

**The Interpersonal Communication Rating Protocol:  
A Manual for Measuring Individual Expressive Behavior  
ICRP-IEB  
Parkinson's Disease Version**

**Health Quality of Life Lab**

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## I. Description and Purpose of the Measure

The 20-item **ICRP-IEB (PD version)** was designed to measure nonverbal and verbal expressive behavior during the stream of naturalistic videotaped social interaction. Ratings are made of discrete actions, such as smiling, gesturing, bodily movement and vocal tone, that observers use as cues to form judgments about a target individual's emotions, thoughts, social motives and personality.

The purpose of the ICRP-IEB is to measure socially detectable behavior that 1) has expressive meaning within an interpersonal context, 2) is involved in the formation of observers' impressions of target individuals, and 3) may affect target or observer social quality of life (such as the caregiver of a target individual with Parkinson's disease). The ICRP-IEB is not concerned with detecting target behavior that can be observed only with highly sensitive tools (e.g., EMG detection of electrical muscular impulses) and are undetectable to the naïve social observer during daily life interpersonal interaction. It is aimed at assessing social expressive capacity or, on the other end of the spectrum, the loss of expressivity capacity. This loss of expressivity is referred to as *expressive masking* in the case of the movement disorder of Parkinson's disease.

The current items of the ICRP-IEB (PD version), their interrater reliability, and the rating form are provided in Appendices A, B and C. These items measure facial (items 1-7), bodily (items 8-11), vocal (items 12-17, 20) and verbal behavior (items 18, 19). Eighteen of the items generally are applicable to measuring expressive behavior in populations capable of at least minimal interpersonal engagement, regardless of health condition. Two items (7, 10) assess symptoms specific to movement conditions such as Parkinson's disease (difficulty closing the mouth during speech, and tremor). The general items can be used to assess normal variation in expressive behavior as well as disruption to normal expressive behavior due to pathological neurological conditions.

The methods underlying this measure were derived from the judgment study paradigm described by Robert Rosenthal (2005) and the subsequent development of this paradigm into the 'thin-slice' method (ratings of 30 sec or less of videotaped interaction) validated by Ambady and Rosenthal (1992) and Ambady et al. (2000). For the content of the original scales we drew upon research in expressivity (Bernieri et al., 1996; Kring & Sloan, 1991) and the social psychology of Parkinson's disease (Pentland, 1991; Pitcairn et al., 1990). We captured dimensions of facial masking that are represented in the facial expression item of the motor section of the Unified Parkinson's Disease Rating Scale (Fahn et al., 1987). The current version of the measure includes four facial behavior items (items 2, 3, 5 and 6) that were informed by the descriptions of eyebrow, cheek and lip actions in the Facial Action Coding System (FACS) of Ekman et al., (2002).

The methods for using this measure, described in Appendices D and E, require videotaping in order to enable several raters to independently rate a target's behavior for the same sample of the target's interpersonal interaction. These independently derived ratings are averaged to form a composite score that reliably indicates the socially detectable magnitude of the sampled behavior. Using this score, we can determine a) the types of behavioral cues that express target state and trait attributes, such as emotions, thoughts, social motives and personality, and the overall detectability of target attributes; b) what behavioral cues observers use to form impressions of target attributes; and c) patterns of accuracy and bias in observers' detection of target attributes. We often use a lens analysis model (Brunswick, 1955) to guide creation of coefficients that indicate how observers use target cues to ascertain psychological attributes of targets.

## II. Development of the Measure

The current ICRP-IEB (PD version) was developed over several studies with four samples that totaled 158 people with Parkinson's disease. The abstracts of relevant studies are found in Appendix F.

### Sample 1: ICRP version 1

Tickle-Degnen and Lyons (2004) and Lyons and Tickle-Degnen (2005) conducted studies using the first version of the ICRP:

- Targets: 1 woman and 5 men with PD who varied in facial masking: American Caucasians
- Clips: 15 clips per target of 30-90 second duration with a total viewing time of 10 minutes per target
- Number of ICRP raters: 3
- Interpersonal context: Target discusses challenges in daily life activities with trained interviewer.

### Reliability (ICRP version 1)

The first version consisted of 23 items, each rated along a 5-point Likert scale (1= low intensity/duration/frequency, 5 = high). Lyons and Tickle-Degnen (2005) found that all items except eye movement achieved acceptable effective reliability of > .70. Raters reported poor video resolution for eye movement. Effective reliability of remaining items ranged from .73 to 1.00.

	Mean reliability (single rater)	Effective reliability (average of 3 raters)
<b>Facial Behaviors</b>		
Expressivity	.83	.94
Smiling	.94	.98
Eyebrow furrowing	.87	.95
Eye movement	-.13	-.51
Blinking	.47	.73
<b>Body Behaviors</b>		
Head movement	.65	.85
Overall amount of movement	.93	.98
Fluidity of movement	.79	.92
Posture shifting	.94	.98
Body swaying	1.00	1.00
Slouching posture	.48	.73
Tremors	.66	.85
Gesturing	.91	.97
<b>Vocal Behaviors</b>		
Vocal inflection	.72	.89
Articulation	.82	.93
Loudness	.69	.87
Vocal speed	.47	.73
Laughing	.97	.99
<b>Verbal Behaviors</b>		
Participant talkativeness	.63	.84
Interviewer talkativeness	.68	.86
Participant assertiveness	.88	.96
Positive content	.75	.90
Negative content	.74	.90

**Validity (ICRP version 1)**

- Lyons and Tickle-Degnen (2005) correlated each ICRP item with target self-ratings of expressive behavior as well as Unified Parkinson's Disease Rating Scale (UPDRS: Fahn et al., 1987) motor items of facial expressiveness, posture, and speech. The ICRP version 1 scales demonstrated convergent and discriminant validity with target self-ratings as well as observed ratings using the UPDRS. The study also provided validation for the ability to self-report expressive behavior among people with PD, a finding consistent with other research (Mikos et al., 2009).
- Tickle-Degnen and Lyons (2004) examined 80 health care practitioners' judgments of target personality. Their findings provided support for the construct validity of the ICRP as a measure of behavioral cues that systematically express target psychological attributes and of cues that are used by others to form impressions of target psychological attributes. Specifically they found that practitioners tended to overuse facial, bodily and vocal masking (what they called 'expressive masking') in their judgments of patient personality as measured on the NEO-Five Factor Inventory (Costa & McCrae, 1992) especially in the socio-emotional domains of personality (e.g., extraversion and neuroticism).

## Sample 2: ICRP version 2

Lyons and colleagues (2003, 2004a, 2004b, 2005; and Degroat et al., 2006) conducted lens analysis studies on 12 people with PD. These studies continued to support the reliability and validity for the items and method underlying the ICRP measures.

- Targets: 6 women and 6 men who varied in facial masking: American Caucasians
- Clips: Target behavior was rated every 10 seconds during one 2-minute clip per target
- Number of ICRP raters: 4
- Interpersonal context: Target describes favorite activities with trained interviewer.

### **Reliability (ICRP version 2)**

Lyons (2003) created a second version of the ICRP, which contained 24 items that:

- did not include four ICRP ver. 1 scales: eye movement, participant assertiveness (verbal), positive content (verbal), negative content (verbal);
- retained the remaining 19 ICRP ver. 1 scales: expressivity, smiling, eyebrow furrowing, blinking, head movement, overall amount of movement, fluidity of movement, posture shifting, body swaying, slouching, tremors, gesturing, participant talkativeness, interviewer talkativeness, vocal inflection, articulation, loudness, vocal speed, and laughing;
- added five new scales: topic control (verbal), humor (verbal), attentiveness (engaged in conversation), neatness of appearance, formality of dress.

Raters achieved adequate effective interrater reliability (average of 4 raters) on the 24 single item rating scales. This reliability ranged from .47 to .97 with an average of .87 (Lyons et al, 2004a). The single item measures that fell below .70 reliability were: fluidity of movement (.48), body swaying (.62) and slouching posture (.47). All others were > .77 (Lyons, 2003, in her Appendix K).

For further lens analyses, Lyons created behavioral composites from items that were highly correlated. She retained single scales as separate items if they showed low correlation with other scales:

- Positive expressivity: a composite of expressivity, smiling, laughing, and use of humor. (Effective interrater reliability (ICC) = .96. Internal consistency alpha = .94)
- Body activity: a composite of overall amount of movement, gestures, posture shifting and head movement (ICC = .98; alpha = .91)
- Vocal legibility: a composite of articulation, inflection, and loudness (ICC = .94; alpha = .88)
- Conversation engagement: a composite of talkativeness, vocal speed, topic control, and attentiveness (ICC = .94; alpha = .92)

Single scale items were the following:

- Eyebrow furrowing (ICC = .84)
- Blinking (ICC = .96)
- Slouching (ICC = .47)
- Tremor (ICC = .78)
- Body swaying (ICC = .62),
- Formality of dress (ICC = .90)
- Neatness of appearance (ICC = .77)

**Validity (ICRP version 2)**

Construct validation of version 2 was supported in the following study findings:

- 1) Lyons et al. (2004a) found expressive behavioral cues to indicate PD normal personality attributes in a manner that was “plausible” and “intuitive.”
- 2) Lyons et al. (2004b) generally replicated Tickle-Degnen and Lyons (2004) study in showing that practitioners appeared to use valid behavioral cues to accurately infer PD personality except for personality domains that were specifically socio-emotional in nature (i.e., extraversion and neuroticism). Lyons et al. provided further evidence that expressive masking contributed to interfering with the accurate detection of socio-emotional attributes in PD.
- 3) DeGroat et al. (2006) developed a coding scheme for identifying the quality and type of favorite activities that targets described in their videotaped interviews. After demonstrating that the coding scheme achieved adequate interrater reliability (e.g. single rater reliability = .66 for positive tone and .77 for negative tone of description about activities), the verbal content about favorite activities was related to target mood and personality. Lyons et al. (2005) further demonstrated that practitioners used verbal cues appropriately for personality domains (openness to experience, agreeableness and conscientiousness) except for the domains of extraversion and neuroticism. For example, extraversion was indicated by describing an activity that occurred in the public domain, while neuroticism was indicated by negatively-toned words describing the activity. These studies suggested that practitioners tend to rely on behavior other than verbal content when determining socio-emotional attributes of people with PD. Specifically they rely on and misinterpret nonverbal behavior.



### **Sample 3: ICRP version 3**

The third version of the ICRP, and the one currently in use, was developed on Samples 3 and 4. Sample 3 studies are described here and Sample 4 studies are described in the next section. Sample 3 came from a database of videotaped baseline interviews of 116 community-living people with PD who participated in a randomized controlled trial that tested the efficacy of self-management rehabilitation with individuals early in their disease, at Hoehn & Yahr 2.0 to 3.0, mode=2.0 (Tickle-Degnen et al., 2010a).

- Targets: 35 women and 81 men who varied in facial masking: 97% American Caucasians
- Clips: Two clips each of 20 second duration per target, with ratings made once per clip (except for Huang et al., 2006, see below).
- Number of ICRP raters: 4 raters (except for Huang et al., 2006, see below).
- Interpersonal context: (1) in one clip, the target discussed a challenging or frustrating event experienced in past week, and (2) in the other clip discussed an enjoyable or satisfying event experienced in past week.

Studies reported below are of sub-samples taken from baseline clips of participants who had consented for their tapes to be utilized for studies other than those undertaken to directly study the efficacy of rehabilitation. Although all clips from the Tickle-Degnen et al. study (2010) have been rated using the ICRP version 3 for each participant for each of four assessment periods (baseline, 6 weeks post intervention, 2 months follow-up, and 6 months follow-up) for an approximate total of 928 clips (116 participants x 2 clips x 4 assessment periods), we have not yet conducted statistical analyses using all of these clips.

#### **Reliability (ICRP version 3)**

Two studies contributed to item development and testing of the interrater reliability of the ICRP:

- 1) Huang et al. (2006) tested the cross-cultural interrater reliability of 8 scales used in both ICRP versions 1 and 2. With minor wording variation these scales were facial expressivity, smiling, eyebrow furrowing, blinking, body (including head and trunk) movement, slouching posture, tremors and gesturing with arms. He added a 9<sup>th</sup> new scale—lifting of eyebrows. This addition was intended to correct earlier versions of the ICRP in which eyebrow furrowing confounded *furrows between the eyebrows* (i.e., vertical frown lines) with *horizontal furrows across the forehead*. This distinction was informed by the work of Ekman et al. (2002) on forehead action units. Huang's design was as follows:
  - Targets: 2 Taiwanese women and 2 Taiwanese men with PD (from a pilot interview study in Taiwan), and 2 American women and 2 American men with PD from Sample 3.
  - Clips: One 2-min clip per target
  - Number of ICRP raters: Two sets of raters, with each set containing 3 Taiwanese raters and 3 American raters, for a total of 6 Taiwanese and 6 American raters.
  - Interpersonal context: Discussion of daily life or enjoyable activities

The primary cross-cultural findings were as follows:

- a. Taiwanese and American raters had similarly high magnitudes of interrater reliability when using the following 7 of the 9 scales: tremors, gesturing, smiling, expressivity, lifting of eyebrows, body movement, and blinking. In both ethnic rater groups, the average of the ratings of 4 or less raters was required to achieve a criterion of .70 effective reliability for these scales.

- b. Taiwanese and American raters differed in interrater reliability for one scale: slouching. Taiwanese achieved the criterion effective interrater reliability of .70 with 2 raters, while Americans required 6 raters to achieve this criterion.
  - c. Both raters had difficulty achieving the effective reliability criterion for eyebrow furrowing.
  - d. Huang et al. concluded that, in general, ethnicity of rater did not appear to moderate interrater reliability when judging American and Taiwanese patients' nonverbal behavior. His follow-up interviewing of the raters suggested that the primary problems in achieving the criterion reliability for eyebrow furrowing and slouching were due to other methodological factors:
    - i. lower variability of these behaviors relative to others in this small sample of patients
    - ii. clarity of the behavior in the videotaped segment-- the frontal perspective made the perception of 'slouching' difficult
    - iii. eye glasses and confusion about the meaning of "furrowing" made the rating of eyebrow furrowing difficult.
  - e. Primary outcomes of this study were 1) continued revision of the eyebrow scales, 2) improvement of rater training protocol with respect to these and other scales, and 3) support for the cross-cultural reliability of the ICRP.
- 2) Takahashi and colleagues (2008, 2010) created the third version ICRP, with 20 items, based upon previous ICRP studies and Ekman et al.'s (2002) work on facial action units. The items informed by Ekman et al. are not coded using their methods of moment-to-moment serial coding by one coder at snapshots in time. Rather a group of ICRP raters each provide one rating of the gestalt impression of the intensity/duration/frequency of each action unit over the entire duration of the clip and these ratings are averaged. The item descriptions are in Appendix A, and the rating form is in Appendix C. Revisions from previous versions are summarized below:
- a. *Active expressivity in the face*: label and description revision to improve clarity
  - b. *Eyebrows raising*: label and description revision to improve clarity (Ekman et al., 2002)
  - c. *Eyebrows pulling together*: label and description revision to improve clarity (Ekman et al., 2002)
  - d. *Blinking*: description revision to improve clarity
  - e. *Cheek raising*: replaces *smiling* as one of the movement components of a genuine happiness smile (Ekman et al., 2002)
  - f. *Lip corner puller*: replaces *smiling* as one of the movement components of several different types of smiling (Ekman et al., 2002)
  - g. *Active mouth closure during speech*: added as a specific speech symptom of PD
  - h. *Movement in trunk & head*: replaces several general bodily movement items (*head movement, overall amount of movement, fluidity of movement, posture shifting, and body swaying*). Label and description revision clarifies that this item does not include extremity movement (which was confused with tremor and gesturing) or facial expression movement (Huang, et al., 2006)
  - i. *Forward slouching*: label and description revision to disambiguate normal relaxed posture from parkinsonian posture of trunk flexion
  - j. *Tremors*: minor description revision
  - k. *Gesturing with arms*: label revision to improve clarity (Huang et al., 2006)
  - l. *Client talkativeness*: minor description revision
  - m. *Vocal inflection*: minor description revision
  - n. *Articulation*: minor description revision
  - o. *Loudness*: minor description revision
  - p. *Vocal speed*: minor description revision
  - q. *Laughing*: minor description revision
  - r. *Positive content*: description revision to simplify and clarify

- s. *Negative content*: description revision to simplify and clarify
- t. *Topic control*: minor description revision

Items from previous versions that were not replaced with new scales include: *interviewer talkativeness* (which was inversely related to *client talkativeness*), scales related to physical appearance (*neatness, formal dress*), and scales that rate ‘macro’ or ‘molar’ social impressions (*attentiveness, humor*).

Whereas in versions 1 and 2, raters made all ratings using the full audio-video channel (face, body, voice and speech), raters of version 3 rated Sample 3 nonverbal facial and bodily behavior with no audio (sound turned off) and rated vocal and speech behavior with no video (video window minimized).

**The interrater reliability of version 3 from Sample 3 is reported in Appendix B.** All but three items achieved criterion effective interrater reliability of  $\geq .70$  with the average of the ratings of 4 raters. Findings suggest that two items, *eyebrows pulling together* and *blinking*, require 5 raters to achieve this criterion. One item, *active mouth closure during speech*, may require specialized training in speech and language pathology to achieve adequate reliability. Nevertheless, this item conceptually represents an important component of facial expressiveness when a person is speaking. Poor mouth closure due to PD can look like a condition of inadequate personal, cognitive or social control (as in drunkenness).

### Validity (ICRP version 3)

Construct validation of version 3 was supported in the following study findings:

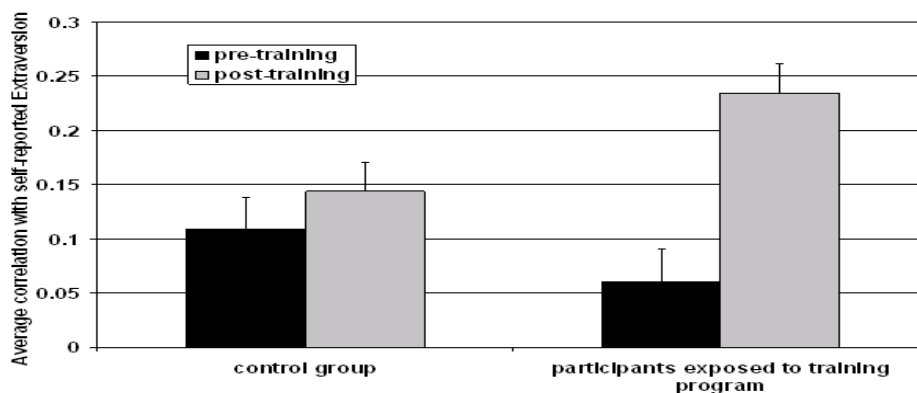
- 1) Takahashi (2008, Takahashi et al., 2010) found that tasks and interview contexts that elicit different levels of comfort and enjoyment demonstrate different task dynamics with respect to expressive masking. Some primary findings were the following:
  - a. Interviewees with PD displayed more genuine smiles of happiness (higher degrees of *lip corner puller* and *cheeks raised*), more *positive content* in their speech, and less *negative content* when speaking about enjoyable rather than frustrating topics.

- b. With Linguistic Inquiry Word Count (LIWC) software (Pennebaker et al., 2001), counts of motivational affect words (hopefulness, apathy, hopelessness, and protest) during interviewee speech of enjoyable vs. frustrating topics contained more words of hopefulness and less words of hopelessness and protest.

Behavior by topic of discussion	Enjoyable Topic	Frustrating Topic	Test of Difference
Measure	M (SD)	M (SD)	F test
<b>LIWC: Word Count</b>			
Hopefulness	2.3 (2.8)	0.9 (1.6)	4.49*
Apathy	0.2 (0.8)	0.5 (1.3)	2.77
Hopelessness	0.2 (0.8)	1.2 (1.8)	3.97*
Protest	0.1 (0.4)	1.0 (1.7)	8.70**
<b>ICRP-IEB Items: Rating from low (1) to high (5)</b>			
Facial expressivity	2.7 (1.0)	2.5 (0.8)	8.28**
Lip corners up	2.1 (0.8)	1.8 (0.6)	20.12**
Cheeks raised	2.1 (1.0)	1.8 (0.7)	17.61**
Positive speech content	2.9 (0.9)	1.1 (0.3)	264.24**
Negative speech content	1.1 (0.3)	2.7 (0.9)	273.39**
N = 106, * $p < .05$ , ** $p < .01$			

- c. Rated nonverbal behavior was more related to full channel (nonverbal and verbal combined) ratings of motivational behavior than rated/verbal behavior, indicating that nonverbal behavior (including facial and expressive masking) exerts a more powerful influence on perceived behavior than verbal behavior, a finding consistent with much nonverbal behavior research.
- d. Although level of expressive behavior varied by context, nonverbal expressive behavior during one topic of the conversation (e.g. enjoyable) was highly correlated with interviewee nonverbal expressive behavior during another topic (frustrating), demonstrating internal consistency of interviewee behavior within an interview.
- 2) Huang (2009, Huang et al., 2009) examined the relationships between facial expressiveness in PD as measured on, rapport behavior, and quality of life. Research assistants rated the extent to which 31 women and 73 men were capable of fulfilling the rapport components of attentiveness, positivity, and mutual coordination with an interviewer. Patients rated their quality of life.
- a. Facial expressiveness in women and men was positively correlated with rated capacity for showing rapport behavior (a composite of attentiveness, positivity, and coordination). Though differences between men and women were not significant, the findings suggest that when discussing a positive topic, women's facial expressivity is a more important element of rapport building (.62) than is men's expressivity (.24). Facial expressiveness is important in dyadic interactions, possibly more so for women than men when the interaction should generate displays of happiness.
- b. Huang also found non-significant differences between women and men in the magnitude of the association between facial expressiveness and quality of life. With increasing facial expressiveness women had less quality of life problems (-.28) whereas facial expressiveness in men showed no predictive relationship to quality of life (.00). Similarly, with increasingly competent display of rapport behavior, women had less quality of life problems (-.28), while this association was of a smaller magnitude in men (-.14). Mediation analyses were inconclusive and non-significant.
- 3) Based on findings about valid cues of PD personality, as measured by the ICRP, Gray and Tickle-Degnen (2007, unpublished data) developed a training program for practitioners to improve accurate detection of extraversion in PD. Student rehabilitation practitioners exposed to the training were instructed to look beyond the Parkinsonian mask and attend more carefully to the social content of target speech. Exposure to the training program improved ability to infer extraversion on the basis of first impressions (taller bars indicate greater sensitivity), compared to controls. Training studies are in progress.

Correlation of expressivity with rated rapport behavior		
Interview topic	Women	Men
Positive	.62	.24
Negative	.40	.44



### **Sample 4: ICRP version 3**

Sample 4 is from a cross-cultural study conducted by Tickle-Degnen et al. (2010b) in Taiwan and America that studied the effect of facial masking on health care practitioner (N=284) judgments of psychological attributes of the targets. ICRP version 3 ratings were conducted.

- Targets: 12 women and 12 men: 50% Asian Taiwanese, and 50% American Caucasians, balanced across gender and near-normal facial expressivity vs. moderate degrees of facial masking. Community living adults in earlier stages of PD (H&Y, M = 2.1, SD = 0.56, range 1-3), averaged 67.5 yrs old (SD = 8.12, range 54-81), and 5.7 yrs in duration of the disease (SD = 3.22, range <1-11).
- Clips: One clip each of 80 second duration per target, with ratings made once per clip. Target speech content (Mandarin Chinese or native Taiwanese in Taiwan, and American English in America) was electronically filtered from the audio channel of the clips by using a low-pass band at 400 Hz, which preserved vocal prosody.
- Number of ICRP raters: 4 raters using items #1-17 (items 18-20 not used because speech content was filtered from the clips for this sample).
- Interpersonal context: Discussion of enjoyable or satisfying event experienced in past week.

#### **Reliability (ICRP version 3)**

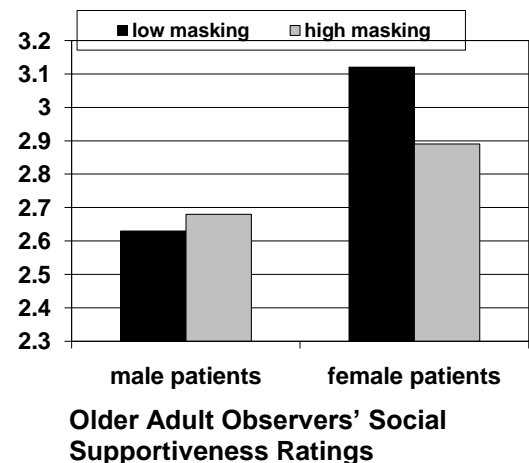
**The interrater reliability of version 3 from Sample 4 is reported in the second page of Appendix B.** The item of active mouth closure, similar to Sample 3, had the lowest interrater reliability, while others reached .70 reliability or approached this criterion. A principal component analysis (PCA) suggested two internally consistent sub-scales in this 17-item version: a positive affect facial expressivity scale consisting of *cheek raising*, *lip corner puller* and *laughing*, and an expressive talkativeness scale consisting of *vocal speed*, *gesturing with arms*, *client talkativeness* and *vocal inflection*.

#### **Validity (ICRP version 3)**

Construct validity was supported in the following study findings:

- 1) In the PCA (Appendix B, Sample 4), complex variable patterns that had meaningful interpretations suggested that the ICRP was differentiating different forms of expressivity and action. *Active expressivity in the face* loaded on two components-- a component of positive affect facial expressivity and a component related to brow activity, suggesting that active facial expressivity was not confounded with positive affect only and occurred even in the presence of non-positive affect. *Movement in the trunk and head* was a correlate of expressive talkativeness. Targets who were expressive talkers moved more in their bodies. *Blinking* showed associations with positive affect facial expressivity, active mouth closure and loudness during speech and expressive talkativeness, consistent with low disease severity in PD, specifically low rigidity and bradykinesia. *Eyebrows raising* seemed to be a nonverbal correlate of both facial and vocal expressivity, regardless of positive or negative affect. *Eyebrows pulling together*, on the other hand, was not a correlate of positive affect facial expressivity, a finding consistent with its typical association with frowning and concentration. The distinction between the patterns of association for eyebrows raising and eyebrows pulling together, suggests that the most current revisions to the ICRP that were informed from Ekman et al.'s work (2002) on eyebrow activity have improved the construct validity of the ICRP measurement of brow movement.

- 2) At screening targets had been assigned a preliminary score using the Unified Parkinson's Disease Rating Scale – Facial Expression (UPDRS-F) score, with 0 = normal to 4 = masked or fixed face, lips parted ¼ of inch or more with complete loss of expression (Fahn et al., 1987). Final masking assessment was completed by five trained researchers, who independently rated each video clip on a 5-point scale (1= low to 5= high duration, intensity or frequency) on five items -- eye and forehead expressivity, blinking, lower face expressivity, open lips when not speaking, and changing emotion in the face-- with adequate effective interrater reliability (ICC range= .78 – .88). The ratings were combined into a facial masking composite (Cronbach's  $\alpha = .86$ ). Another set of four trained raters used the ICRP-version 3 to rate the tapes. **The single item ICRP-version 3 active expressivity in the face correlated with the masking composite at  $r = -.92$** , demonstrating that the single facial expressivity item on the ICRP performed as well as the composite in measuring individual variation in facial expressivity.
- 3) Tickle-Degnen et al. (2010b) demonstrated that health care practitioners in Taiwan and America were biased by masking in their judgments of depression, sociability, social supportiveness and cognitive competence, relative to tested patient attributes. Targets with moderate masking were perceived as more depressed, less sociable, less socially supportive and less cognitively competent compared to targets with near-normal expressivity, despite no average differences between the two groups. Effect size  $r$ 's were very large and ranged from .76 through .87 ( $p$ 's < .0001). Judgments toward women across cultures were more biased than those toward men, especially in culturally valued attributes. The study suggests a global tendency to use facial expressivity in forming pre-diagnostic impressions of people with PD. It appears that the facial mask violates gender and cultural norms about facial expressivity and stigmatizes individuals along attributes that are most valued within a culture.
- 4) Hemmesch et al. (2009) demonstrated similar findings for older adults' impressions of the American targets. She found that masking was detrimental to the perceived social supportiveness of targets and their perceived value as a relationship partner. In addition, Hemmesch showed that accuracy of evaluating target social supportiveness was lower in those targets who had moderate facial masking than in those with near normal expressivity.



- 5) Bogart et al. (2010) evaluated the target and practitioner data to examine the moderating effect of culture on practitioner accuracy in perceiving target personality. The study tested three possible mechanisms for the influence of culture on practitioners' accuracy of personality judgments relative to the self-reports of people with PD: universality of trait encoding and decoding, ingroup recognition advantage, and variation in trait importance. Findings demonstrated that behavioral cue use (as measured with the ICRP-version 3) varied by culture in general. However across cultures facial expressivity (or masking) was the most highly utilized cue for assessing personality. The pattern of cultural differences supported the mechanism of variation in trait importance as the primary moderator of trait judgment accuracy.

### III. Strengths and Limitations of the Measure

The ICRP-version 3 assesses dynamic expressive behaviors that are commonly employed by observers when forming impressions of people with PD and others. The majority of the items are rated reliably with four or fewer raters. Studies consistently find that the measure is sensitive to individual variation in target expressiveness and in observer's utilization of behavioral cues when forming impressions. Convergent validity with UPDRS-F, target patient self-report items and speech content coding is supported. Construct validity is supported in lens analyses that show there to be an association between behavioral cues measured with the ICRP and target personality. Observers' use of cues across several studies points to an over utilization of facial expressivity when forming impressions of people with PD. In summary, the body of evidence to date suggests that the measure is useful for studies directed toward understanding the social and psychological aspects of living with PD.

There is less evidence for the use of the measure in studies designed to evaluate biological pathological processes in PD. However with respect to the symptom of facial masking, the metric properties of the ICRP measure in general may provide advantages, particularly for research, over the original and newly revised versions of the UPDRS-F (Fahn et al., 1987; Goetz et al., 2008), which is commonly used in clinical practice and clinical research. The UPDRS-F consists of one five-point severity of masking scale that does not differentiate action units within the face. There is some evidence in the literature that differentiation of facial actions is important to understanding PD pathology, emotions and problems in action unit coordination within the face (e.g., Bowers et al, 2006; Pitcairn et al., 1990). In addition the ICRP involves more than one independent rater, which contributes to interrater reliability, while the UPDRS-F commonly employs one rater.

Continued development of the PD version of the ICRP is warranted to address, for example, the following questions:

- 1) How could the items of *active mouth closure during speech* and *forward slouching* be improved to more reliably and validly capture these socially important behaviors?
- 2) Are items within a 'communication channel' such as facial items, body items, or vocal items actually measuring different behavioral elements of the channel, or are they consistently measuring non-independent aspects of a gestalt impression of the communicative expressivity of that channel? For example, are ICRP raters able to differentiate *lip corner puller* from *cheek raising* as do trained FACS coders (Ekman et al., 2002)?
- 3) Most of our work has focused on expressive items that commonly have 'normal' personality or emotional meaning in conditions that do not involve movement disorders. If we continue to explore stigmatization in PD, it will be important to develop items related to tremor and abnormal movement of other types. For example, what items should be designed to adequately capture different qualities and locations of tremor and other forms of abnormal movement? How do these abnormal movements contribute to impression formation?

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## APPENDIX A

### ITEMS

Each rater judges the gestalt degree of intensity/duration/frequency of 20 types of target expressive behavior depicted in each clip using a 5-point Likert type scale: 1 = *low*, 2 = *fairly low*, 3 = *medium*, 4 = *fairly high*, 5 = *high*. Raters use the following descriptions of behavior during training and retain a copy of this form for use as needed throughout the rating of study targets. They are allowed to watch the clips as many times as needed to make the rating.

The variable descriptions ask raters to consider one or more of the following:

**Frequency:** how often a behavior or movement occurs

**Duration:** how long a behavior or movement lasts

**Intensity or degree:** refers to the strength, force, or level/amount of emotion or movement

#### Description of items

1) **Active expressivity in face:**

1 = primarily one emotional expression “plastered” on the face, with low to no movement or change

5 = highly active, animated, mobile and moving face with changing emotional expressions

2) **Eyebrows raising:**

1 = absent or weak, very infrequent upward raising of eyebrows

5 = frequent, active, animated eyebrows raising, horizontal furrow across forehead

3) **Eyebrows pulling together:**

1 = absent or weak, very infrequent pulling of eyebrows together

5 = frequent, active, animated eyebrows pulling together, wrinkles between the eyebrows

4) **Blinking:**

1 = no to extremely infrequent closing/opening of eyelids

5 = extremely frequent

5) **Cheek raising:**

1 = absent or weak, very infrequent raising of cheek

5 = frequent, active, animated cheek raising, crow’s feet lines or wrinkles in the eye corners

6) **Lip corner puller:**

1 = absent or weak, very infrequent lip corner puller

5 = frequent, active, animated pulling the corners of the lips back and upward, deepen infraorbital furrow

7) **Active mouth closure during speech:**

1 = rarely closed mouth during speech

5 = very frequent active mouth closure during speech, between words and sentences

**8) Movement in trunk & head;**

- 1 = no to very infrequent movement of trunk and head, excluding movement in extremities or within face
- 5 = moved very often

**9) Forward slouching;**

- 1 = a primarily erect and/or relaxed backward posture
- 5 = severity drooping forward curl to trunk and neck of long duration

**10) Tremors;**

- 1 = a lack of tremor of any limb, the head, or the chin, or a tremor that appears only momentarily
- 5 = a strong, high amplitude tremor that is of long duration

**11) Gesturing with arms;**

- 1 = no noticeable to very infrequent gesture (nonverbal acts that replace, illustrate, or punctuate speech)
- 5 = very frequent gestures and/or used large amplitude gestures

**12) Client talkativeness;**

- 1 = very low amount of time spent in speaking during the entire clip
- 5 = high amount of time speaking

**13) Vocal inflection;**

- 1 = "monotone" vocal quality and undetectable changes in pitch and tone
- 5 = very animated, demonstrating changes in pitch and tone of voice

**14) Articulation;**

- 1 = nearly impossible to understand the words for most of the clip
- 5 = speaks clearly and distinctly

**15) Loudness;**

- 1 = speaks very softly, bordering upon a whisper
- 5 = speaks very loudly, bordering upon a shout during the entire clip

**16) Vocal speed;**

- 1 = a very slow rate of speech that has audible pauses throughout the entire clip
- 5 = extremely rapid, frequently running words together without pauses in between

**17) Laughing;**

- 1 = never laugh or use a weak, barely noticeable or brief laugh
- 5 = laughs often, for a long time, and/or uses a hearty laugh

**18) Positive content:**

- 1 = speaks rarely about positive or happy things
- 5 = speaks primarily about positive or happy things

**19) Negative content:**

- 1 = speaks rarely about negative or unhappy things
- 5 = speaks primarily about negative or unhappy things

**20) Topic control:**

- 1 = no obvious role in directing the topic and pacing of the conversation
- 5 = the participant completely directed the flow and course of the conversation throughout the clip

**APPENDIX B****SAMPLE 3: INTERRATER RELIABILITY**

Mean reliability (for 1 rater) and effective reliability (for average of 4 raters) on 216 clips extracted from interviews of people with PD (summarized in Takahashi, 2010).

Rating scale	ICC (n = 1 rater)	ICC (n = 4 raters)
1. ACTIVE EXPRESSIVITY IN FACE	.67	.89
2. EYEBROWS RAISING	.59	.85
3. EYEBROWS PULLING TOGETHER	.32	.65
4. BLINKING	.36	.69
5. CHEEK RAISING	.62	.87
6. LIP CORNER PULLER	.59	.85
7. ACTIVE MOUTH CLOSURE DURING SPEECH	.12	.35
8. MOVEMENT IN TRUNK & HEAD	.62	.87
9. FORWARD SLOUCHING	.48	.79
10. TREMORS	.71	.91
11. GESTURING WITH ARMS	.74	.92
12. CLIENT TALKATIVENESS	.54	.82
13. VOCAL INFLECTION	.40	.72
14. ARTICULATION	.53	.82
15. LOUDNESS	.42	.75
16. VOCAL SPEED	.40	.73
17. LAUGHING	.76	.93
18. POSITIVE CONTENT	.59	.85
19. NEGATIVE CONTENT	.57	.84
20. TOPIC CONTROL	.42	.74

**SAMPLE 4: PRINCIPAL COMPONENT ANALYSIS (PCA) & RELIABILITY**

Variables formed from PCA with ICRP items #1-17 on 24 interview clips (speech content filtered) of Taiwanese and American people with PD. Effective reliability (for average of 4 raters) for each ICRP item is reported, and internal consistency for composite variables (unpublished data analysis).

Variables	ICRP version 3 item	Component					Effective 4-rater reliability	Composite internal consistency
		1	2	3	4	5		
Positive affect facial (Composite)	cheek raising	0.97					0.87	0.95
	lip corner puller	0.95					0.61	
	laughing	0.90					0.95	
Active expressivity in face	active expressivity in face	0.80			0.40		0.94	--
Expressive talkativeness (Composite)	vocal speed		0.79				0.61	0.78
	gesturing with arms		0.74				0.94	
	client talkativeness		0.74				0.80	
	vocal inflection		0.64				0.64	
Active mouth closure during speech <sup>a</sup>	active mouth closure during speech			0.83			0.48	--
Loudness <sup>a</sup>	loudness			0.82			0.68	
Forward slouching <sup>a</sup>	forward slouching				0.86		0.91	--
Tremors <sup>a</sup>	tremors				-0.63		0.90	
Postural variation while talking expressively	movement in trunk and head		0.61		0.57		0.84	--
Fluid blink (low rigidity)	blinking	0.45	0.40	0.48			0.78	--
Eyebrows pulling together	eyebrows pulling together					0.92	0.89	--
Expressive brow raising	eyebrows raising	0.57	0.41	0.58			0.90	--

<sup>a</sup> Not formed into composites, though loaded together on a component, because of poor internal consistency or conceptual validity.

## APPENDIX C

## RATING FORM COMPLETED BY EACH RATER FOR EACH CLIP

Clip #:		Rater Name:				Date:			
			times watched	Low	Fairly Low	Medium	Fairly High	High	
Video only	1	Active expressivity in face		1	2	3	4	5	
	2	Eyebrows raising		1	2	3	4	5	
	3	Eyebrows pulling together		1	2	3	4	5	
	4	Blinking		1	2	3	4	5	
	5	Cheek raising		1	2	3	4	5	
	6	Lip corner puller		1	2	3	4	5	
	7	Active mouth closure during speech		1	2	3	4	5	
	8	Movement in trunk & head		1	2	3	4	5	
	9	Forward slouching		1	2	3	4	5	
	10	Tremors		1	2	3	4	5	
	11	Gesturing with arms		1	2	3	4	5	
Audio only	12	Client talkativeness		1	2	3	4	5	
	13	Vocal inflection		1	2	3	4	5	
	14	Articulation		1	2	3	4	5	
	15	Loudness		1	2	3	4	5	
	16	Vocal speed		1	2	3	4	5	
	17	Laughing		1	2	3	4	5	
	18	Positive content		1	2	3	4	5	
	19	Negative content		1	2	3	4	5	
Audio and Video	20	Topic control		1	2	3	4	5	

## APPENDIX D

### STEPS FOR USING AND SCORING THE MEASURE

1. **Targets are videotaped during standardized social interactions.** Cameras are positioned to show a frontal view of the sitting torso in most of our studies. Hanging microphones are ideal for individuals with movement disorders and do not impede naturalistic social interaction.
2. **A segment of the videotaped interaction is chosen for analysis. The segment should contain social behavior that is relevant to the specific aims of the research study.** Clips are selected systematically. We find that clips of 20 seconds duration provide adequate nonverbal and verbal information to reliably and validly assess interpersonal behavior, although clips may be of a different duration. Clips can be taken from any naturalistic social interaction. Typically, we have chosen clips from a videotaped interview in which a standardized question has been asked or a topic of discussion has been posed by a trained interviewer. Topics include the following:
  - a. Description of daily activities.
  - b. Favorite activities
  - c. Challenging or frustrating event experienced in the last week
  - d. Enjoyable or satisfying event experienced in the last week
3. **A single short clip or a series of clips are extracted from the representative portion of each target's videotaped interaction.** The clip or clips are selected systematically across all targets to represent points at which targets are most engaged in the topic of the conversation or task.
4. **Clips are arranged on a DVD or electronic presentation file in an order that is relevant to the aims of the specific research study.** Clips are arranged on the DVD in random or systematic order. Typically the clips are ordered randomly or in blocked randomization to balance different features of the targets (e.g., gender or culture). Clips are edited on to the DVD with each clip preceded by a black clip showing the clip number that is about to be rated (3 sec duration), followed by the clip itself, followed by black space (3 sec duration) before the next clip number is shown.

There are alternative methods for performing the ratings of different channels;

- a. Create separate clips for video channel only, audio channel only and combined A/V clips and arranged in random order on DVD within blocks (i.e., randomized within each channel condition). This procedure requires that each target clip be presented three times, one for each channel condition. This method provides the most discrimination between the audio and video ratings.
- b. Create one clip per target and arrange in random order on the DVD. First, raters rate all clips in the video only channel (audio turned off for items 1- 11). Second, they replay the DVD and rate all clips in the audio only channel (video window minimized for items 12- 19). Third, they replay the DVD and rate all clips with combined audio/video (item 20). Compared to the method described in (a) above, in which different channel clips are each separately randomly organized, this method presents the clips in the same order for each channel rating. Raters report that when they are making the second pass (audio only) they have not remembered what the person looks like or the manner in which they behaved in the video only channel. Therefore, this method may adequately discriminate the behavior in the two channels; however, raters may not be consciously aware that their audio ratings are being influenced by their previous set of video ratings.



- c. An additional option is to content-filter the audio channel of clips for ratings of items 12-17 or for items 1-17. This method removes the speech content from the audio channel and preserves nonverbal/paralinguistic aspects of speech production (Van Bezooijen & Boves, 1986).
5. **Research assistants are trained to rate the clips with the ICRP-IEB** (See Appendix E for an example):
- a. At least four research assistants are selected for rating behavior in the clips.
  - b. Training generally consists of three sessions of a total of approximately five hours for 1) explanation and description of the ICRP, 2) sensitization to visual and audio nonverbal and verbal channels of behavior, 3) sensitization to the varieties of facial, bodily, vocal and verbal behavior, 4) sensitization of micro facial movements using the Micro Expression Training Tool (METT) and Subtle Expression Training Tool (SETT), Ekman, 2003), d) clarification and answering questions about rating decision rules, and e) development of rating timelines, rater logs.
  - c. Raters are trained to rate as quickly as possible, forming a ‘gestalt’ impression of the behavior. They are informed that there are no right or wrong rating scores. However they are allowed to watch video clips or listen to audio clips as often as needed to make a judgment. They record the number of times they have watched and/or listened to a clip.
  - d. Raters are instructed to perform all ratings independently of one another and are supervised regularly to maintain rating integrity and consistency. They keep standardized rating logs to record rating progress, questions, note decision rules for rating, etc.
  - e. Raters are blinded to target disease severity and experimental condition. Separate groups of raters are used in studies as required to preserve study internal validity. For example, Huang (2009) had different sets of raters evaluate target rapport variables and facial expressiveness. Those conducting rapport ratings were unaware that facial expressivity or a specific behavior was an element of the study.
6. **The target’s interpersonal behavior is scored.** The researcher averages the ratings of raters for each item to form one composite score per item per clip. The psychometric property of the average composite score and the manner in which it is used in analyses is such that there is no need for raters to agree upon the exact rating number that they choose for a given item rating. Internal consistency (covariation) among the raters’ profiles of the ratings across clips, rather than exact agreement, is what is required. Raters who achieve high effective interrater reliability are ones whose profiles of ratings covary with one another. The average behavior per clip reliably indicates individual variation among different target behavior.

Additional composites can be formed from the across-rater average for each item:

- a. **Parkinsonian facial masking** is indicated by low scores on items 1, 4, 7.
- b. **Generalized expressive masking** across face, body and voice can be assessed by forming a composite from post-hoc correlates or principal component analyses of the items.

When these composites are formed, the internal consistency of the new composite score is analyzed with Cronbach’s alpha, ICC, and/or loadings on the principal components analysis.

7. **Interrater reliability may be re-calculated.** Typically, interrater reliability is re-calculated for every study. Should reliability fall below .70 for a particular item or composite, the researcher can choose to increase reliability by increasing the number of raters who view the clips. Tables and methods provided in Rosenthal (2005) are used to identify the number of raters needed to achieve sufficient effective interrater reliability (Type III ICC in SPSS software).

8. **Validity checks are conducted.** Depending on the aims of a specific study, the ICRP is validated through a variety of means. Examples are given below.
- a. Periodic checks on consistency of raters' decision rules during the rating procedure and any possible confusion.
  - b. Triangulation of multiple methods for assessing interpersonal behavior in clips. For example:
    - i. Covariation with the Unified Parkinson's Disease Rating Scale- Facial Expression item independently applied to the clips by a trained researcher
    - ii. Covariation among rated clips from the same sample of targets but that vary in length, such as validating 20 second clips against 1.5 minute clips.
    - iii. Covariation among repeated measures of target behavior over time.
    - iv. Change in behavior according to context. For example, more laughing and smiling (lips upturned and cheek raising) or expressive bodily movement are expected on the average during positive topic interviews than negative topic interviews.

## APPENDIX E

### SAMPLE TRAINING TIMELINE AND PROCEDURE

Takahashi (2008) developed a three-session rating training procedure. From this procedure, the following suggested training is provided below. Each of the three sessions is conducted on a different day and raters are instructed to practice rating between sessions. In the first two sessions, raters use sample clips of non-study targets to learn how to rate each item of the ICRP. In the third session, raters work on actual study target clips. A time log and record of rater questions and supervisor answers is kept by the rating supervisor.

**Session 1: Date & Time:** \_\_\_\_\_ **Location:** \_\_\_\_\_

**Time line (2 hours): 4 SAMPLE CLIPS EACH OF 20 sec duration**

#### VIDEO CHANNEL ONLY

**All raters see the same clips at the same time**

- |          |  |
|----------|--|
| (30 min) | Introduction, purpose of the study, task of raters<br>Sensitization to facial behavior (Ekman, 2003):<br>Micro Expression Training Tool (METT)<br>Subtle Expression Training Tool (SETT) |
| (4 min)  | Item 1: Active expressivity in face. The item is explained and discussed. This process occurs for each ICRP item.  |
| (4 min)  | Item 2: Eyebrows raising   |
| (4 min)  | Item 3: Eyebrows pulling together  |
| (4 min)  | Item 4: Blinking   |
| (4 min)  | Rating clips with items 1 – 4 (20 sec x 4 sample clips)  |
| (10 min) | Discussion (Q & A)   |
| (4 min)  | Item 5: Cheek raising  |
| (4 min)  | Item 6: Lip corner puller  |
| (4 min)  | Item 7: Active mouth closure during speech   |
| (8 min)  | Item 5: Cheek raising  |
| (4 min)  | Item 6: Lip corner puller  |
| (4 min)  | Rating clips with items 5 – 7  |
| (10 min) | Discussion (Q & A)   |
| (4 min)  | Item 8: Movement in trunk & head   |
| (4 min)  | Item 9: Forward slouching  |
| (4 min)  | Item 10: Tremor  |
| (4 min)  | Item 11: Gesture with arms   |
| (4 min)  | Rating clips with items 8 – 11   |
| (10 min) | Discussion (Q & A). Instruction in keeping rating logs.  |

**Session 2: Date & Time:** \_\_\_\_\_ **Location:** \_\_\_\_\_

**Time line (1 hr 30 min): 4 SAMPLE CLIPS EACH OF 20 sec duration**

**AUDIO CHANNEL ONLY for ITEMS 12 – 19**  
**VIDEO PLUS AUDIO for ITEM 20**

**All raters listen to the same clips at the same time. They use the same clips as in Session 1. They are unaware that the clips are the same as those in session 1, until they rate item 20, because video is turned off for items 12-19.**

(10 min)	Introduction, review of session 1, purpose of rating audio channel
(4 min)	Item 12: Client talkativeness. The item is explained and discussed. This process occurs for each ICRP item.
(4 min)	Item 13: Vocal inflection
(4 min)	Item 14: Articulation
(4 min)	Item 15: Loudness
(4 min)	Item 16: Vocal speed
(4 min)	Rating clips with items 12 – 16 (20 sec x 4 clips)
(10 min)	Discussion (Q&A)
(4 min)	Item 17: Laughing
(8 min)	Item 18: Positive content
	Item 19: Negative content
(4 min)	Rating clips with items 17 – 19 (20 sec x 4 clips)
(10 min)	Discussion
(4 min)	Item 20: Topic control
(4 min)	Rating clips with item 20 (20 sec x 4 clips)
(12 min)	Discussion (Q&A)

**Session 3: Date & Time:** \_\_\_\_\_ **Location:** \_\_\_\_\_

**Time line (1hr 30 min): ACTUAL STUDY CLIPS USING ENTIRE ICRP**

**Raters are at different computers and are not able to view one another's work**

(20 min)	Review of the rating instructions and rules (Q & A)
(30 min)	Raters use the ICRP at individual rater stations to evaluate clips
(5 min)	Break
(30 min)	Raters use the ICRP at individual rater stations to evaluate clips
(5 min)	Discussion (Q & A). Rating supervisor sets rating timeline goal for each rater and individual supervision meeting times

## APPENDIX F

## ABSTRACTS OF RELEVANT STUDIES

**Sample 1: ICRP version 1**

**Lyons, K.D., & Tickle-Degnen, L. (2005). Reliability and validity of a videotape method to describe expressive behavior in Parkinson's disease. *American Journal of Occupational Therapy*, 59, 41-49.**

The ability to effectively communicate thoughts, feelings, and identity to others is an important aspect of occupational performance. The symptoms of Parkinson's disease can impair a person's ability to verbally and nonverbally communicate with others. In order to better understand issues of communication functioning for this population, research tools to describe expressive and communicative behavior during occupation and social interaction are needed. In this study, six persons with Parkinson's disease participated in individual, videotaped interviews focused on problem solving during daily activities. Three trained graduate students viewed edited clips from the videotapes and completed a rating scale of expressive behavior designed by the authors. Data support the reliability and construct validity of the behavioral rating scale, suggesting that measures of expressive behavior of persons with Parkinson's disease can be effectively derived using short segments of videotaped activity.

**Tickle-Degnen, L., & Lyons, K.D. (2004). Practitioners' impressions of patients with Parkinson's disease: The social ecology of the expressive mask. *Social Science & Medicine*, 58, 603-614.**

The expressive mask of Parkinson's disease, a reduced spontaneity, intensity, and fluidity of facial, bodily, and vocal expression, jeopardizes interpersonal interaction and quality of life. Observers have difficulty perceiving the "real" person behind the mask, leading to failed communication and misunderstanding. A social ecological explanation of this difficulty is that observers have learned in their daily social lives, and quite appropriately so, that expressive behavior reveals meaningful information about character. The premise of this study was that health practitioners, especially novices, would bring into the clinic their everyday perceptual tendencies related to deciphering character. The study examined 30 novice and 50 expert practitioners' impressions of the personality of six patients with Parkinson's disease who were videotaped during a healthcare interview. It was found that practitioners, especially novices, appeared to be overly sensitive to expressive masking when forming impressions about patient extraversion. They incorrectly perceived patients with more masking to be less extraverted than patients with less masking. Novice practitioners were particularly inaccurate in their impressions of neuroticism compared to experts. Novices incorrectly perceived patients with more masking as being more neurotic, whereas experts tended to be sensitive to valid cues of neuroticism. Practitioners' impressions of patient conscientiousness were not sensitive to masking and were highly accurate.

## Sample 2: ICRP version 2

**Lyons, K.D., Tickle-Degnen, L., Henry, A., & Cohn, E. (2004a). Behavioral cues of personality in Parkinson's disease. *Disability & Rehabilitation*, 26, 463-470.**

*Purpose:* To determine if there were observable cues of personality to be found in the appearance and expressive behaviour of six men and six women with Parkinson's disease.

*Method:* Participants completed a personality measure and engaged in an individual, videotaped interview. Four trained raters measured the expressive behaviour demonstrated in the videotapes. A correlational design was used to explore associations between self-reported personality and measures of expressive behaviour.

*Results:* In this sample, more eyebrow furrowing indicated significantly higher levels of Neuroticism and less formal dress indicated significantly higher levels of Openness to Experience. These associations remained large and significant after controlling for the effect of disease severity.

*Conclusions:* Whereas previous research has focused on the detrimental effect of Parkinson's disease symptoms on first impressions, this study explored the potential for accurate first impressions of personality by identifying observable cues of personality. Findings suggest that in early stages of Parkinson's disease there may be plausible and intuitive cues of personality present in expressive behaviour.

**Lyons, K.D., Tickle-Degnen, L., Henry, A., & Cohn, E. (2004b). Impressions of personality in Parkinson's disease: Can rehabilitation practitioners see beyond the symptoms? *Rehabilitation Psychology*, 49, 328-333.**

*Objective:* To explore rehabilitation practitioners' use of observable cues of personality to form accurate impressions of persons with Parkinson's disease.

*Participants:* Ninety-nine practitioners from disciplines of occupational, physical, and speech therapy and nursing and medicine.

*Procedure:* Participants viewed excerpts of videotaped interviews of 6 men and 6 women with mild-to-moderate Parkinson's disease and formed impressions of the targets' personality.

*Main Outcome Measure:* NEO Five Factor Inventory personality test.

*Analysis:* Brunswik lens model correlational analysis of the associations between expressive behavior and personality judgments.

*Results:* Practitioners were accurate in judging Openness to Experience, Agreeableness, and Conscientiousness but were unable to detect interparticipant differences in levels of Extraversion and Neuroticism.

*Conclusion:* Accuracy in judging some traits suggests that future research may identify interventions, such as sensitizing practitioners to valid behavioral cues or modifying contextual features, to maximize a practitioner's ability to understand a client's personality.

**Sample 2: ICRP version 2** (Continued)

**Lyons, K.D., Tickle-Degnen, L., & DeGroat, E.J. (2005). Inferring personality traits of clients with Parkinson's disease from their descriptions of favourite activities. *Clinical Rehabilitation, 19*, 799-809.**

*Objective:* To explore the extent to which practitioners effectively use cues from clients' verbal descriptions of their favourite activities to form accurate impressions of the personality of clients with Parkinson's disease.

*Participants:* Ninety-nine practitioners from disciplines of occupational, physical and speech therapy, nursing or medicine.

*Procedure:* Six men and six women with Parkinson's disease completed a self-report measure of personality and were individually interviewed regarding their favourite activities. The practitioners viewed 2-min segments of those videotaped interviews and provided judgements of the clients' personality.

*Measure:* The NEO-Five Factor Inventory and a coding scheme to describe characteristics of clients' favourite activities.

*Analysis:* Clients' self-reported personality was correlated with the activity characteristics to identify the degree to which each characteristic was a cue of personality. Practitioners' judgements of personality were correlated with the activity characteristics to identify how heavily the practitioners weighted each cue. These two sets of weightings were compared using Pearson's correlations to determine whether practitioners used an appropriate cue strategy related to the activity descriptions.

*Results:* Practitioners appropriately used the personality cues found in the clients' favourite activity descriptions to assess the traits of Openness to Experience, Agreeableness and Conscientiousness ( $r = 0.66$ ,  $r = 0.60$ , and  $r = 0.55$ , respectively, all  $p \leq 0.02$ ). Practitioners appeared to use less effective cue strategies for the traits of Neuroticism and Extraversion.

*Conclusion:* Clients with Parkinson's disease appear to express their personality in their descriptions of favourite activities, and practitioners appear to make use of these expressive verbal cues effectively for some aspects of personality.

**DeGroat, E., Lyons, K.D., & Tickle-Degnen, L. (2006). Verbal content during favorite activity interview as a window into the identity of people with Parkinson's disease. *Occupational Therapy Journal of Research: Occupation, Participation, & Health, 26*(2), 56-68.**

The purpose of this study was to document the degree to which a brief segment of an occupational therapy interview about favorite activities served as a window into personal identity and experience in clients with Parkinson's disease. Two-minute segments of videotaped interviews of 12 participants with Parkinson's disease were transcribed and analyzed. A verbal content measure was developed, its reliability tested, and its items correlated with participants' self-rated personality and mood. Overall, the inter-rater reliability for this verbal content measure was acceptably high, and many expected associations between participant verbal content and participant identity as related to personality and mood were found. The results tentatively suggest that the client's discussion of favorite activity participation, as well as the tone and frequency of the client's verbal communication, can provide insight into the identity of the client, and this information is available to the practitioner even for clients who have difficulty expressing their identities nonverbally. This exploratory study establishes a foundation for further research in the area of identity expression through verbal content in individuals with diminished nonverbal expressiveness.

### Sample 3: ICRP version 3

**Tickle-Degnen, L., Ellis, T.D., Saint-Hilaire, M., Thomas, C., & Wagenaar, R.C. (2010). Self-management rehabilitation and health-related quality of life in Parkinson's disease: A randomized controlled trial. *Movement Disorders*, 25, 194-204.**

**This study's baseline videotaped interviews provided the database for Sample 3 studies.**

The purpose of this randomized controlled trial was to determine if increasing hours of self-management rehabilitation had increasing benefits for health-related quality of life (HRQOL) in Parkinson's disease beyond best medical treatment, if effects persisted at two and six months follow-up, and if targeted compared to non-targeted HRQOL domains responded more to rehabilitation. Participants on best medication therapy were randomized to one of three conditions for six weeks intervention: 0 hrs of rehabilitation; 18 hrs of clinic group rehabilitation plus 9 hrs of attention control social sessions; and 27 hrs of rehabilitation, with 18 in clinic group rehabilitation and 9 hrs of rehabilitation designed to transfer clinic training into home and community routines. Results (N = 116) showed that at six weeks there was a beneficial effect of increased rehabilitation hours on HRQOL measured with the Parkinson's Disease Questionnaire-39 summary index ( $\eta^2 = .23$ , CI = .05 - .40,  $p = .01$ ). Benefits persisted at follow-up. The difference between 18 and 27 hrs was not significant. Clinically relevant improvement occurred at a greater rate for 18 and 27 hrs (54% improved) than for 0 hrs (18% improved), a significant 36% difference in rates (95% CI = 20% to 52% difference). Effects were largest in two targeted domains: communication and mobility. More concerns with mobility and activities of daily living at baseline predicted more benefit from rehabilitation.

**Huang, P-C., Tickle-Degnen, L, & Ma, H-I. (2006, unpublished manuscript). *American and Taiwanese inter-rater reliability of ratings of Taiwanese and American parkinsonian nonverbal behavior*. Tufts University.**

*Objective.* The objective of this study was to test the cross-cultural interrater reliability of rating scales designed to assess the nonverbal behavior of Taiwanese and American women and men with Parkinson's disease (PD). The rating scales were derived from those tested previously with American raters and people with PD, and which had demonstrated reliability and validity with single ethnicity group.

*Method.* Taiwanese (n=6) and American (n=6) raters rated a video-only, 2-minute segment from each of the videotaped interviews of 8 people with Parkinson's disease. The stimulus tape consisted of four women (n=2 Taiwanese and n=2 American) and four men (n=2 Taiwanese and n=2 American) with Parkinson's disease who ranged in age from 51 to 72. The raters used eight or nine 5-point scales to rate interviewee behavior. Interrater reliability coefficients were examined for consistency across rater ethnicity, interviewee ethnicity and interviewee gender.

*Results.* The overall interrater reliability of the scales was acceptable across cultures: .58 for a single rater, and .86 for the average of at least 6 raters. No statistically significant differences in interrater correlation coefficients were found across the different groups.

*Conclusion:* The study results suggest that raters can reliably detect differences in the intensity and frequency of the behavior of this client population across ethnicity and gender.



**Sample 3: ICRP version 3** (continued)

**Takahashi, K. (2008).** *Behavior in Parkinson's disease as related to self-efficacy and outcome expectancy.* Unpublished doctoral dissertation, Boston University.

Occupational therapy seeks to effectively change clients' behavior to result in better quality of life by both focusing on tasks that clients find purposeful and meaningful and by enhancing clients' sense of competence. Self-regulatory system theory (Bandura, 1977) similarly demonstrates that behaviors are best predicted by the combined influence of self-efficacy and outcome expectancy which results in four different motivational states: apathy, hopelessness, protest, and hopefulness. In clinical contexts, therapists evaluate clients' states by observing clients' nonverbal and verbal behavior. However, people with Parkinson's disease are often misunderstood about their motivation because of their motor symptoms. This dissertation focused on whether people with Parkinson's disease display behavior that discriminates four categories of motivation, and how context influences their behavior.

Men and women with Parkinson's disease ( $N = 106$ ) discussed two topics (enjoyable activity versus frustrating activity) during an assessment with a female or male interviewer, and from videotaped clips four types of observer-rated motivation (apathy, hopelessness, protest, and hopefulness) as well as 12 verbal and 18 nonverbal discrete behaviors were measured. Nonverbal behavior was shown to contribute greater to the observers' judgment than verbal behavior. Because of the impairment of nonverbal behavior in Parkinson's disease, observers must be cautious in making inferences about motivation from nonverbal behavior alone. Displays of apathy and hopelessness were indicated by less eye movement, smiling, talkativeness, and body movement. Displayed protest was indicated by more frowning and hopefulness by more smiles. Verbal behaviors were also found to indicate each observed motivation.

Interview context (topic, gender of interviewer and participants) was found to influence behavior in people with Parkinson's disease. During the enjoyable compared to frustrating activity topic, participants smiled more, were generally more facially expressive and used more positive words. With respect to gender effects, participants were less talkative about their negative feelings, seemed more apathetic, with the same versus opposite gender interviewer (especially male with male interviewer). Therapists are encouraged to take interview context into consideration when assessing the motivation of clients with Parkinson's disease. The results suggested that a clinical observational procedure for motivation is possible and necessary for people with Parkinson disease.

**Takahashi, K., Tickle-Degnen, L., Coster, W. J., & Latham, N. (2010).** *Expressive behavior in Parkinson's disease as a function of interview context.* *American Journal of Occupational Therapy*, 64, 483-494.

*Objective.* Parkinson's disease affects the ability to express motivation through face, body, and voice; contextual factors may facilitate or inhibit expressive behavior. The purpose of this study was to determine whether qualities of the interview context are associated with client motivational behavior in Parkinson's disease.

*Method.* Men and women with Parkinson's disease ( $N = 106$ ) discussed 2 topics (enjoyable activity vs. frustrating activity) during an assessment with a female or male interviewer. From videotaped clips, displays of 4 categories of motivation and 12 verbal and 18 nonverbal behavioral patterns were rated.

*Results.* During the discussion of enjoyable activities, participants used more positive words, smiled more, and were more facially expressive. Participants were less talkative about their negative feelings and appeared to be more apathetic with the same-gender interviewer.

*Conclusion.* Occupational therapy practitioners should vary the emotional tone of their questions to improve the validity of motivation assessments.

**Huang, P-C. (2009). *Social behavior, gender and quality of life in Parkinson's disease*. Unpublished doctoral dissertation. Boston University.**

Recent studies have found that women and men have different experiences living with Parkinson's disease (PD) and create different impressions when they have reduced facial expressivity. Previous research also suggests that reduced facial expressiveness, called facial masking, is a common symptom in people with PD. Because social relations typically are facilitated through facial expressiveness, masking may create negative interpersonal impressions. This study examined the questions: (1) Are there gender differences in quality of life in people with PD? (2) Are there associations between facial expressiveness and capacity to show rapport in people with PD? (3) Are there associations between social behavior (facial expressiveness and rapport) and social well-being? (4) Is there a moderating role of gender?

Videotaped interview and data of 104 participants (31 women) were analyzed. Our findings showed that women reported more problems in stigmatization, and men reported more problems in activities of daily life. Both women and men who showed less facial expressiveness were less likely to show rapport during the interview. Women's higher levels of facial expressivity and rapport behavior would occur with fewer problems in social support and communication. These associations remained significant after controlling for covariates including age, living status, marital status, PD duration, PD stage, cognitive status, depression symptoms, and extraversion. The magnitudes of zero-order correlations were generally greater in women compared to men. However, the gender differences that existed in zero-order correlations were not supported when controlling for the covariates.

The findings demonstrate the need to broaden our knowledge on how certain symptoms may relate to people's social roles. The possible moderation of gender should be explored in future studies. Health-care providers should be aware of the potential relationship between facial expressiveness and rapport, and the implications for family, community, and therapeutic relationships.

**Huang, P-C., Tickle-Degnen, L., Coster, W., & Orsmond, G. (2009, unpublished manuscript). *Facial expressiveness, rapport and gender in Parkinson's disease*. Boston University.**

Previous research has suggested that reduced facial expressiveness, called facial masking, is a common symptom in people with Parkinson's disease (PD). Because social relations typically are facilitated through facial expressiveness, facial masking may create negative interpersonal impressions. Recent studies have found that women and men have different experiences living with PD and create different impressions when they have reduced facial expressivity. This study examined the questions: (1) Is there an association between facial expressiveness and capacity to show rapport in people with PD? And (2) Is there a moderating role of gender? Videotaped interviews and data of 104 participants (31 women) were analyzed. Both women and men who showed less facial expressiveness were less likely to show rapport during the interview. This association remained significant after controlling for age, living status, marital status, PD duration, PD stage, cognitive status, depression symptoms, and extraversion. Gender differences that existed in zero-order correlations were not supported when controlling for these variables. Health-care providers should be aware of the potential relationship between facial expressiveness and rapport, and the implications for family, community, and therapeutic relationships.

### Sample 4: ICRP version 3

**Tickle-Degnen, L., Zebrowitz, L.A., & Ma, H-I. (2010, unpublished manuscript). *Gender, culture and health care stigma in parkinsonism*. Tufts University.**

The motor symptom of facial masking in Parkinson's disease ('poker face') involves a reduction in the automatic and controlled emotional and social response of facial musculature. People with the disease may appear apathetic, asocial and cognitively compromised. Previous studies demonstrate that practitioners respond negatively to Parkinson's induced masking and by over-utilizing facial expressivity in their impressions draw inaccurate conclusions about psycho-social attributes. Socio-cultural norms about facial expressivity vary according to gender and culture, yet little research has studied the effect of socio-cultural factors on practitioners' predispositions toward patients who vary in facial expressivity. This study evaluated the effect of parkinsonian masking, gender and culture on practitioners' first impressions of patient psychological attributes. Practitioners (N=284) in America and Taiwan judged 12 Caucasian American and 12 Asian Taiwanese women and men patients in video clips from interviews. Half of each patient group had a moderate degree of facial masking and the other half had near-normal expressivity. Practitioners in both countries judged patients with higher masking to be more depressed and less sociable, less socially supportive, and less cognitively competent than patients with lower masking ( $P$ 's < .0001) despite no difference in tested patient psychological attributes. The negative effect of higher masking was stronger for women than men patients, particularly among American patients. Higher masking in American patients was disadvantageous for impressions of sociability, while in Taiwanese patients for impressions of social supportiveness and cognitive competence. American practitioners were more sensitive to masking when judging sociability and Taiwanese practitioners were more sensitive to masking when judging cognitive competence. Findings suggest that gender norms related to facial expressiveness interact with cultural values to influence practitioners' impressions of patients with Parkinson's disease. Women patients with Parkinson's disease appear to be more vulnerable to health care stigmatization than men at initial impression, particularly for culturally valued psycho-social attributes.

**Hemmesch, A.R., Tickle-Degnen, L., & Zebrowitz, L.A. (2009). *The influence of facial masking and gender on age peers' impressions of older adults with Parkinson' disease*. *Psychology & Aging, 24*, 542-549.**

Parkinson's disease (PD) involves facial masking, which may impair social interaction. Older adult observers who viewed segments of videotaped interviews of individuals with PD expressed less interest in relationships with women with higher masking and judged them as less supportive. Masking did not affect ratings of men in these domains, possibly because higher masking violates gender norms for expressivity in women but not in men. Observers formed less accurate ratings of the social supportiveness and social strain of women than men, and higher masking decreased accuracy for ratings of strain. Results suggest that some of the problems with social relationships in PD may be due to inaccurate impressions and reduced desire to interact with individuals with higher masking, especially women.

**Bogart, K. R. (2010, unpublished manuscript). *A cross-cultural lens analysis of rehabilitation practitioners' perceptions of people with Parkinson's disease*. Tufts University**

*Objective:* Research has shown rehabilitation practitioners form inaccurate judgments about the personalities of targets with Parkinson's disease (PD). However, little is known about the influence of culture on practitioner impressions. The purpose of this study was to examine three possible mechanisms for the influence of culture on practitioners' accuracy of personality judgments relative to

the self-reports of people with PD: universality of trait encoding and decoding, ingroup recognition advantage, and variation in trait importance.

*Participants:* 284 rehabilitation practitioners from the United States (US) and Taiwan (TW) and 24 targets with PD from the US and TW.

*Procedure:* Participants with PD completed a personality inventory and a videotaped interview. Practitioners judged personality from 80 s. clips of the interviews. Trained research assistants coded targets' expressive behavior.

*Analysis:* Brunswik lens model analysis of the associations between self-reported personality, expressive behavior, and practitioners' judgments of target personality across cultures.

*Results:* Cross-cultural differences in achievement were found for 4 of the Big Five personality traits. The pattern of cultural differences in judgment accuracy suggests differences in trait importance, not ingroup bias, affected trait perception accuracy. An ingroup recognition bias was not supported because practitioners did not recognize traits of same-culture targets more accurately. Extraversion was recognized at levels above chance and accurately recognized equally across cultures, suggesting that this personality attribute is universally encoded and decoded. Practitioners across all cultures made personality judgments based on the mask, particularly for extraversion.