

Running head: BIPOLARITY AND AMBIVALENCE

The bipolarity of attitudes: Unfolding the implications of ambivalence

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*Abstract*

Recently, some attitude researchers have argued that the traditional bipolar model of attitudes should be replaced, claiming that a bivariate model is superior in several ways, foremost of which is its ability to account for ambivalent attitudes. This study argues that ambivalence is not at odds with bipolarity per se, but rather the conventional view of bipolarity, and that the psychometric evidence supporting a bivariate interpretation has been flawed. To demonstrate this, a scale developed out of the bivariate approach was examined using a unidimensional unfolding Item-Response Theory model: General Hyperbolic Cosine Model for polytomous responses. The results were consistent with a bipolar interpretation, providing support for the argument that ambivalent evaluations are the correct middle-point of a bipolar evaluative dimension. Thus, it is argued that attitudinal ambivalence does not necessitate moving beyond bipolarity, but rather, moving beyond the conventional conceptualisation and assessment of attitudes.

Keywords: Attitude scaling, Ambivalence, Bipolarity, Unfolding, Item Response Theory.

Since Thurstone (1928) first declared that attitudes can be measured, the attitude dimension has been conceptualised as bipolar in structure, i.e., attitudes are understood as varying in a unidimensional manner from extremely negative to extremely positive evaluations with more ‘neutral’ positions in between. Such a conceptualisation is intuitively appealing, as many dichotomies (e.g., good versus evil, liberal versus conservative, happy versus sad) are a common part of our everyday experience and communication (Thompson, Zanna, & Griffin, 1995). Despite the appeal of this conceptualisation, several researchers have called for its rejection in favour of a bivariate model, where positive and negative evaluations are regarded as varying on distinct, unipolar dimensions, which are in turn independently assessed (Cacioppo & Bernston, 1994; Cacioppo, Gardner, & Bernston, 1997, 1999).

One of the main arguments for this bivariate model has been the claim that the ‘neutral’ part of the conventional bipolar model does not account for ambivalent attitudes (Cacioppo & Bernston, 1994; Cacioppo, Gardner, & Bernston, 1997, 1999; de Liver, van der Pligt, & Wigboldus, 2007; Petty & Brinol, 2008; Priester & Petty, 1996; Thompson, et al., 1995). Attitudinal ambivalence occurs when a person simultaneously holds both positive (favourable) and negative (unfavourable) evaluations toward an attitude object, i.e., their overall evaluation is mixed or conflicted, and not indifferent. Ambivalence is particularly problematic for the bipolar understanding implicit within the Likert-style (1932) approach to attitude assessment, as the scoring function cannot accommodate ambivalent attitude statements (Andrich, 1996; Andrich & Styles, 1998; Nowlis, Kahn, & Dhar, 2002). As a result, conventional survey-design wisdom has explicitly discouraged the inclusion of ‘double-barrelled’ attitude statements, which express mixed or conflicted attitudes, as they are argued to be ambiguous or confusing for respondents (Thurstone & Chave, 1929).

The current paper attempts to clarify the implications of ambivalence for the bipolar model of attitudes by comparing a factor-analytic approach to an unfolding model approach to rating data from an attitude scale developed under the bivariate view. This comparison does not require a Likert-style approach and implements a psychometric model premised on a more realistic response process, and so provides a robust evaluation of the implications of ambivalence for a bipolar conceptualisation of attitudes.

*Evaluating the evidence against the bipolarity of attitudes*

The main proponents of a bivariate model of attitudes argue that bipolarity entails a reciprocal relationship between the positive and negative substrates of an attitude, i.e., the presence of positive evaluations toward an attitude object necessitates the absence of negative evaluations, and vice-versa (Cacioppo & Bernston, 1994; Cacioppo et al., 1997, 1999). Under this assumption of reciprocity, attitudes at the middle-point between the two poles lack any significant positive or negative evaluation, i.e., they are indifferent or non-attitudes (Converse, 1970). As a consequence, the bivariate proponents argue that a two-dimensional representation of attitudes is required to capture all possible attitudinal dispositions, as this representation allows both reciprocal and non-reciprocal relationships between positive and negative evaluations.

The purported psychometric evidence for this bivariate representation includes a number of correlational and factor analytic studies where ratings of positive and negative attitude items were neither found to significantly, negatively correlate, nor to positively and negatively load on a common factor (Cacioppo et al., 1997; Conner & Armitage, 2008; Patchen, Hofman, & Davidson, 1976). Moreover, many participants in the above studies indicated agreement with both positive and negative evaluative items. Traditional bipolar assessments, e.g., Likert-style

items and response scale, would not have been able to unambiguously accommodate these ambivalent respondents. Thus, they argue that the bipolar dimension implicitly accepted by attitude researchers for close to a century is artificial and that the psychometric evidence supports the use of bivariate attitude scales, where positive and negative attitudes are independently assessed (Cacioppo et al., 1997).

Closer scrutiny of the above arguments and evidence supports the conclusion for an alternative conceptualisation of the attitude dimension, but it is unclear that the bipolar model needs to be abandoned altogether. Firstly, when considering any number of bipolar analogies, it is unclear why bipolarity requires a reciprocal relationship between the polar elements. One such analogy, which was erroneously invoked by Cacioppo et al. (1997), is the balance knob on an audio stereo. When turned to the left pole, only sound from the left channel is audible, when turned to the right pole, only sound from the right channel is audible. However, when turned to the centre the result is not the absence of either channel, but rather the mixing of the two to give stereo sound, i.e., there is non-reciprocal relationship between the poles at the middle-point. To achieve the analogous state of attitudinal indifference in the stereo analogy, you would require two unipolar balance knobs for each channel that could be set to a zero-point.

Furthermore, the psychometric evidence for a bivariate understanding is undermined by its reliance upon linear analyses of the relationships between positive and negative evaluations. The use of such analyses as correlations and factor analysis to confirm bivariate models has been repeatedly criticised in a parallel debate in the affect literature (Green, Goldman, & Salovey, 1993; Russell & Carroll, 1999). Of most relevance to the current research is the criticism by several authors that factor and correlational analyses are inappropriate for analysing bipolar concepts, as they assume that the observed responses are linearly related to the underlying latent

variable (Coombs & Kao, 1960; Davison, 1976; Ross & Cliff, 1964; van Schuur & Kiers, 1994).

When a set of attitude responses conforms to a unidimensional unfolding model, this relationship is represented by a non-linear, single-peaked function (Andrich, 2016). As a result of this non-linearity, only responses to attitude items that are close together on the latent attitude dimension will highly, positively correlate, and vice-versa (Andrich & Styles, 1998). Correlations between items that are neither close nor far apart will be closer to zero.

In terms of the factor analytic solution, van Schuur and Kiers (1994) point out that an unfoldable dataset will manifest an 'extra' factor. This is problematic as it has repeatedly lead researchers to erroneously conclude that there are two latent variables underpinning the responses in a number of contexts. They go on to suggest that this 'extra-factor phenomenon' is the most parsimonious explanation for the bivariate solution obtained in studies of the structure of affect. Therefore, if it can be shown that responses to bivariate attitude scales fit a unidimensional unfolding model, then correlational or factor analyses of these measures can no longer be interpreted as compelling evidence for a bivariate model of attitudes.

*The advantages of the unidimensional unfolding approach to attitude assessment*

At a very general level, unfolding models hypothesise that an ideal-point response process governs attitude responses (Andrich, 2016; Coombs, 1964). This means that individuals will only agree with attitude items that are sufficiently close to their location, i.e., their ideal-point, on the latent attitude dimension and disagree with those that are not. Figure 1 below depicts a simplified example of this relationship and the resulting single-peaked response function.

The person's degree of agreement with each of the items, A, B, C, and D, is not necessarily determined by whether the valence of the item is consistent with the valence of their

attitude. Rather, it depends upon this proximity relationship. Hence, even though items B and C are of opposite valences, as the person's location falls equidistant between the two, an unfolding model would predict that the person would indicate the same level of agreement with both.

Importantly, unlike the method of summated ratings and related methodology, unfolding models allow one to test, rather than assume, that the responses adequately conform to the assumptions of the model (Andrich & Luo, 1996; Kyngdon, 2006). The assumptions of particular concern to the current study include this proximity response process and its single-peaked function, as well as unidimensionality.

Another advantage is that the hypothesised response process of the unfolding approach allows and encourages the inclusion of items from the entire span of the attitude dimension. Andrich (1996) and Roberts, Laughlin, and Wedell (1999) point out that conventional scaling techniques tend to lead to the inclusion of only moderately extreme items that are either clearly positive or negative in nature. This is because the dominance response process of the method of summated ratings is inconsistent with the response behaviour exhibited on both more intermediate and more extreme items. Andrich (1996) and Roberts et al. (1999) demonstrate that this requirement leads to the underestimation of the attitudes of individuals who are located at the very extremes of the attitude dimension when applying an unfolding approach, as these individuals only maximally agree with items that are both the same valence *and* similarly extreme to their own attitudes. In addition, it is argued here that this requirement also makes these conventional techniques inappropriate for distinguishing ambivalent attitudes. Ambivalent individuals are likely to only show maximal agreement with more intermediate items that are *simultaneously* positive and negative in valence, which in turn cannot be clearly positively or

negatively scored and so are excluded from the summated ratings approach (Andrich & Styles, 1998).

The preclusion of the sort of intermediate items that may distinguish ambivalence is not a feature of unfolding measurement models. In fact, such ambivalent items are commonly used in empirical unfolding applications. For example, Andrich (1988, p.47) addressed participants' attitudes toward capital punishment using the statement, drawn from the original work of Thurstone (1928), "I don't believe in capital punishment, but I am not sure it isn't necessary." Michell (1994, p.253) examined attitudes toward homosexuality including the statement, "I have no moral objections to homosexuality and, while not wanting to see it encouraged, believe it is a mistake to treat it as a crime." Roberts et al. (1999, p.217) assessed individuals' attitudes toward abortion including the statement, "There are some cases where abortion is justified, but there are just as many cases where it is not." Maximum agreement responses to such items are typically at their peak among individuals that are located closer to the centre of the latent attitude dimension. Thus, implicit within these past unfolding applications is a validation of the alternative bipolar conceptualisation proposed in this paper.

### *Aims and Hypotheses*

The primary aims of this paper are to demonstrate that ambivalence does not necessitate the bivariate assessment of attitudes under an unfolding approach and to empirically verify the proposed alternative conceptualisation of the bipolar attitude dimension. It will attempt to extend the validation provided in past unfolding applications by performing unfolding analyses on attitude scales developed out of Cacioppo et al.'s (1997) bivariate conceptualisation of attitudes. The use of these bivariate scales reduces the demand characteristic to interpret the items as bipolar in nature, which may have been present in these other unfolding applications. It is



predicted that the linear analyses of the responses to the bivariate scales will be consistent with past findings and interpretations, including few strong negative correlations between the items of the positive and negative subscales, and each of the subscales will load on to independent factors. Furthermore, it is expected that the subscales will adequately fit a bipolar, unidimensional unfolding model, with the ambivalent items' estimates located proximal to the centre of the latent attitude dimension.

## Method

### *Participants*

The study included 121 (86 females and 35 males) introductory psychology students. Their ages ranged between 17 and 27 ( $M = 19.20$ ,  $SD = 3.23$ ). All participants received partial course credit in return for their participation.

### *Materials & Procedure*

Cacioppo et al.'s (1997) Bivariate Evaluations and Ambivalence Measures (BEAMs) were used to assess attitudes toward abortion and Aboriginal Australians. These topics were selected because the author believed that some proportion of the sample would feel ambivalence toward them. The BEAMs include three subscales designed to assess positive, negative, and ambivalent evaluations. In addition, consistent with Cacioppo et al. (1997), two forms of the positive and negative subscales were utilised; Form A to assess people's attitudes toward abortion, and Form B to assess people's attitudes toward Aboriginal Australians. The items from each of the subscales and forms are set out in Table 1 below.

The different forms were argued by Cacioppo et al. (1997) to be statistically equivalent and were used to minimise the interpretation of the items across the subscales as varying in a bipolar manner, e.g., if the item 'positive' was included in the positive subscale, then a synonym

of 'negative' was used in the Negative subscale instead. Further, the subscales were completed individually, separated by a filler-task consisting of five different esoteric analogies, e.g. "Chick is to Hen as Calf is to...?" The order of presentation of each subscale was counterbalanced across the sample.

Participants were given the attitude topic and were asked to rate the extent to which each of the subscale items reflected their own attitude using a unipolar, 5-point response scale, ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). The coefficient alphas obtained for each of the subscales and each of the forms were all acceptable, ranging from .80 to .92.

#### *Data Analysis*

Firstly, given the importance of the category of maximum agreement in the estimation of the item locations in the unfolding analyses, as described below, participants' use of the response scale was examined to ensure that the full range of categories were being used. For the abortion topic, this revealed that participants did not use the maximum agreement category ('5') for one item ('Delighted') and there were fewer than five observations in this category for a further four items ('Appealing', 'Pleasant', 'Rewarding' & 'Comfortable'). For the Aboriginal Australians topic, the category of maximum agreement was not used for four items ('Tense', 'Negative', 'Unlikable', 'Unsatisfying') and there were fewer than five observations in this category for a further nine items ('Delighted', 'Muddled', 'Jumbled', 'Conflicted', 'Undesirable', 'Unhappy', 'Opposing' & 'Bad'). To ensure some level of information for item location estimation, the '4' and '5' response categories were collapsed for these items, and these were further collapsed with the '3' category for the 'Delighted' item for the Abortion topic, and for the 'Unlikable' and 'Bad' items for the Aboriginal Australians topic. These recoded data were used for both the linear and unfolding analyses to maximise the comparability of results.

The linear analyses, including Pearson product-moment correlations and Principal Component Analysis (PCA) were carried out in a manner consistent with Cacioppo et al. (1997) using IBM SPSS Statistics (Version 24) software<sup>1</sup>.

For the unfolding analyses, Andrich's (1996) General Hyperbolic Cosine Model (GHCM) for polytomous responses was used, as it provides the most parsimonious parameterisation of an unfolding model within a mainstream item-response theory (IRT) framework [see Kyngdon (2006) for an introductory overview of unfolding theory and the HCM]. The GHCM generalises Andrich and Luo's (1993) HCM for dichotomous responses, where the manifest (i.e., observed) agree category is modelled as the item location using the single-peaked, Hyperbolic-Cosine function, and the manifest disagree category is modelled as two latent disagree responses; disagree below and disagree above. These two latent disagree responses reflect the ideal-point or proximity response process described in Figure 1, where a person may disagree with an item that is not sufficiently proximal to their own attitude because it is too extreme, or because it is not extreme enough.

In the case of the GHCM for polytomous responses, all manifest categories other than the category of maximum agreement are modelled as two latent disagree responses. For example, for the 'Strongly Agree', 'Agree' and 'Undecided' response categories in a Likert-scale, the 'Strongly Agree' category is modelled as the category of maximum agreement, with the peak of the curve for this category corresponding to the item's location. This is based on the assumption that respondents will only use this category for items that are close to their own attitude, i.e., their ideal-point. The 'Agree' category is modelled as the two latent disagree responses most proximal to, and symmetrical around the item's location. The 'Undecided' category is then

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<sup>1</sup> Note that Pearson product-moment correlations and the 'little jiffy' approach, including PCA extraction and Varimax rotation, were applied to replicate Cacioppo et al. (1997) even though the response data were only ordinal and arguably not appropriate for these analyses.

modelled as the two latent disagree responses which are the next most proximal to, and symmetrical around the item's location. In general, the GHCM expects that as the distance between the item's location and the person's location on the latent attitude dimension increases, in either direction, the probability that they will select a category of lesser agreement increases (Andrich, 1996).

The unfolding analyses were performed on the recoded responses using the RateFOLD (Version 2.03) software (Luo, 2002). After the positive and negative items were specified in the software by the researcher to correspond with the BEAMs Positive and Negative subscales, the item and person locations were estimated utilising a Joint Maximum Likelihood iterative algorithm. The software also provides item-level and overall chi-square ( $\chi^2$ ) tests of model fit, which indicate whether the aggregated deviations between the observed and expected responses within and across items are statistically significant [see Luo, Andrich, & Styles (1998) for a technical overview of the model, estimation procedure and fit statistics]. Fit was also examined by visual inspection of each item's Expected Value Curve (EVC), which plots the observed mean responses of different class intervals (i.e., groupings of people with the same or similar location estimates) against the GHCM's expected curve. Six class intervals were formed to ensure a minimum sample size of 20 people in each, while covering the range of person location estimates.

## Results

As predicted, inspection of the pattern of correlations between the positive and negative subscales' items across the two attitude topics revealed no strong linear relationship, with correlations ranging from close to zero to only moderate in strength. The average of the positive-negative item correlations was  $-.33$  ( $SD = .14$ ) for the abortion topic, and  $-.22$  ( $SD = .12$ ) for the

Aboriginal Australians topic. In addition, as hypothesised, the results of the PCA revealed a three-factor solution for the two attitude topics, with each subscale significantly loading on to a single factor<sup>2</sup>. The averages of the Varimax-rotated loadings for the two issues are presented in Table 2, demonstrating separate negativity, positivity and ambivalence factors.

After demonstrating the data's comparability with past findings, the unfolding analyses were performed. The tests of fit and location estimates of each of the items across the two attitude topics can be seen in Table 3. The solutions obtained for the abortion and Aboriginal Australians BEAMs were mostly consistent with predictions. The overall test of fit revealed that the abortion BEAMs sufficiently fit the unidimensional GHCM,  $\chi^2_{409} = 448.91$ ,  $p = .08$ . Moreover, inspection of the EVC for the item showing the greatest misfit ('Muddled'), presented in Figure 2, showed that people in the most positively located class interval had a marginally higher level of agreement than expected, but overall the item did not substantially diverge from model expectation. Therefore, this item was retained. Inspection of the EVCs for all other items of the abortion BEAMs did not reveal any additional substantial misfit.

For the Aboriginal Australians BEAMs, the overall test of fit did indicate statistically significant deviation from model expectation,  $\chi^2_{359} = 409.60$ ,  $p = .03$ . In particular, the 'Tense' item showed the greatest misfit and inspection of its EVC (see Figure 2) revealed that people in the two most positive class intervals had a higher level of agreement than expected, and the item showed no discrimination between the three most negative class intervals, indicating that there was no clear point of maximum agreement for the item. After the 'Tense' item was removed from the analysis, the Aboriginal Australians BEAMs sufficiently fit the unidimensional GHCM,

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<sup>2</sup> For both the Abortion and Aboriginal Australians topics, a fourth component had an eigenvalue greater than 1. However, inspection of the factor loadings revealed that this component was only relevant for two anomalous items and so was excluded from the final solution for parsimony.

$\chi^2_{344} = 357.67$ ,  $p = .29$ . Inspection of all remaining items' EVCs did not reveal any substantial misfit, so these 21 items were retained.

The item-maps displaying the item location estimates of the 22-item abortion BEAMs and 21-item Aboriginal Australians BEAMs relative to the distribution of person location estimates on each latent attitude dimension are presented in Figure 3. The Positive subscale items were quite extreme relative to the distribution of person estimates for both the abortion ( $M = 2.33$ ,  $SD = .24$ ) and Aboriginal Australians ( $M = 2.29$ ,  $SD = .16$ ) topics. The Ambivalent subscale items were the most proximal items to the centre of the distribution, but were closer to the negative pole than expected for both the abortion ( $M = -0.94$ ,  $SD = .18$ ) and Aboriginal Australians ( $M = -0.85$ ,  $SD = .37$ ) topics. The Negative subscale items were most proximal to the negative pole for both the Abortion ( $M = -1.63$ ,  $SD = .21$ ) and Aboriginal Australians ( $M = -1.72$ ,  $SD = .46$ ) topics and were moderately extreme relative to the distribution of person estimates.

For the Abortion topic, all item estimates were quite clustered for each subscale. For the Aboriginal Australians topic, the Positive subscale item estimates were similarly clustered, whereas the item estimates for the Ambivalent and Negative subscales were somewhat more varied, but also tended to have somewhat larger standard errors (see Table 3). Interestingly, 63% of the person estimates for the Abortion topic ( $M = -0.16$ ,  $SD = 1.68$ ), and 66% of the person estimates for the Aboriginal Australians topic ( $M = 0.62$ ,  $SD = 1.63$ ) were located between the most proximal Positive and Ambivalence subscale item estimates.

Figure 4 presents exemplar EVCs for items drawn from the Positive, Negative and Ambivalent subscales for the abortion topic. The 'Divided' item from the Ambivalent subscale displays the most pronounced proximity (or ideal-point) response behaviour, with a large drop in agreement at both the most positive and most negative class intervals, which was reflective of the

pattern for the more centrally estimated items from this subscale across the two topics. The ‘Unlikable’ item from the Negative subscale showed a similar pattern, but with a less pronounced decrease in agreement at the most negative class interval, which was generally the case for items from this subscale across the two topics. In contrast, responses to the ‘Approving’ item from the Positive subscale were more consistent with a dominance response process, as the level of agreement monotonically increased across the class intervals from most negative to most positive. This pattern was consistently observed across all of the Positive subscale items across the two topics.

### Discussion

The present study offers evidence that ambivalent attitudes are not at odds with a bipolar conceptualisation of attitudes and provides a further example that linear analyses cannot be used as evidence for a bivariate interpretation. As predicted, the Abortion BEAMs items were found to adequately fit the bipolar, unidimensional GHCM at the overall and item level. Moreover, the Aboriginal Australians BEAMs adequately fit the GHCM after the removal of a single anomalous item. Finally, the item location estimates for each of the subscales were reasonably consistent with the research hypotheses.

#### *A renewed conceptualisation of bipolar attitudes*

Just as the audio stereo balance knob possesses a mixing of the polar elements at its centre, the current study supports the contention that ambivalence is at the centre of the bipolar attitude dimension. Moreover, although such a bipolar conceptualisation of attitudes has been implicit in earlier unfolding applications, the present research supports a unidimensional interpretation of a scale developed out of the bivariate approach to attitudes. This is particularly significant, as the BEAMs and the research design were specifically developed to minimise the

potential demand characteristic for participants to perceive the subscales as forming a single, bipolar scale.

It must be noted that the item location estimates for the Ambivalent subscale were closer to the negative pole than expected. This finding is consistent with Cacioppo et al. (1997) who explain it as being the result of ambivalence's affinity with negative mood states. More simply, it could be the case that some participants perceived the items in the Ambivalent subscale as mildly negative, rather than ambivalent. This seems a reasonable speculation when one considers the valence of such items as 'Tense', 'Contradictory' or 'Conflicted'. In addition, the Ambivalent subscale showed the highest overall degree of misfit compared to the other two subscales. This finding is consistent with Roberts et al. (1999), who found in their unfolding application that the estimates of the items and persons located in what they termed the 'neutral' region of the attitude dimension were the most unreliable. They also attributed this to the variance in the interpretation of 'neutral' items across the sample.

Both findings allude to the importance of theoretical considerations during item construction and highlight the richness of the information that is provided by an unfolding IRT approach, which would not be provided by more traditional analyses. Given that the present conceptualisation of bipolarity argues for a 'mixing' of the polar elements at the centre, it seems reasonable to suggest that the ambivalent items should be constructed to express a 'mixing' of the positive and negative descriptors, e.g., good *and* bad. Such items may permit a more robust investigation of the relationship between ambivalence and the polar elements, and provide further evidence for this renewed conceptualisation of bipolar attitudes with ambivalence at the centre.

*Criticisms of this renewed conceptualisation*



One potentially impactful criticism of this bipolar conceptualisation is that just as its predecessor discounts ambivalence, this model does not capture indifferent attitudes. While at face value this appears to be a severe deficiency, conceptual consideration suggests otherwise. When the attitude researcher utilises such procedures as those in the current study, what they are attempting to do is locate the respondents' position on a latent evaluative dimension. Indifference is defined as the absence of any form of evaluation in the respondent; they are undecided, simply do not care, or may not know about the issue (Poortinga & Pidgeon, 2006). The attempt to accommodate such individuals on an evaluative dimension seems somewhat akin to the absurd situation of attempting to weigh on a balance scale something that has no mass.

Consequently, a means of distinguishing indifferent individuals is required, which is distinct from establishing their location on the attitude dimension. Similar points have been made repeatedly in the attitude literature, and even originally by Thurstone (1928, p.530) when he stated, "an attitude is a complex affair which cannot be wholly described by any single numerical index". This complexity may be fruitfully captured by considering assessment of the attitude parameters discussed in the attitude strength literature (Krosnick & Petty, 1995).

These include parameters such as attitude intensity, importance, certainty and the latitude of acceptance, which seem far more appropriate for identifying indifferent attitudes as they are directly concerned with how much individuals care and/or know about an attitude topic, not how they evaluate it. Assessing such parameters would also permit one to investigate where indifferent individuals locate themselves on the attitude dimension when forced to do so. Under the typical understanding, we would expect them to locate themselves close to the centre of the dimension, which may be an additional explanation of the lack of fit found for some of the Ambivalent subscale items. However, Converse (1974) found evidence that indifferent

individuals tend to locate themselves in a rather haphazard way across the dimension. If further research provides evidence that the latter is more likely, the bipolar model of attitudes presented here will be further endorsed.

Another criticism is that the present study's psychometric focus leads it to disregard the non-psychometrically based evidence cited in Cacioppo et al. (1997) for a bivariate understanding. For example, they cite a number of neurophysiological and experimental studies that appear to support the dissociation of the positive and negative evaluative processes underpinning attitudes. However, in a parallel debate in the affect literature, Green, Salovey, and Truax (1999) point out that the psychological experience of positive and negative emotion may occur along bipolar lines, even if the processes underlying these feelings are understood as being physiologically separable. Similarly, the experience of attitudes may vary along bipolar lines even if the underlying positive and negative evaluative processes are independent. It is this conscious endpoint that we are wishing to investigate in explicit attitude measurement and the findings of the current study provide evidence that it is valid to continue to treat attitudes as varying in a bipolar manner, albeit in a non-conventional manner.

*Moving beyond the method of summated ratings*

Overall, the current findings present further evidence that the ubiquity of the method of summated ratings, and related methodologies, should be reconsidered in explicit attitude measurement. The scaling solution of the Positive and Negative subscales of the BEAMs for each of the issues reveals a pattern typical of a measure developed under the traditional approach (Andrich, 1996; Roberts et al., 1999). This includes the bunching of items of the same valence around moderately extreme locations on the attitude dimension, which was most apparent for the Negative subscale items. The more extreme locations and the associated dominance response

behaviour of the Positive subscale items were not as predicted. However, Andrich (1996) explains how Likert's (1932) approach encourages the inclusion of such extreme items, as they optimise its cumulative scoring procedure. This optimisation comes at the expense of providing items that discriminate across the full range of evaluative dispositions.

On this point, the most alarming result in the current study was the mismatch of item locations to person locations across both attitude topics, which resulted in a clustering of person estimates at the centre of the evaluative dimension, thus highlighting the need for items that reflect attitudes across the entire dimension, and particularly toward the centre. As previously discussed, the unfolding approach permits more central, ambivalent items within a bipolar framework because it does not require items to be positively or negatively scored. Therefore, there is no scoring problem posed by items that express both positive and negative evaluations. Nonetheless, such items are known to be difficult to write and may be ambiguous or confusing for respondents (Brown & Maydeu-Olivares, 2010).

Michell (1994) provides a potential method for the construction of these kinds of ambivalent items through the use of a binary tree structure to carefully control the semantic relations between items, which in turn minimises any ambiguity in the interpretation of the relative ordering of items across the attitude dimension. Ambivalent items created through this meticulous process would likely be more appropriate for assessing ambivalent attitudes and their implications for our understanding of the evaluative dimension than those used in the present research. Furthermore, as abovementioned, Roberts et al. (1999) demonstrated that the unfolding approach can better account for attitudes at very extreme locations, because it allows for the inclusion of equally extreme items, which may also be rigorously constructed using Michell's

(1994) method. Consequently, through more considered item construction, the unfolding approach appears better suited for assessing individuals of all evaluative dispositions.

### *Conclusion*

This study provides evidence against the argument that attitude assessment must move beyond bipolar conceptualisations to account for ambivalence. The ignorance of ambivalence has not been an artefact of bipolarity per se, but rather a consequence of treating bipolarity as necessitating a reciprocal relationship between positive and negative evaluations. Moreover, it has provided evidence that the linear analyses presumed to support the bivariate representation are questionable, and that under an unfolding approach, ambivalent attitudes are consistent with a bipolar conceptualisation. Based on these findings, attitudinal ambivalence does not motivate a move beyond the bipolar assessment of attitudes. Rather, it appears time to move beyond the dominant attitude assessment methodologies to also consider unfolding IRT models. In combination with meticulous and theoretically informed item construction, the unfolding approach promises more precise and robust information about people and items across the entire evaluative dimension.

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Tables

Table 1

*Form A and Form B Items of the BEAMs Positive, Negative, and Ambivalent subscales*

Positive		Negative		Ambivalent
A	B	A	B	A/B
Favourable	Desirable	Undesirable	Unfavourable	Muddled
Appealing	Positive	Negative	Unappealing	Jumbled
Pleasant	Likable	Unlikable	Unpleasant	Tense
Agreeable	Happy	Unhappy	Disagreeable	Conflicted
Approving	Supporting	Opposing	Disapproving	Divided
Rewarding	Good	Bad	Punishing	Contradictory
Delighted	Attractive	Unattractive	Distressed	
Comfortable	Satisfying	Unsatisfying	Uncomfortable	

Table 2

*Averages and standard deviations of the Varimax factor loadings across items of the BEAMs positive, negative, and ambivalent subscales for attitudes toward abortion and Aboriginal Australians.*

Subscale	Abortion*			Aboriginal Australians**		
	F1	F2	F3	F1	F2	F3
Negative	.73 (.07)	.20 (.10)	-.22 (.15)	.68 (.14)	-.15 (.11)	.25 (.23)
Positive	-.20 (.11)	-.07 (.03)	.51 (.28)	-.14 (.18)	.74 (.04)	-.04 (.15)
Ambivalent	.19 (.09)	.76 (.09)	-.06 (.05)	.26 (.14)	-.02 (.07)	.50 (.27)

\* Eigenvalues were 8.47, 3.05 and 1.78 and the final solution explained 60.46% of the overall variance.

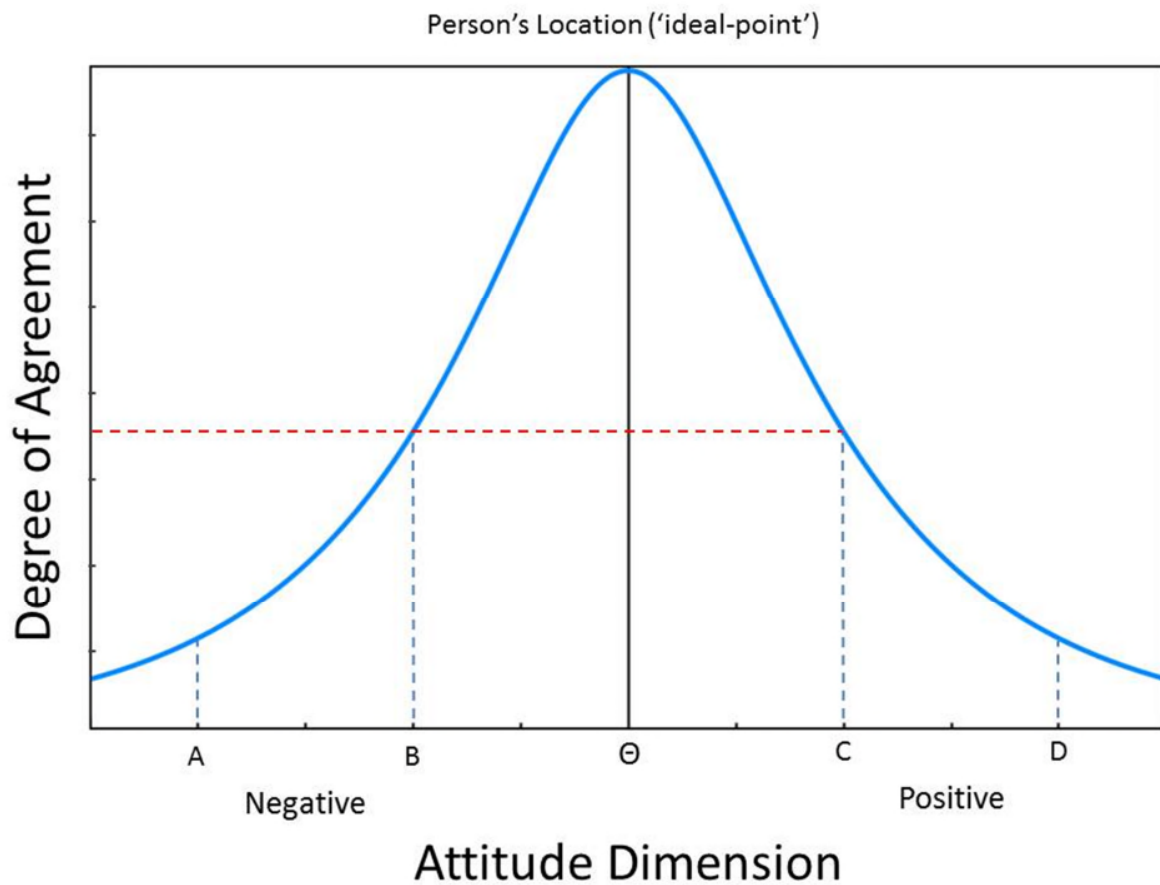
\*\* Eigenvalues were 7.47, 3.75 and 1.72 and the final solution explained 58.80% of the overall variance.

Table 3

*The GHCM item location estimates ( $\hat{\theta}_i$ ), standard errors of the estimates (SE) and tests of fit for the Abortion and Aboriginal Australians BEAMs (Form B items in brackets were used for attitudes toward Aboriginal Australians)*

	Abortion				Aboriginal Australians			
	$\hat{\theta}_i$	SE	$\chi^2(df)$	p	$\hat{\theta}_i$	SE	$\chi^2(df)$	p
<u>Positive subscale</u>								
Pleasant (Likable)	2.69	.09	23.8 (15)	.07	2.28	.05	22.9 (20)	.29
Comfortable (Satisfying)	2.62	.07	16.5 (15)	.35	2.54	.05	22.8 (20)	.30
Approving (Supporting)	2.36	.07	22.1 (20)	.33	2.39	.05	25.4 (20)	.19
Agreeable (Happy)	2.31	.06	30.7 (20)	.06	2.35	.05	33.6 (20)	.03
Delighted (Attractive)	2.27	.10	8.4 (10)	.58	2.24	.06	18.2 (15)	.25
Rewarding (Good)	2.24	.07	12.6 (15)	.64	2.12	.05	15.5 (20)	.75
Appealing (Positive)	2.21	.07	11.1 (15)	.75	2.32	.05	21.6 (20)	.36
Favourable (Desirable)	1.94	.06	13.2 (20)	.87	2.04	.05	24.0 (20)	.24
<u>Ambivalent subscale</u>								
Jumbled	-0.78	.05	24.0 (20)	.24	-1.30	.07	20.7 (15)	.15
Muddled	-0.82	.05	34.0 (20)	.03	-1.02	.07	19.1 (15)	.21
Conflicted	-0.88	.05	28.9 (20)	.09	-0.54	.08	20.9 (15)	.14
Divided	-0.90	.05	21.2 (20)	.38	-0.41	.08	18.9 (15)	.22
Contradictory	-0.95	.05	28.3 (20)	.10	-1.00	.06	21.5 (20)	.37
Tense	-1.28	.05	14.5 (20)	.81	-0.27	.08	35.4 (15)	.00
<u>Negative subscale</u>								
Unattractive (Distressed)	-1.31	.05	22.2 (20)	.33	-1.49	.07	15.8 (15)	.39
Unsatisfying (Uncomfortable)	-1.39	.05	27.5 (20)	.12	-1.28	.08	15.1 (15)	.44
Undesirable (Unfavourable)	-1.57	.05	19.6 (20)	.49	-1.70	.07	4.8 (15)	.99
Opposing (Disapproving)	-1.58	.05	14.9 (20)	.78	-1.44	.07	9.5 (15)	.85
Unhappy (Disagreeable)	-1.66	.05	25.1 (20)	.20	-1.19	.07	14.7 (15)	.47
Bad (Punishing)	-1.74	.06	20.8 (20)	.41	-1.93	.10	12.8 (10)	.21
Unlikable (Unpleasant)	-1.88	.05	16.5 (20)	.68	-2.27	.09	8.7 (10)	.55
Negative (Unappealing)	-1.90	.05	13.0 (20)	.88	-2.45	.08	7.9 (15)	.93

Figures



*Figure 1.* A single-peaked function derived from the ideal-point response process where the degree of agreement with the negative items A and B, and the positive items C and D is determined by their proximity to the person's location ( $\Theta$ ) on the latent attitude dimension and not their valence.

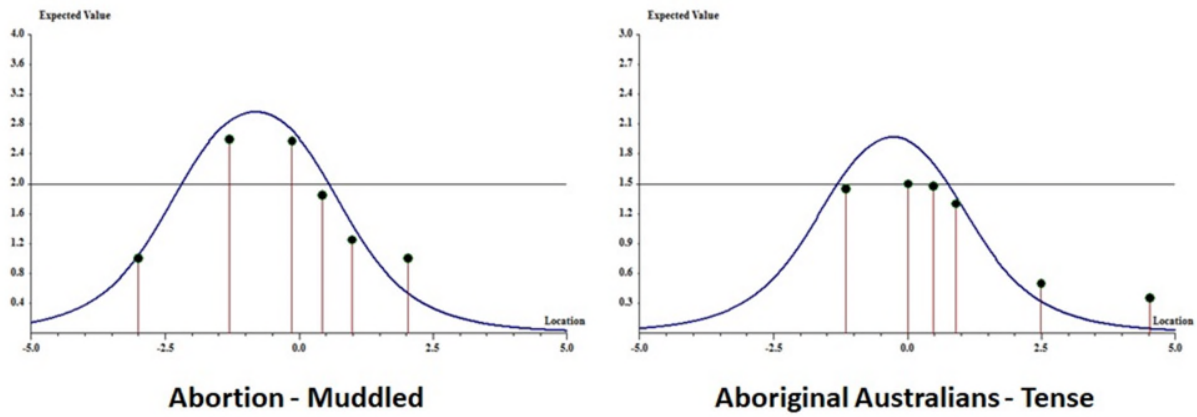


Figure 2. Expected Value Curves for the items displaying the greatest misfit for the Abortion and Aboriginal Australians BEAMs. Mean observed values (black dots) for each class interval are plotted against the theoretical, single-peaked response curve.

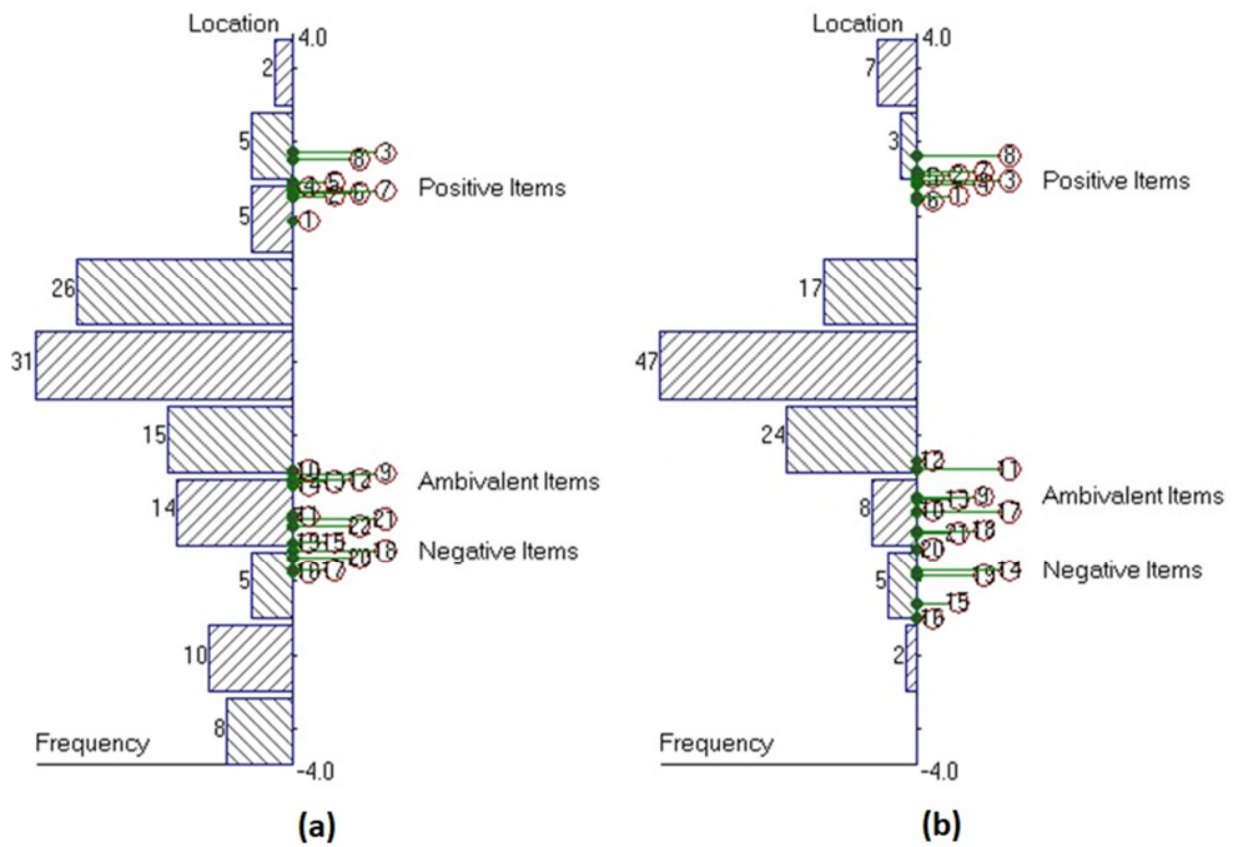


Figure 3. Item-maps for the (a) 22-item Abortion BEAMs, and (b) 21-item Aboriginal Australians BEAMs. The Positive, Ambivalent and Negative subscale labels correspond with the average item location estimate for that subscale.

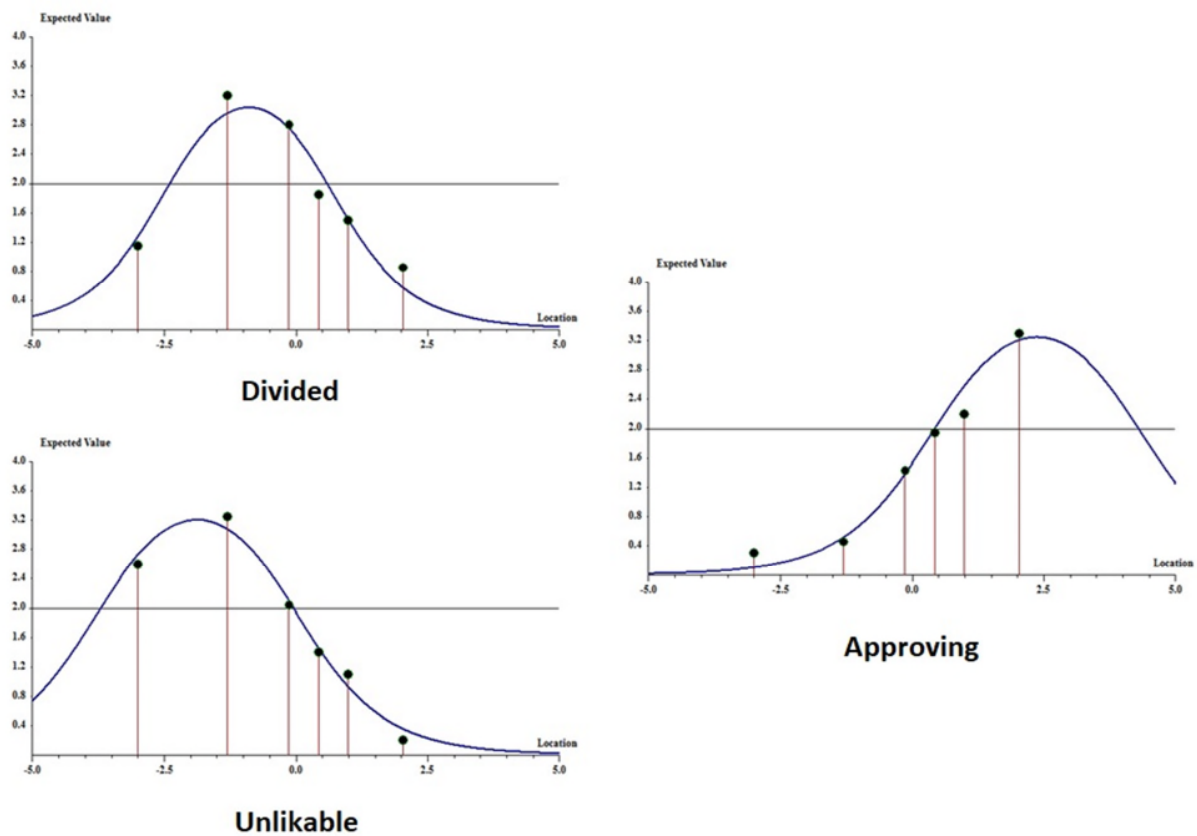


Figure 4. Expected Value Curves for the 'Approving', 'Divided' and 'Unlikable' items from the Abortion BEAMs.