with social, global and environmental justice. In contrast to the AAQ-II, the items of the EPIC makes no reference to pain, fear and worry. Of course, the presence or absence of certain words is not enough by itself to make a measure more or less sensitive in everyday contexts: this is an empirical question. Future research is necessary to help determine the precise extent to which the EPIC may assist CBS address more prosocial areas. As Holmbeck notes, that process of scale development is a "cumulative process" taking place "across many different types of research studies and across research programs" (Holmbeck & Devine, 2009, p. 692). That said, it is hoped that the development of the EPIC can be one small part, of the CBS mission to help: "create a behavioral science more adequate to the challenges of the human condition" (Hayes et al., 2012, p.2).

EPIC

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.

1 Never True	2 Very Seldom True	3 Seldom True	4 Sometimes True	5 Frequently True	6 Almost Always True	7 Always True

1	I try to avoid thinking about difficult topics [A]	1	2	3	4	5	6	7
2	I find I follow rigid patterns when doing some tasks [BR]	1	2	3	4	5	6	7
3	When awkward thoughts occur I try and block them out [A]	1	2	3	4	5	6	7
4	Although I have never been told to I find I perform certain activities in a set order [BR]	1	2	3	4	5	6	7
5	In my personal life I steer clear of conversations that I find uncomfortable [A]	1	2	3	4	5	6	7
6	I notice I do certain everyday tasks in a particular order [BR]	1	2	3	4	5	6	7
7	If unpleasant situations come to mind I think about something else [A]	1	2	3	4	5	6	7

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