

## Use of the *Interact Short Form* as a tool to evaluate emotion of people with profound intellectual disabilities

K. P. Y. Liu,<sup>1</sup> T. Lee,<sup>2</sup> A. Yan,<sup>2</sup> C. W. M. Siu,<sup>1</sup> F. W. Y. Choy,<sup>1</sup> K. L. K. Leung,<sup>1</sup> T. Y. Siu<sup>1</sup> & A. C. S. Kwan<sup>2</sup>

<sup>1</sup> *The Hong Kong Polytechnic University, Kowloon, Hong Kong*

<sup>2</sup> *Fu Hong Society, Kowloon, Hong Kong*

### Abstract

**Background** One of the essential purposes of intervention programmes for people with profound intellectual disabilities (ID) is to enhance the desirable mood and behaviour and decrease the undesirable ones through stabilizing their emotion. There is lack of validated instrument to offer a comprehensive measure that covers the mood and behaviour, both desirable and undesirable, appropriate for people with profound ID.

**Method** This study aimed to examine the validity and reliability of the *Interact Short Form* for evaluating the mood and behaviour of people with profound ID, and at the same time, review their emotional profile using the *Interact Short Form*. Both content validity using expert panel review and construct validity by means of factor analysis were investigated. A total of 75 people with profound ID were recruited. Inter-rater reliability was tested. The results of the *Interact Short Form* were described to reflect the emotional profile of this group of participants.

**Results** Using the results of expert panel review and those from factor analysis, we found three subscales representing the mood and behaviour of

people with profound ID. They were: 'emotional expression', 'interests towards tasks' and 'behaviours to environment'. All three subscales were found to be internally consistent ( $\alpha = 0.71-0.88$ ). The *Interact Short Form* – People with profound ID version also showed good inter-rater reliability (mean = 0.72). The results of the *Interact Short Form* showed that this group of participants had fairly stable emotion under the structured setting and activities in the residential institutions where data were collected.

**Conclusions** The *Interact Short Form* – People with profound ID version serves as a helpful tool for both clinical and research use in assessing the mood and behaviour of people with profound ID in a simple, comprehensive and systematic way.

**Keywords** adults, measurement, mood and behaviour, profound intellectual disability

### Introduction

Emotional problems in people with profound intellectual disabilities (ID) have received much attention in healthcare research (Duker *et al.* 1996). The outcome of various interventions for this group of people often focuses on enhancing their happiness and positive engagement (Lancioni *et al.* 2005), and decreasing undesirable challenging behaviour (O'Reilly *et al.* 1999, 2000), with an ultimate focus of addressing the emotion issue.

Correspondence: Dr Karen PY Liu, Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong (e-mail: karen.liu@inet.polyu.edu.hk).

Emotion is a psycho-physiological state that moves a person to action. It represents an experiencing stimulus that takes into account the potential for gain or pleasure (Candland 1977). Emotion states tend to influence or prime thought processes, which subsequently affect a person's mood and behaviour across a range of situations (Argus *et al.* 2004). For example, Ross & Oliver (2002) revealed that people with low mood had a relatively high score for self-injurious behaviour.

In measuring emotion manifested as mood and behaviour, widely used instruments that assess people's psychopathology related to the diagnosis of mental health problems include: the *Diagnostic Assessment for the Severely Handicapped-II* (Matson *et al.* 1991), the *Psychiatric Assessment Schedule for Adults with Developmental Disabilities Checklist* (Moss *et al.* 1998), and the *Reiss Screen for Maladaptive Behaviour* (Reiss 1988). The others that focus on people's mood and behaviour include the *Anxiety, Depression and Mood Scale* (Esbensen *et al.* 2003) and the *Mood Ratings* (Carr *et al.* 2003). These instruments focus on mood and challenging behaviour. However, they do not specifically consider the main therapeutic effects of interventions that aim at promoting desirable behaviour, inhibiting challenging behaviour, and enhancing an individual's ability to adapt to surrounding environment and people within it (Singh *et al.* 2004). Other assessments that include both desirable and undesirable outcomes consist of the *Behaviour and Mood Disturbance Scale* developed by Green *et al.* in 1982 and the *Checklist of Challenging Behaviour* developed by Harris *et al.* in 1994. However, they are focused on mood and behaviour of people with higher intellectual functioning, and do not specifically focus on the needs of people with profound ID.

The *Interact Short Form* was initially developed to evaluate the mood and behaviour for people with dementia (Baker & Dowling 1995). These are the moods that prime mood-congruent thoughts and behaviour, such as desirable moods like happiness that makes a person attentive and interactive, and undesirable moods like unhappiness that could induce wandering act and restlessness (Mayer *et al.* 1992; Erber & Erber 2000). The *Interact Short Form* contains six subscales with 12 items that cover these desirable and undesirable mood and behaviour, including people's attentiveness and their interac-

tion with the environment. These six subscales are: 'mood', 'speech', 'relating to others', 'relating to the environment', 'need for prompting' and 'stimulation level'. The person's mood and behaviour are rated based on the rater's observation in a structured and standardized way. This kind of observational rating scale has the advantage of using non-verbal responses to assess the mood and behaviour of participants who have difficulty communicating, such as people with dementia, as it was originally developed for people with profound ID.

Hence, in order to enable a more comprehensive and systematic method for recording the basic and primitive mood and behaviour of people with profound grade of ID, the objective of this study was to establish the content and construct validity, and the inter-rater reliability of the *Interact Short Form* for assessing the mood and behaviour of people with profound ID, and to review the emotional profile of people with profound ID using the validated *Interact Short Form*.

## Method

### Participants and settings

All persons with profound ID (with IQ below 20 as measured by the Wechsler Adult Intelligence Scale) aged 18 years or above living in two community-based residential institutions run by the same organization ( $n = 100$ ) were invited to participate in this study. As a result, 75 subjects with profound ID, including 35 female individuals (46.74%) and 40 male individuals (53.3%), were recruited. The age of this group of subjects ranged from 19 to 71 years (mean = 40.5, SD = 13.0). They were all Chinese and unmarried. All the subjects attended training centres during daytime and were assigned with various training programmes, such as desktop work, group gross motor activities and self-care activities. They would follow instructions given by the health-care professionals under the specific training programmes.

### Data sources

Data comprised scores obtained using the *Interact Short Form* based on observing the participants' mood and behaviour.

### Instrument

As described earlier, the *Interact Short Form* consists of a total of 12 items. The participants were rated on a 5-point Likert scale, ranging from '1', indicating 'not at all', to '5', indicating 'nearly all of the time'. It was completed by the rater through observing participants' mood and behaviour for 10 min when carrying out their usual daily activities.

### Rater training

Four university undergraduate students studying rehabilitation sciences did the observation of participants' mood and behaviour using the *Interact Short Form*. All raters underwent extensive training by one author who had clinical experience in using the *Interact Short Form* and working with people with ID. Before being eligible to use the *Interact Short Form*, all raters reviewed each item and scoring method of the *Interact Short Form*. Any query regarding the meaning of the terms and scoring was resolved. Raters then administered the *Interact Short Form* to two selected people with profound ID. Their incongruent ratings were discussed and resolved. They then rated another 10 people with profound ID. Exact agreements on individual items for all observers exceeded 80% (mean = 84.5%; range = 81.0–90.5%). Issues underlying any disagreements were discussed in a final training session, and ongoing support to the raters was available throughout the study.

### Procedure

An eight-member multidisciplinary expert panel evaluated the content validity of the *Interact Short Form*, including the relevance and representativeness of the items to people with profound ID. The panel included four social workers and four occupational therapists. All were healthcare professionals who had worked in day-to-day care for people with ID for an average of 9.4 years. They were grouped together to evaluate the content validity of the *Interact Short Form* by rating each item on its relevance and representativeness using a 5-point Likert scale to reflect the mood and behaviour of people with profound ID. Items with a rating of <3 would be taken out for discussion among all panel members to generate a group consensus opinion.

According to the instructions of the *Interact Short Form*, the mood and behaviour of the participants were observed for 10 min in an activity room while they were performing the daily routine sedentary activities during morning or afternoon sessions (Baker & Dowling 1995). The participants were arranged in their usual seats and were required to carry out regular tasks that they had been doing for at least 2 weeks. Three raters, who received training for using the *Interact Short Form*, sat in different corners of the activity room before the participants entered the room to have their mood and behaviour recorded. Before the data were taken for this study, these raters were present in the same room and, in the same time of the day, performing the similar tasks for 5 days. This arrangement would make sure that the participants had become used to these raters in their usual daily routines to avoid a change in mood and behaviour due to the presence of the raters being strangers. Thirty-three randomly selected participants were rated by another rater for a second time using the *Interact Short Form* for study purposes of rater reliability.

The study was approved by the Research Ethics Committee of The Hong Kong Polytechnic University. Written informed consent was obtained from each participant and his/her guardian.

### Statistical methods

Descriptive statistics for reporting the results on content validity and emotional profile were employed. To investigate the construct validity of the *Interact Short Form*, the factor analysis was reported. principal component analysis with orthogonal varimax rotation was used. The internal consistency of the *Interact Short Form* was explored by the Cronbach's alpha coefficient. Kappa statistics were used to measure the inter-rater reliability between the two raters on single-item scores of the *Interact Short Form*. The data analysis was conducted using the Statistical Package for the Social Sciences (SPSS Inc, Chicago, IL), version 12.0, for Windows.

## Results

### *Interact Short Form* for people with profound intellectual disabilities

Upon the content validation, most of the items were found to be relevant to, and representative of, mood and behaviour for people with profound ID. The expert panel commented that it was not usual for people with profound ID to 'talk spontaneously'. They unanimously recommended the item be modified to 'produce meaningful sound' instead. This modified item was incorporated in the *Interact Short Form* version to be tested for people with profound ID reported in the section below. No change was made to the scoring system and rating criteria.

### Construct validity

The *Interact Short Form* when applied to the participant data produced good internal consistency ratings for the overall scale (0.83). However, confirmatory factor analysis applying the original *Interact Short Form* six-subscale structure to data was not satisfactory, as it could not extract any factor out from the original six-factor structure.

An alternative four-factor model that explained 70.8% of variance was derived by applying principal component factor analysis. A varimax rotation was

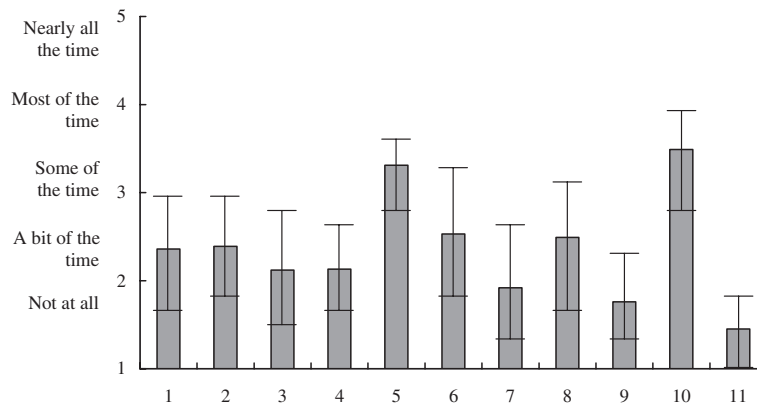
used, eigenvalues >1 were used to identify factors, and items with a factor loading >0.60 were interpreted as loading on that factor (Table 1). The factor structure of the *Interact Short Form* was based on a sample of 75 people with profound ID. The value of the Kaiser-Meyer-Olkin was 0.73, indicating that the sample size was adequate to conduct the analysis. Significant results from Barlett's test of sphericity ( $\chi^2 = 406.9$ ,  $P < 0.001$ ) further supported the usefulness of the statistical procedure. The four factors that emerged were: (1) emotional expression ( $\alpha = 0.88$ ), consisting of five items that addressed on happiness and sadness; (2) interests towards tasks ( $\alpha = 0.71$ ), consisting of four items of engagement with tasks; (3) behaviours to environment ( $\alpha = 0.72$ ), consisting of two items that addressed the person's act to social and physical environment; and (4) 'produce meaningful sound', which was the only item in the last factor (Table 2). However, this was the item that was questioned by the experts working with people with ID in term of its relevance to people with profound ID. When this item was dropped out from the instrument, a three-factor model that explained 66.3% of the variance was derived using the same procedure as described above. The revised 11-item *Interact Short Form* – People with profound ID version when applied to the participant data produced a slight higher level of internal consistency ratings for the overall scale

**Table 1** Factor loadings of the *Interact Short Form*

Variable	Factor I ( $\alpha = 0.88$ )	Factor II ( $\alpha = 0.71$ )	Factor III ( $\alpha = 0.72$ )	Factor IV
Tearful/sad	0.86			
Confused	0.84			
Relaxed, content	0.80			
Fearful/anxious	0.79			
Happy/content	0.64			
Did things out of own initiative		0.71		
Attentive/focused		0.71		
Bored, inactive		0.64		
Enjoying self, active or alert		0.62		
Related well to other staff/people			0.89	
Wandering, restless or aggressive			0.86	
Produce meaningful sound				0.90

		Alpha	Average inter-item correlation
Factor I	Emotional expression	0.88	0.58
Factor II	Interests towards tasks	0.71	0.40
Factor III	Behaviours to environment	0.72	0.56

**Table 2** Measures of internal consistency for the subscales of the *Interact Short Form*



**Figure 1** Participants' profile using the *Interact Short Form*. (1) Tearful/sad; (2) confused; (3) relaxed, content; (4) fearful/anxious; (5) happy/content; (6) attentive/focused; (7) did things out of own initiative; (8) enjoying self, active or alert; (9) bored, inactive; (10) related well to other staff/people; (11) wandering, restless or aggressive.

(0.84). As can be seen in Table 2, all inter-item correlations were higher than 0.4 in this three-factor model.

#### Inter-rater reliability

The performance of 33 randomly selected subjects was rated by two independent raters. The inter-rater reliability ( $n = 33$ ) was calculated using kappa statistics. The range of the obtained kappa coefficients for the 11 items was 0.68–0.77 (mean = 0.72). All items yielded good agreement that demonstrated good inter-rater reliability (Tooth & Ottenbacher 2004).

#### Emotion profile of people with profound intellectual disabilities

Looking at the results of the *Interact Short Form* – People with profound ID version (Fig. 1), the group of participants seemed to show a 'happy' and 'content' mood (mean = 3.31, SD = 0.84), which indicated that the frequency of this occurrence during the 10-min observation reached to 'some of the time' to 'most of the time'. While they were happy and content, participants also demonstrated

high rating in the item 'related well to other staff/people' (mean = 3.49, SD = 0.99). These two observations were consistent with the other items, like 'attentive/focused' (mean = 2.53, SD = 1.42), and 'enjoying self, active or alert' (mean = 2.49, SD = 1.46). For the other items, participants showed, more or less, similar ratings that were around the occurrence of 'a bit of the time'. This group of participants did not show frequent occurrence of undesirable behaviours, such as 'wandering, restless or aggressive' (mean = 1.45, SD = 0.89). This item had the lowest rating among all in the *Interact Short Form* – People with profound ID version.

#### Discussion

The results of content validity, construct validity and reliability showed that the *Interact Short Form* – People for profound ID version can be used as a brief screening tool to assess mood and behaviour of people with profound ID.

The result of content validity of the *Interact Short Form* for use with people with profound ID was congruent with the results of factor analysis. The

item related to 'talk spontaneously' was removed from this version for people with profound ID. It is not relevant to the people's usual behaviour and ability (Lancioni *et al.* 2002).

For construct validity, the results showed that the 11 items in the *Interact Short Form* demonstrated a good enough item-group structure in our sample of people with profound ID. All the 11 items were grouped in a pattern that reflected desirable and undesirable mood and behaviour, and interaction with tasks and environment. They are: (1) emotional expression; (2) interests towards tasks; and (3) behaviours to environment. Although these areas do not reflect the whole spectrum of mood and behaviour of people with profound ID, the three-factor solutions cover the desirable therapeutic effects expected from most interventions for people with profound ID (Marston *et al.* 1997; Ross & Oliver 2002; Esbensen *et al.* 2003). Besides, the items also include 'atypical symptoms' as behavioural depressive equivalents such as challenging behaviours like aggression and irritability (Meins 1995; Davis *et al.* 1997; Marston *et al.* 1997). To look closer to the individual items of the *Interact Short Form*, these include observed happiness and sadness (Esbensen *et al.* 2003); behavioural depressive equivalent reflecting mood, such as wandering, restlessness or aggressiveness (Ross & Oliver 2002); and interaction with social and physical environment (Esbensen *et al.* 2003). Therefore, the both desirable and undesirable mood and behaviour of people with profound ID are briefly covered in the items of the instrument.

One minor concern is the limited number of items that loaded onto the subscale 'behaviours to environment'. This may limit the reliability, sensitivity and validity of this subscale. However, as the *Interact Short Form – People with profound ID* version has only 11 items and is intended to be used as a quick screening instrument with which front-line workers can quickly rate the mood and behaviour of people with profound ID, it should be considered fairly satisfactory that a subscale loads with only two items. The results for internal consistency and inter-rater reliability generated in this study also demonstrated a good item structure and good reliability of the instrument. According to the instructions of the original *Interact Short Form*, participants were observed for 10 min. This observation duration seemed to be rather limited and should be specified

to reflect the people's mood and behaviour for that particular period of time and specific activity.

With the *Interact Short Form – People with profound ID* version, the emotional profile of the participants reflected that they were a group with stable emotion. Although the participants were under external influences such as the staff's physical and verbal prompting and the interaction with other people throughout the rating process, the results showed a high consistency of rating scores among raters. Participants were all rated in their usual setting under a stable environment and working on routine and regular activities. This supports the statement that a person's mood and behaviours, which are the observable emotional states of that individual, are dependent upon the different circumstances and environment he/she encounters (Ross & Oliver 2002; Argus *et al.* 2004).

Regarding the *Interact Short Form – People with profound ID* version, future research could further look into the representativeness of the items and might include more items such as different modes of communications like gesture and facial experience that were related to social and environmental interaction – the subscale with fewer items. However, this would require further investigation of how the people with profound ID manifest their social and environmental interaction. It would also require further work in order to be used for evaluating the long-term effect of intervention on behaviour. More work can be carried out for looking at the convergent and divergent validity of the instrument with other constructs or measures.

There are several other limitations to this study. The main limitations are the relatively small size and relatively small variations in the mood and behaviour of the sample. As there are 62 000–87 000 people with ID, according to the Census and Statistics Department of Hong Kong, the sample may not be representative of all people with ID. In fact, samples must not only be representative, but also be of sufficient size to produce reliable factors for factor analyses (Portney & Watkins 2000).

## Summary

To the best of our knowledge, the *Interact Short Form – People with profound ID* version is a screening instrument and is one of the only instru-

ments that covers both the desirable and undesirable mood and behaviour. While the aims of different interventions for people with profound ID are to increase desirable mood and behaviour and decrease the occurrence of undesirable mood and behaviour, this *Interact Short Form – People with profound ID* version would be one of the choices to assess the current state of mood and behaviour of people with profound ID. As the instrument is a behaviour-based observational instrument, it is not restricted by the individual's handicap, such as his/her communicative level, and it does not rely on the individual's expression of feelings, but rather involves a rater observing the behaviour exhibited by his/her mood. Although the 11 items of the *Interact Short Form – People with profound ID* version may not reflect a wide spectrum of mood and behaviour of people with ID, it serves as a helpful and quick tool for evaluating the mood and behaviour on this group of people, and thus facilitates clinical utility and future research in this area.

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### References

- Argus G. R., Terry P. C., Bramston P. & Dinsdale S. (2004) Measurement of mood in adolescents with intellectual disability. *Research in Developmental Disabilities* **25**, 493–507.
- Baker R. & Dowling Z. (1995) *Interact*. Research & Development Support Unit, Poole Hospital, Dorset.
- Candland D. (1977) The persistent problems of emotion. In: *Emotion* (eds D. K. Candland, J. P. Fell, E. Keen, A. I. Leshner, R. Plutchik & R. M. Tarpy), pp. 1–84. Wadsworth Publishing Co., Belmont, CA.
- Carr E. G., McLaughlin D. M., Giacobbe-Grieco T. & Smith C. E. (2003) Using mood ratings and mood induction in assessment and intervention for severe problem behavior. *American Journal on Mental Retardation* **108**, 32–55.
- Davis J. P., Judd F. K. & Herrmann H. (1997) Depression in adults with intellectual disability. Part 2: a pilot study. *Australian and New Zealand Journal of Psychiatry* **31**, 243–51.
- Duker P. C., Didden R., Korzilius H. & Van Acht M. (1996) Database problem behavior: a literature retrieval system for professionals dealing with problem behaviours of individuals with intellectual disabilities. *International Journal of Disability, Development and Education* **43**, 197–202.
- Erber R. & Erber M. W. (2000) Mood and processing: a view from a self-regulation perspective. In: *Theories of Mood and Cognition: A User's Handbook* (eds G. L. Clore & L. L. Martin), pp. 63–84. Lawrence Erlbaum Associates, Inc., Mahwah, NJ.
- Esbensen A. J., Rojahn J., Aman M. G. & Ruedrich S. (2003) Reliability and validity of an assessment instrument for anxiety, depression, and mood among individuals with mental retardation. *Journal of Autism and Developmental Disorders* **33**, 617–29.
- Green J. G., Smith R., Gardiner M. & Timbury G. C. (1982) Measuring behavioural disturbance of elderly demented patients in the community and its effects on relatives: A factor analytic study. *Age and Aging* **11**, 121–126.
- Harris P., Humphreys J. & Thomson G. (1994) A checklist of challenging behaviour: The development of a survey instrument. *Mental Handicap Research* **7**, 118–133.
- Lancioni G. E., O'Reilly M. F., Campodonico F. & Mantini M. (2002) Increasing indices of happiness and positive engagement in persons with profound multiple disabilities. *Journal of Developmental and Physical Disabilities* **14**, 231–7.
- Lancioni G. E., Singh N. N., O'Reilly M. F., Oliva D. & Basili G. (2005) An overview of research on increasing indices of happiness of people with severe/profound intellectual and multiple disabilities. *Disability and Rehabilitation* **27**, 83–93.
- Marston G. M., Perry D. W. & Roy A. (1997) Manifestations of depression in people with intellectual disability. *Journal of Intellectual Disability Research* **41**, 476–80.
- Matson J. L., Gardner W. I., Coe D. A. & Sovner R. (1991) A scale for evaluating emotional disorders in severely and profoundly retarded persons: development of the Diagnostic Assessment for the Severely Handicapped (DASH) scale. *British Journal of Psychiatry* **159**, 404–9.
- Mayer J. D., Gaschke Y. N., Braverman D. L. & Evans T. (1992) Mood-congruent judgment is a general effect. *Journal of Personality and Social Psychology* **63**, 110–32.
- Meins W. (1995) Symptoms of major depression in mentally retarded adults. *Journal of Intellectual Disability Research* **39**, 41–5.
- Moss S., Prasser H., Costello H., Simpson N., Patel P., Rowe S., *et al.* (1998) Reliability and validity of the PAS-ADD Checklist for detecting psychiatric disorders

- in adults with intellectual disability. *Journal of Intellectual Disability Research* **42**, 173–83.
- O'Reilly M. F., Lancioni G. E. & Emerson E. (1999) A systematic analysis of the influence of prior social context on aggression and self-injury within analogue analysis assessments. *Behavior Modification* **23**, 578–96.
- O'Reilly M. F., Lancioni G. E., King L., Lally G. & Dhommnaill O. N. (2000) Using brief assessments to evaluate aberrant behavior maintained by attention. *Journal of Applied Behavior Analysis* **33**, 109–12.
- Portney L. G. & Watkins M. P. (2000) *Foundations of Clinical Research. Application to Practice*, 2nd edn. Appleton & Lange, East Norwalk, CT.
- Reiss S. (1988) *Reiss Screen for Maladaptive Behavior Test Manual*. IDS Publishing Corporation, Worthington, OH.
- Ross E. & Oliver C. (2002) The relationship between levels of mood, interest and pleasure and 'challenging behaviour' in adults with severe and profound intellectual disability. *Journal of Intellectual Disability Research* **46**, 191–7.
- Singh N. N., Lancioni G. E., Winton A. S., Molina E. J., Sage M., Brown S., *et al.* (2004) Effects of snoezelen room, activities of daily living skills training, and vocational skills training on aggression and self-injury by adults with mental retardation and mental illness. *Research in Developmental Disabilities* **25**, 285–93.
- Tooth L. R. & Ottenbacher K. J. (2004) The kappa statistic in rehabilitation research: an examination. *Archives of Physical Medicine and Rehabilitation* **85**, 1371–6.

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## Appendix

Items included in *Interact Short Form* – People with ID version

### Emotional expression

- 1 Tearful/sad
- 2 Confused
- 3 Relaxed, content
- 4 Fearful/anxious
- 5 Happy/content

### Interests towards tasks

- 6 Did things out of own initiative
- 7 Attentive/focused
- 8 Bored, inactive
- 9 Enjoying self, active or alert

### Behaviours to environments

- 10 Related well to other staff/people
- 11 Wandering, restless or aggressive