Validation of the Factor Structure of the Interactions
with Disabled Persons Scale

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Abstract

The Interactions with Disabled Person's Scale (IDP; Gething, 1991) is designed to measure attitudes towards people with a disability. Factor analysis of the 20-item scale has identified six relatively stable and correlated factors tapping different aspects of discomfort during contact with people with disabilities (Gething, 1992, 1994). The present study investigated the factor structure of the IDP scale using 2,850 pre-service teachers from six universities in Australia and South Africa. Multigroup confirmatory factor analysis indicated that the six-factor model fitted the data from both the Australian and South African samples. A two-factor solution reported by MacLean and Gannon (1995) was rejected. Further analysis of subscales formed from these factors showed that scores were weakly related to gender, previous contact with people with disabilities, and length of full-time employment prior to commencing study.

Validation of the Factor Structure of the Interactions with Disabled Person's Scale

There are a limited number of scales assessing attitudes towards people with disabilities that are suitable for use in Australia. Most are normed on American data, such as the Scale of Attitudes Towards Disabled Persons and the Mental Retardation Misconceptions Scale (Antonak, 1982; Antonak & Livney 1988). Both of these scales have been found to be unsuitable for tracking attitudes over an extended period and have poor internal consistency (Beckwith & Matthews, 1994). To fill the void, Gething (1986) developed the Attitudes Towards Disabled Persons Scale (ATDP-O) to measure the attitudes of nondisabled members of the workforce in Australia. Subsequently, the ATDP-O underwent evaluation and refinement and a revised 20-item version of the scale, renamed the Interaction with Disabled Persons Scale (IDP), was released in 1991 (Gething, 1991b). The present study is part of a longitudinal study of change in attitude as a consequence of participation in pre-service teacher training programmes. The study includes samples of pre-service teachers from both Australia and South Africa. This first research report focuses on the validation of the IDP in both countries and examines whether scores on the IDP taken at the outset of the study covary with variables such as age, gender, level of education, years of employment, and amount of contact with people with disabilities. The report begins with a review of previous validation research on the IDP.

The IDP was both designed and standardised within Australia with populations from different social and cultural backgrounds. A normative data set, consisting of representatives from all major occupational categories in the classifications published by the Australian Bureau of Statistics in 1988 (Gething, 1992), was derived from 4,180 people between 1988 and 1990 (Gething, 1991a). Test-retest reliabilities have been found to compare favourably with existing instruments (Gething & Wheeler, 1992) and construct validity has been established through exploratory factor analyses of 12 datasets (Gething, 1994). Following these analyses, Gething concluded that "the twenty items of the IDP Scale divided into relatively consistent groups of six factors" (p.28). The first factor, Discomfort in Social Interactions, contained six items (Questions 9, 11, 12, 16, 17, and 18) relating to a person's behaviour and reaction on meeting someone with a disability (e.g., Q9: I feel uncomfortable and find it hard to relax). The second largest factor, named Coping/Succumbing Framework, contained four items (Questions 1, 2, 3, and 13) relating to the view that a person was likely to take towards a person with a disability (e.g., Q3: I feel frustrated because I don't know how to help). Factor 3, labeled Perceived Level of Information, was measured by five items (Questions 3, 6, 9, 10, and 12) relating to information about disability (e.g., Q6: I feel ignorant about disabled people). Factor 4 contained two items (Questions 7 and 20), both pertaining to a person's Vulnerability. The remaining two factors were defined by two items each and accounted for 5.2% (Questions 14 and 15) and 5.0% (Questions 4 and 5) of the variance, respectively. This six-factor solution omitted items 8 and 19, which had low communality estimates and failed to load on any factor.

MacLean and Gannon (1995), in an exploratory factor analysis of data obtained from 343 students, preferred a solution that required 10 of the 20 IDP items and encompassed just the first two of Gething's (1994) factors, which they relabelled Discomfort and Sympathy. The two factors were orthogonal and different levels of discomfort and sympathy were reported according to gender, age, and experience in dealing with people who have a disability.

Other research has supported the validity of the IDP by showing that scores on the instrument relate in a meaningful way to external criteria. Results consistently show that prior contact with people with disabilities is associated with lower scores on the IDP (Gething, 1991; Gething, 1991a). Level of contact has, therefore, emerged as a positive and significant

factor in determining attitudes towards people with disabilities. In addition, professionals who receive training about people with disabilities show significant attitude change over time (Gething, 1994). Education students at the University of Sydney, for example, demonstrated decreasing levels of discomfort over a three year period of pre-service study (Gething, 1992). Similar findings were reported by Beckwith and Matthews (1994) between first- and later-year undergraduate students.

Amount of contact is not the only variable that has been shown to relate to IDP scores. Gething (1991a) found significant differences for a) age, with younger people recording more negative attitudes; b) level of education, with those having lower levels of education in the normative sample showing greater discomfort in their interactions with people with a disability; and c) occupational groupings, with managers showing more discomfort than professionals. Trainee professionals have indicated less discomfort than tertiary students (Beckwith & Matthews, 1994). Gender differences were reported by MacLean and Gannon (1995) with male undergraduate students displaying more discomfort in their interactions with people with disabilities. These same authors reported that female undergraduates have more positive attitudes towards people with disabilities. In the normative data, nurse practitioners (N=183) had significantly more positive attitudes towards people with disabilities (Gething, 1992). Faculty of Education academic staff have also been found to exhibit more positive attitudes towards people with a disability than staff in other faculties within a university (McLennan & Rapley, 1997).

To summarise, the IDP scale has proved useful for measuring level of discomfort when interacting with people with disabilities. From a psychometric viewpoint, exploratory factor analyses conducted to date suggests that the IDP can be used to measure either two (MacLean & Gannon, 1995) or six factors (Gething, 1994). An interesting feature of the previous structural validation research, however, has been the necessity to drop up to three items from the 20-item scale because of low communality estimates (e.g., Gething, 1994; MacLean & Gannon, 1995). Items 8 (I try to act normally and ignore the disability) and 19 (I feel better with disabled people after I have discussed their disability with them) consistently fail to load on any factor, even in a six-factor solution.

Such a situation suggests that further research is still required on the structure of the IDP to determine the number of factors measured by the scale and also the subscale formation. Information about the subscales is important in a training context where it is possible to target specific aspects of the way people react to people with disabilities. Given evidence that training can improve overall scores on the IDP, there is no doubt that certain professions will also wish to direct training effort towards particular areas tapped by the IDP, if these can be identified and operationally defined through subscales.

The principal aim of the current study was to conduct a structural analysis of the IDP in a large sample of Australian university pre-service teachers. Confirmatory factor analysis was used to test two models that have been proposed in the literature: the six-factor model described in the review article by Gething (1994) and the two-factor model proposed by MacLean and Gannon (1995). A secondary aim was to test the validity of this structure for a sample of South African pre-service teachers. Gething (1994) reported that data was being collected in other countries but no structural analyses have yet been conducted. It was important to establish at the outset of this longitudinal study that the IDP was also suitable for use in a South African setting. Multi-sample confirmatory factor analysis was used here. A third aim was to test for relations between subscale scores and variables such as age, gender, employment experience, level of education, and amount of previous contact with people with disabilities.

Method

<u>Participants</u>

The respondents were all students in the Faculty of Education at one of six universities: three universities were in Queensland, Australia (N = 2,375), the other three were in the Western Cape of South Africa (N = 475). Of the total cohort, 79% were female, 84% had English as their first language, 90% were under the age of 30, and only 2% had undertaken any study specifically on people with disabilities.

<u>Measures</u>

The current version of the IDP (Gething 1991b) consists of 20 items and employs a six-point Likert format with no neutral point. Respondents were asked to indicate the extent to which they agreed with the 20 statements by choosing one of the Likert options, using the numbers 1 through 6. In general, a high score on an item meant that the respondent experienced considerable discomfort when dealing with people with disabilities. A small number of items (q10, q14, q15) were reverse-scored.

Other personal details were obtained including age, gender (1 = male, 2 = female), whether or not English was the first language (1 = yes, 2 = no), the amount of contact the respondent had with people with disabilities (1 = daily, 2 = weekly, 3 = monthly, 4 = quarterly, 5 = less frequently than quarterly), highest level of formal education attained prior to attempting the course (1 = year 12, 2 = diploma, 3 = first degree, 4 = postgraduate), current year of tertiary study (1 through 4), and the number of years of full-time employment prior to commencing the present course.

<u>Procedure</u>

A Personal Details questionnaire and the IDP were administered to all participants in a classroom setting. Total administration time was less than 20 minutes.

Results

The main aim of the research was to test the structure of the IDP in an Australian sample. In the first stage of data analysis, therefore, the AMOS (Arbuckle, 1997) structural modelling package was used to test Gething's (1994) six-factor model on the combined dataset from the Australian universities (N = 2375). The particular model tested was the one obtained by Gething on the combined samples (N = 5468) collected during the period 1988-1990 (Gething, 1994, p.29). The model stipulated that items 9, 11, 12, 16, 17, and 18 defined a Discomfort factor; items 1, 2, 3, and 13 a Coping/Succumbing factor; items 3, 6, 9, 10, & 12 an Information factor; items 7 and 20 a Vulnerability factor; items 14 and 15 a Coping factor; and items 4 and 5 a second Vulnerability factor. Note that items 3, 9, and 12 each loaded on two factors, as they did in Gething's model. All factors were linked by covariance pathways. Other than the specification of these pathways, the model was unconstrained. The parameter estimates obtained from maximum likelihood procedures are shown in Table 1.

Factor Structure of IDP 6

Table 1

Factor Loadings and Factor Intercorrelations for Gething's (1994) Six-Factor Solution, Australian Sample (N = 2375).

Items	Factors					
	Discomfort	Coping/ Succumbing	Information	Vulnerability (Direct)	Coping	Vulnerability (Indirect)
9	.42		-.44			
11	.63					
12	.38		-.44			
16	.47					
17	.77					
18	.77					
1		.52				
2		.59				
13		.51				
3		.43	-.44			
6			-.56			
10			.15			
7				.51		
20				.69		
14					.34	
15					.71	
4						.63
5						.71
	1.00					
	-.12	1.00				
	-.56	-.17	1.00			
	.55	.23	-.46	1.00		
	-.50	.44	.31	-.36	1.00	
	.17	.60	-.36	.53	.13	1.00

Note. All coefficients significant (P < .05) except the path for item 10 (.15)

Because of the large sample size, the Chi Square test was not considered an appropriate measure of fit (Hu & Bentler, 1995). Instead, the adjusted goodness of fit index (AGFI: Joreskog & Sorbom, 1984), the Tucker-Lewis Index (TLI: Tucker & Lewis, 1973), and the Root Mean Square Error of Approximation (RMSEA) were used. The AGFI and the TLI vary along a 0-1 continuum in which values greater than .9 are taken to reflect an acceptable fit (McDonald & Marsh, 1990). For the RMSEA, values below .05 indicate a close fit with values up to .08 still acceptable (Browne & Cudeck, 1993). For the model shown in Table 1, the AGFI was .92, the TLI was .85, and the RMSEA an acceptable .06. Thus, the model provided a reasonable fit to the data.

MacLean and Gannon (1995) proposed a competing model based on just 10 of the IDP items and measuring Gething's first factor (Discomfort) plus a factor that represented a combination of the remaining factors that they labelled Sympathy. Accordingly, a second model was tested on the Australian data that described items 9, 11, 12, 17, and 18 as defining a Discomfort factor and items 1, 2, 3, 5, and 13 defining an orthogonal Sympathy factor. Results from the AMOS analysis suggested that the model does not fit the data . The AGFI was .88, TLI was .81, and RMSEA an unacceptable .10. These indices were all outside acceptable levels and provided no justification for favouring a model that used just a subset of the IDP items. Accordingly, the MacLean and Gannon model was not considered further.

The second research aim was to test the preferred Gething six-factor model on data obtained from trainee teachers in South Africa (N = 475). Multiple sample comparison procedures in AMOS were used to do this. The test here was whether the common factor analysis model already tested with the Australian sample also fitted the data from the South African sample. In the first instance, an identical structural model was fitted with path values free to vary between the samples. The goodness of fit tests were mostly acceptable. The AGFI was .91, TLI was .85, and the RMSEA value was .04. These findings suggest that Gething's (1994) six-factor model is also valid in a South African context.

Improving the Model

Although the fit indices for the Australian sample were acceptable and the multiple sample factor analysis indicated that the same model could be applied to the South African data, inspection of the parameter estimates for both groups suggested that some improvements could be made. Table 1 shows that for the Australian sample, items 9 and 12 had slightly higher loadings on Information than on Discomfort. For the South African sample, however, items 9 and 12 did not load at all on Discomfort. Item 10 had a nonsignificant loading on Information in both samples. Accordingly, a revised model was derived that omitted item 10 altogether and described items 9 and 12 as indicator variables for just the Information factor, rather than for both the Discomfort and Information factors (Gething, 1994).

Multisample factor analysis from AMOS was used to fit this model to both the Australian and South African samples. Parameter values were allowed to vary between the populations. Fit statistics indicated that the model fitted both groups with an AGFI index of .92, TLI of .87, and RMSEA of .04. The resulting parameter estimates for both groups are shown in Table 2. The Australian estimates are similar to those shown in Table 1 and are included in brackets in Table 2. It can be seen that the factor loadings are very similar for the two groups. A stricter test was therefore applied whereby the factor loadings were also constrained to be equal across the samples. Although the fit statistics were still satisfactory for this model, the difference in Chi square values for the two models indicated that the model with the unconstrained loadings provided the better fit.

Table 2

Factor Loadings and Factor Intercorrelations for Revised Six-Factor Solution, Both Samples.

Items	Factors					
	Discomfort	Sympathy	Uncertainty	Fear	Coping	Vulnerability
11	.48(.63)					
16	.47(.47)					
17	.80(.77)					
18	.77(.77)					
1		.39(.52)				
2		.48(.58)				
13		.51(.52)				
3		.38(.49)	.30(.36)			
6			.42(.46)			
9			.69(.78)			
12			.61(.74)			
7				.49(.51)		
20				.49(.69)		
14					.46(.34)	
15					.55(.71)	
4						.52(.63)
5						.51(.71)
	1.00					
	.04(-.15)	1.00				
	.69(.82)	.28(.08)	1.00			
	.35(.55)	.40(.23)	.68(.55)	1.00		
	-.07(-.50)	.32(.44)	-.06 (-.42)	.27(-.36)	1.00	
	.30(.17)	.55(.60)	.44(.31)	.80(.53)	.08(.13)	1.00

Note. Parameter estimates for Australian sample shown in brackets. All coefficients significant (P < .05) except those underlined.

Comparing the model proposed by Gething (1994) and the modified version reported above, we favour the latter for a number of reasons. Firstly, on a purely statistical level, using the conventional test of differences in Chi square values it provides a better fit for both the Australian and South African samples when tested individually. Furthermore, the modified model shows items 9 and 12 as loading on a single factor rather than two factors, leaving only item 3 with the undesirable characteristic of sharing its variance across two factors. Removing items 9 and 12 from the Discomfort factor leaves just four items: (11) I can't help staring at them; (16) I feel overwhelmed with discomfort about my lack of disability; (17) I am afraid to look the person straight in the face; and (18) I tend to make contacts only brief and finish them as quickly as possible. This factor is easily identified as Gething's Discomfort in Social Interactions dimension. Gething's second factor is not altered in the modified model but we have followed MacLean and Gannon's (1995) lead in labelling it Sympathy. The factor shares four of the five items that define Sympathy in MacLean and Gannon's model. The third factor is now defined by four items rather than five: (3) I feel frustrated because I don't know how to help; (6) I feel ignorant about disabled people; (9) I feel uncomfortable and find it hard to relax; (12) I am unsure because I don't know how to behave. Together, these items tap what

Gething has labelled Perceived Level of Information but which we have labelled Uncertainty. Factors four, five, and six are unchanged but we have altered the name of the fourth factor from Vulnerability to Fear to distinguish it from the sixth factor, which Gething also labelled Vulnerability.

The final research aim concerned the investigation of relations previously noted by Gething (1991a) and MacLean and Gannon (1995) between IDP subscale scores and external variables. The variables involved were age, gender, level of prior education, year of study, amount of contact with people with disabilities, and years of full-time employment prior to commencing present degree. With the exception of gender, all of these variables involved at least ordinal level of measurement, so Pearson's product moment correlations were used to analyse the relations. Given the equivalence of factor structures across the Australian and South African samples, the full data set was used for this purpose.

Descriptive statistics for the six factors and their correlations with external variables are shown in Table 3. It can be seen that the internal consistency reliability estimates for the subscales are mostly in the moderate to low range. The reliability is particularly weak for Coping, one of the lesser factors that was more or less ignored by Gething (1994). Based on average responses to the six-point Likert items, the means for the subscales indicate that when interacting with people with disabilities this combined sample of Education students a) does not feel particularly uncomfortable, b) has a high level of sympathy, c) is moderately uncertain, d) is fearful of being disabled, e) copes with the interaction (although this subscale is unreliable), f) feels vulnerable.

Table 3

Descriptive Statistics for Six-Subscales and Correlations With External Variables

| Variable | Descriptives | | | Correlations with External Variables | | | | |
	M	SD	α	Age	Gender	Education	Contact	Employment
1. Discomfort	2.49	1.03	.75	-.05	.05	-.03	.15	-.10
2. Sympathy	5.13	.66	.57	-.05	-.24	-.01	.02	-.10
3. Uncertainty	3.65	.97	.67	-.03	-.06	.05	.26	-.06
4. Fear	4.38	1.24	.47	-.05	.00	-.03	.15	-.02
5. Coping	4.45	.99	.39	.05	-.12	.02	-.09	.09
6. Vulnerability	4.37	1.08	.58	.08	-.07	.07	.00	.02

Regarding correlations with external variables, with such a large sample size even very small correlations (> .038) were significant, so we have concentrated on the magnitude of the coefficients themselves as indicators of effect size (see Tatsuoka, 1993). The first independent variable, age, had very low correlations with all six subscales, the highest being .08 with Vulnerability. Gender was related to the Sympathy subscale, where the correlation was -.24, with females likely to feel more sympathy for people with disabilities. The next variable, level of education completed, did not have any correlations above .07. Contact, a variable measuring the amount of contact the respondent had experienced with people with disabilities where a high score indicated very little contact, was correlated with Discomfort (.15), Uncertainty (.26), and Vulnerability (.15). Thus, students who had more contact with people with disabilities felt less discomfort and uncertainty, and felt less vulnerable. Finally, a

variable measuring the length of time a person had spent in full-time employment (Employment) showed weak associations with Discomfort (-.10) and Sympathy (-.10).

Discussion

Confirmatory factor analysis suggested that a six-factor solution provided the best representation of the structure of the IDP, thus supporting the findings of Gething (1994) and colleagues (Gething & Wheeler, 1992). Confirmatory factor analysis also extended the validity of this model to a sample of South African pre-service teachers. An alternative two-factor model based on a subset of 10 items proposed by MacLean and Gannon (1995) did not fit our Australian data and was discarded. Unreported exploratory factor analyses suggested that the items of the IDP could be combined in other ways to form four subscales. These solutions involved deleting up to six items and did not result in the identification of new factors, just the combination of minor factors in Gething's (1994) solution. Furthermore, when subjected to confirmatory factor analysis, the fit indices for these solutions were inferior to those reported in this study for Gething's pattern.

As has happened in virtually all studies involving the IDP, some items were dropped. Items 8 and 19 were not included in our model testing because they did not form part of the models proposed by either Gething (1994) or MacLean and Gannon (1995). Item 8 (I try to act normally and ignore the disability) does not appear to be deficient in an obvious way but it is not hard to see why item 19 consistently shows low communality. The wording of this question (I feel better with disabled people after I have discussed their disability with them) would be difficult to answer for anyone who has not broached the subject of disabilities when conversing with a disabled person. Item 10 (I am aware of the problems which disabled people face), which was dropped in the present study and also dropped by MacLean and Gannon, is the only positively-worded item in the subscale it is intended to define. Item 15 (After frequent contact, I find I just notice the person not the disability) is also problematic. It is part of a subscale (Coping) that has very poor reliability and, again, one can see why when looking at the wording of the item. The external variable measuring frequency of contact with people with disabilities indicated that on average the frequency for this sample was less than once per month, so it is difficult to see how respondents can answer a question that assumes they have frequent contact.

The performance of these items may change, however, over the course of this longitudinal study. Gething (1993) stressed the need to monitor the quality of interactions with people with disabilities and advocated the importance of promoting disability awareness training as part of pre-service training. Consequently, pre-service teachers at each university are being encouraged to interact more with people with disabilities and are being trained in disability . Levels of discomfort as measured on the six factor scale will then be used to ascertain any changes in attitudes across the four years of study. For this reason, the full scale will be retained for the duration of the present study. Using the full scale, or close to the full scale, there is no compelling reason to deviate from the structure favoured by Gething. One-off studies (e.g., MacLean & Gannon, 1995) may report different structures but they are based on a smaller item set which does not include the problematic ones listed above. The present study represents the first confirmatory factor analysis of the IDP and adds to the weight of studies favouring a broad span of underlying dimensions for the full IDP scale.

The final aim of the study concerned the relationship between subscale scores and age, experience with people with disabilities, education, and employment. Our own findings provide some support for previous studies that have reported relationships between these variables but we point out that the relationships are rather weak. Our data show that the highest correlation coefficient obtained in the present study was .26, representing the

relationship between Uncertainty and amount of previous contact. The more contact one has with people with disabilities the more one gets to know about their problems, the more comfortable one feels in their presence, and the less one fears ending up like them. Our data also suggest that females tend to feel more sympathy for people with disabilities than males.

Compared to previous findings by Gething (1992) and Beckwith and Mathews (1994), there was no association between levels of discomfort reported by pre-service students and their background level of education or years of employment. When considering reasons for the different outcomes, it should be noted that only 2% of the total cohort in the present study had undertaken any compulsory or elective units about people with disabilities. It should also be noted that the effects may be weak in this study because of restriction in range on a number of variables. Most of the sample were under 30 years of age (90%), most were female (79%), most had English as a first language (84%), and most had less than one year of prior full-time employment (74%). With so much restriction on variables such as age, language, gender, and prior employment, it is not really surprising that the relationships are weak in this study. A further point that needs to be made is that some of the effects reported in previous studies, although significant, have been very weak, often involving correlations below .20 (e.g., MacLean & Gannon, 1995, p. 800).

In conclusion, there is no doubt that more work is required on the IDP to rectify problems relating to item wording and subscale reliability but we are reasonably confident that in its current form, a six-factor solution is the best representation of the underlying structure. We have made some slight modifications in this study but the factors are the same as those identified by Gething (1994). The use of confirmatory factor analysis enabled us to reduce the factorial complexity of items 9 and 12 so that these two items now define only the third factor in Gething's solution. We also relabelled factors two, three, and four to clarify their nature and to achieve unique labels for each of the six factors. The subscales are likely to provide an in-depth view of how perceptions differ among different population groups and how perceptions change in response to training. With the inclusion of a large South African sample in this study, and confirmation that a six-factor measurement model for the IDP is equally valid in South Africa, we are also able to recommend the suitability of the IDP for use in that country.

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