Validity Evidence for Interprofessional Performance Scale in Conference (IPSC) in Japan [version 1]

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Abstract

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Introduction: Assessment of interprofessional learning (IPL) in practice is a key educational strategy. Especially, interprofessional collaboration in a conference is reasonable to assess interprofessional competency because we have many conferences for sharing information and coping with complex issues interprofessionally in practice. This study aimed to validity evidence supporting the IPL assessment scores, namely the Interprofessional Performance Scale in Conference (IPSC), and to evaluate its reliability.

Methods: As a content validity, to obtain a consensus concerning the IPSC, we held five workshops from June 2016 to January 2018. Covering a response process, healthcare professional participants (raters) assessed interprofessional performance using the developed IPSC by watching 3 different types of videos of case conferences, with 5 healthcare professionals participating in each. Rater agreement for the response process among six different raters was assessed using intraclass correlation coefficients (ICCs). Concerning internal structure, we examined the descriptive statistics and one-way analysis of variance as well as Generalizability (G) and Decision (D) studies. We explored the consequences of the IPSC through feedback sheet.

Result: The finalized IPSC assessment consisted of 12 items with 4-point Likert scales. ICC was 0.45 for the overall score. The association between IPSC and videos was significant while that of IPSC and professionals was not. The G and phi coefficients were 0.86 and 0.84, respectively. In descending order, the portion of the variance was professionals (15.7%) and the interaction of professionals and raters (11.5%) of the total variance. As D study, to reach a phi coefficient of 0.80, seven items and five raters were required. Through assessing
interprofessional performance in case conferences, we clarified participants could reflect their own interprofessional competency as a consequence of the IPSC.

Conclusion: Findings from this study support using the IPSC as a tool to make consistent assessments of interprofessional performance in conferences.

Keywords
Psychometrics, Assessment, Interprofessional, Decision-making, Effective, Healthcare professionals, Patient care
Introduction

In global health, the number of complex problems that healthcare practitioners must deal with from multiple perspectives is increasing (Bateman et al., 2001). To enhance the quality of care for complex healthcare needs, healthcare professionals should strive to improve healthcare team communication, efficiency and cohesiveness (Gilbert, Yan and Hoffman, 2010). To this end, the last decade has seen increasing appreciation of the value of interprofessional learning (IPL) as a key educational strategy (Gilbert, Yan and Hoffman, 2010). To date, however, no clear consensus on the best way to assess IPL has yet emerged (Rogers et al., 2017).

Assessment plays an important role to drive learning (Thistlethwaite, 2015) across summative and formative assessments (Barr H, Gray R, Helme M, Low H, 2016). In addition, assessment is key to competency-based assessment (Frenk et al., 2010). Accordingly, we have previously discussed how to assess capability (Gardner et al., 2008; Brewer and Jones, 2013) and interprofessionalism (Hall, Weaver and Grassau, 2013). In pre-registration, despite progress in the discussion on how to assess how IPL, few studies have investigated the assessment of post-registration or continuous IPL in practice. The assessment of IPL in practice is required for several reasons: to verify the ability to provide safe and effective practice; to meet the needs and expectations of patients, clients and communities, as well as families; and to ensure effective cooperation and interprofessional communication between healthcare professionals. For example, multi-professional trainees and staff who participate in interprofessional conferences can strengthen both their understanding of other professionals’ roles and their own interprofessional facilitation skills (Sordahl et al., 2018). These various benefits warrant further research into the assessment of interprofessional performance in a conference.

Moreover, assessment of IPL should be feasible, affordable and acceptable for all stakeholders, and able to acknowledge the sensitivity of interprofessional competency while encouraging learning (Rogers et al., 2017). In this sense, interprofessional collaboration in a conference has been frequently implemented for sharing information and coping with complex issues. Therefore, we focused on interprofessional case conferences and developed the Interprofessional Performance Scale in Conference (IPSC) based on interprofessional competency frameworks in Japan (Haruta et al., 2018).

In this study, we aim to gather validity and reliability evidence supporting the use of the IPCS as a useful and acceptable approach to measure interprofessional performance based on an interprofessional competency framework for multidisciplinary healthcare practitioners.

Methods

We conceptualized validity following Messick’s unified framework, gathering the following sources of validity evidence: content, response process, internal structure, and consequences of testing (Downing, 2003; Downing and Yudkowsk, 2009).

Content: We developed the IPSC as an assessment tool in the form of a multidisciplinary consensus-based assessment scale to assess interprofessional performance in a case conference based on interprofessional competency in Japan, which includes 2 core domains and 4 peripheral domains (Table 1).

The core domains are: “Patient/client/family/community-centered”, and “Interprofessional communication”, and the peripheral domains are “Role contribution”, “Facilitation of relationships”, “Reflection”, and “Understanding of others”. These domains almost exactly match the consensus for interprofessional outcomes in the following 6 domains, namely role understanding, interprofessional communication, interprofessional values, coordination and collaborative decision-making, reflexivity, and teamwork (Rogers et al., 2017).

A consensus method based on the subjective opinions of several experts is considered an appropriate way of developing a performance assessment (Boursicot et al., 2011; Sandberg et al., 2015). To gather a wide range of multiprofessional opinions and to examine acceptance in practice, we held 5 public workshops focused on the assessment of IPL from 2016 to 2018 for multidisciplinary healthcare practitioners. Information on the workshops was disseminated through the homepage and mailing list of an academic organization. These workshops consisted of four sections: 1) introduction of the aim, schedule, and research participants; 2) a lecture about the interprofessional competency framework in Japan; 3) assessment using the prototype IPSC, with participants watching the simulated interprofessional case conference on site or by video; and 4) reflection on methods to assess interprofessional performance in conferences using the IPSC. In the setting of the simulated case conferences in these workshops, a physician in charge, ward nurse, pharmacist, physiotherapist, and medical social worker (MSW) participated in the case of a male patient who had been given a diagnosis of cerebral embolism caused by atrial fibrillation and who was admitted to a hospital. In the conference setting, he was advised after hospitalization for two weeks to transfer to a hospital with a recovery rehabilitation ward, despite wanting to be discharged home and receive outpatient care.
Prior to conducting this study, 2 researchers (physician, and specialist of psychological statistics) involved in the Interprofessional Competency Framework in Japan project, 3 healthcare professionals (medical assistant, occupational therapist, and speech therapist), and 2 of the authors (JH, YY) developed the 17 items of the IPSC as prototype 1. We then revised prototype 1 based on feedback from workshop participants of the Conference of the Japan Primary Care Association in June 2016 and a workshop in August 2016 to develop prototype 2. To obtain participants’ feedback, we created a feedback sheet with a four-point grading scale for assessment based on the overall quantification of content validity: 1=very acceptable; 2=mostly acceptable; 3=neutral; 4=not quite acceptable; and 5=not acceptable. If participants scored 3-5 points, they let us know the revised points through the feedback sheet. Second, to improve prototype 1, we revised the IPSC and asked for feedback repeatedly in October and December of 2016. Third, we likewise revised the IPSC and obtained feedback from the Japan Primary Care Association in 2017. Fourth, we finalized the Japanese version of the IPSC. Finally, we translated the IPSC into English, and obtained consensus for this translated version from workshop participants in the Asia Pacific Medical Education Conference in January 2018.

Response process: We developed 3 different types of video material. Video 1 showed the physician commanding the other professionals, especially contradicting the PT, and showed the other healthcare professionals eager to avoid displeasing the physician. Video 2 showed the MSW smoothly questioning each healthcare professional playing the role of moderator, and their collaboration in sharing constructive opinions. Video 3 showed the nurse insisting on her role contribution with regard to the other professionals, except for the physician. In particular, the MSW became nervous of the nurse and could not play an effective role.

Study participants as raters using purposive sampling were recruited from among participants of the previous workshops from 2016 to 2018, as described above. Eligible participants had over 5 years of professional experience. Each participant assessed one or two healthcare professionals in the 3 videos described above on the website. We allocated the participants such that 6 participants as raters could assess each professional participating in the simulated interprofessional case conference on the video. Using the data, we analyzed the intraclass correlation coefficient (ICC) to measure rater reliability (Shrout and Fleiss, 1979). In addition, we assessed the percentage of variance among the raters using a generalizability study (G study) (Bloch and Norman, 2012).

Internal structure: First, we examined the descriptive statistics (max, min, median, mean, and standard deviation) of IPSC scores, for all items in each of the 3 videos, and compared them. Second, to compare the impact of the 3 videos on the average of the 5 professionals’ total score of IPSC and the impact of the 5 professionals in each video on the average total score of the IPSC, a one-way analysis of variance (ANOVA) and Tukey’s multiple comparison test was used. P < 0.05 was considered to indicate a statistically significant difference for ANOVA. Third, we used the generalizability theory to analyze the reliability of scores from the observation data of the video using the IPSC (Bloch and Norman, 2012). Generalizability theory was used to assess the internal structure of the IPSC in order to analyze the reliability of IPSC scores. All aspects included professionals (p) in the video, items (i) in the IPSC, and study participants as raters (r), as well

| Core domains                  | Statements                                                                 |
|-------------------------------|-----------------------------------------------------------------------------|
| Patient-/Client-/Family-/Community-centered | Collaborative professionals can focus on important issues in which patients, clients, families, and communities are interested, and share goals in order to improve healthcare services for patients, clients, families, and communities. |
| Interprofessional Communication | Professionals respect other different professionals and share roles, knowledge, ideas, and values with each other for patients, clients, families, and communities. |

| Peripheral domains          | Statements                                                                 |
|------------------------------|-----------------------------------------------------------------------------|
| Role Contribution           | Professionals can understand mutual roles and utilize knowledge and skills with each other to conduct their roles properly. |
| Facilitation of Relationship | Professionals can build, maintain and grow relationships with different professionals. Professionals can also properly cope with conflicts among different professionals. |
| Reflection                   | Professionals can review concepts, performance, emotion, and values of their own professions, and powerfully understand their collaborative experiences with different professionals to improve collaboration. |
| Understanding of Others     | Professionals can understand concepts, performance, emotion, and values of other professions to improve collaboration. |

Table 1. Interprofessional Competency Framework: competency domains and statements
as interaction terms. The phi coefficient was chosen over the G coefficient for all G studies, given that the IPSC represents a criterion-based measure. We also conducted decision studies (D studies) to project improvements in reliability for the varying number of raters and to determine the number of items that would need to be scored to assess interprofessional performance in a case conference.

Consequences: We explored the descriptive data through feedback sheets by using free descriptive answer text focused on how and what participants considered the assessment of interprofessional performance while watching the interprofessional conference video.

The study protocol was approved by the Institutional Review Board of the University of Tsukuba (No.1066).

Results/Analysis

Content: A total of 75 healthcare professionals participated in revising the IPSC (Table 2). The prototype 1 IPSC, which was developed based on the interprofessional competency framework in Japan, consisted of 17 items in all domains, namely 3 “Patient/client-family/community-centered” items, 4 “Interprofessional communication” items, 2 “Role contribution” items, 4 “Facilitation of relationships” items, 2 “Reflection” items, and 2 “Understanding of others” items. Acceptance rates by participants in the first two workshops were 14/18 (74%) and 10/15 (67%), respectively (Table 2).

After the first two workshops, the authors created prototype 2, which consisted of 15 items based on the feedback, namely 2 “Patient/client-family/community-centered” items, 3 “Interprofessional communication” items, 2 “Role contribution” items, 4 “Facilitation of relationships” items, 1 “Reflection” item, and 2 “Understanding of others” items. Further, we added 1 “Coordination and collaborative decision-making” item, which was one of the consensus interprofessional outcome items in the 6 domains. Acceptance rates by participants in the middle two workshops were 5/6 (83%) and 3/4 (75%), respectively.

After the two intermediate workshops in October and December 2016, the authors created a final version consisting of 12 items based on the feedback received, namely 2 “Patient/client-family/community-centered” items, 3 “Interprofessional communication” items, 2 “Role contribution” items, 2 “Facilitation of relationships” items, 2 “Understanding of others” items, and 1 “Coordination and collaborative decision-making” item. Further, they deleted the 1 “Reflection” item because raters were unable to assess reflection only by watching the care conference video of multidisciplinary healthcare professionals. The representations of items were slightly changed for ease of understanding. The acceptance rates by participants in the last two workshops were 18/19 (95%) and 5/5 (100%), respectively. The finalized IPSC included 12 items in 6 domains using 4-point Likert scales (4: Excellent, 1: Poor) and is shown in Table 2.

Response process: The 16 study participants (raters) who watched the 3 videos consisted of 6 doctors, 1 dentist, 1 nurse, 2 pharmacists, 4 therapists, 1 medical educator (non-healthcare professional), and 1 acupuncturist. As a result of the allocation of participants as raters, the healthcare professionals in each video were assessed by six different healthcare professionals (raters). The ICC was 0.45 for the overall score. ICCs for the other domain scores ranged from 0.13 to 0.53, which, except for the domain “patient centered care”, indicated fair or moderate agreement among the raters (Table 3). Raters accounted for only a small proportion (1.5%) of the variance in G studies (Table 4).

Internal structure: In the IPSC, the possible scores range from 0 to 48 for total score and from 0 to 4 for each of the 5 criteria (including N/A=zero). The mean, maximum and minimum IPSC scores for each video were 27.7, 29.8 (MSW), and 25.2 (Doctor) in video 1; 38.5, 43.8 (Doctor), and 35.8 (Nurse and PT) in video 2; and 29.5, 35.2 (Doctor), 19.5 (Nurse) in video 3. Standard deviation was 10.3 (Doctor in video 1) as max and 2.8 (Pharmacist in video 2) (Table 5).

The F-test for the one-way ANOVA and Tukey’s multiple comparisons test between IPSC and videos showed a significant difference in mean (F=10.53, p <0.01); the difference of the average between video 1 and video 2 was 11.3 (CI 4.37-18.56, P=0.003); and the difference of the average between video 2 and video 3 was 9.3 (CI 2.24-16.63, P=0.01)). In contrast, the association between IPSC and professionals was not significant (F=0.438, P=0.779) (Table 6, 7).

For the G study, we used data from 15 professionals (p) in the video, 12 items (i) in the IPSC, and study participants as raters (r) of the IPSC. The G and phi coefficients were 0.86 and 0.84, respectively (Table 4). Professionals accounted for 15.7% of the total variance, constituting a large portion of variance. The second largest source of variance came from the interaction of professionals and raters (11.5%); that is, certain professionals were scored higher by one rater than by another. A large proportion of the residual error variance came from interactions between facets. Decision study (D study)
results indicated that 7 items were required to reach a phi coefficient of 0.80 and 5 raters were required for a phi coefficient of 0.80.

**Consequences:** We collected 137 descriptive data as sentences from all workshops. Many participants responded that they were able to compare their own interprofessional competency to the professionals’ performance in the video and that they reflected their own professional effect in interprofessional case conferences. Some participants reported that active listening and comprehension founded on opinions based on understanding of other professionals’ role were keys in interprofessional communication.

**Discussion**
We gathered validity and reliability evidence supporting the use of IPSC, which functions not only for assessment but also as a reflection tool based on an interprofessional competency framework for multidisciplinary healthcare practitioners.

In real practice, IPSC may be mainly used for formative assessment because we tend to focus more on the learning process in post-registration or continuing professional development than our achievement (Lobst et al., 2010). Thus, we need to

| Table 2. Evidence of content validity |
|-------------------------------|-----------------|-------------|-------------|------------------|--------------------|-----------------------|
| Prototype | Participants | Professionals | Gender | Number | Manner of watching the conference | Response rate | Acceptance rate |
| Prototype 1 | The Conference of Japan Primary Care Association in June of 2016 | Doctor | Male | 16 | on site | 18/25 (72%) | 14/18 (78%) |
| | | Female | 2 | | | | |
| | | Pharmacist | Male | 4 | | | |
| | | Female | 3 | | | | |
| | The workshop in August of 2016 | Doctor | Male | 3 | on site | 15/26 (58%) | 10/15 (67%) |
| | | Dentist | Male | 1 | | | |
| | | Nurse | Female | 1 | | | |
| | | Dietician | Female | 1 | | | |
| | | Psychologist | Female | 1 | | | |
| | | PSW | Female | 1 | | | |
| | | Unknown | 7 | | | | |
| Prototype 2 | Participants in the workshop in October 2016 | Doctor | Male | 1 | Video | 6/6 (100%) | 5/6 (83%) |
| | | Female | 1 | | | | |
| | | Pharmacist | Male | 2 | | | |
| | | Nurse | Female | 1 | | | |
| | | Psychologist | Female | 1 | | | |
| | Participants in the workshop in December of 2016 | Doctor | Male | 2 | Video | 4/4 (100%) | 3/4 (75%) |
| | | Medical assistant | Female | 1 | | | |
| | | Pharmacist | Male | 1 | | | |
| Prototype 3 | Participants in the Conference of Japan Primary Care Association in 2017 | Doctor | Male | 15 | Video | 19/19 (100%) | 18/19 (95%) |
| | | Female | 1 | | | | |
| | | Pharmacist | Male | 2 | | | |
| | | Nurse | Female | 1 | | | |
| | Participants in the APMEC in 2018 | Physician | Male | 1 | Video | 5/6 (83%) | 5/5 (100%) |
| | | Female | 5 | | | | |
| Total | 75 | | | | | |
use efficient and effective assessment strategies and tools for basing transition decisions on competence (Carraccio et al., 2016). The findings of consequence using IPSC indicated that some healthcare professionals compared their own interprofessional performance to others, which might drive self-directed learning. Moreover, given the high workloads experienced by educational practices and clinical settings, we recommend the application of video assessment using IPSC. IPSC, which can be assessed on an interprofessional competency framework, may function seamlessly across the educational continuum from undergraduate to postgraduate and continuing professional development (Lobst et al., 2010). For instruments such as the iOSCE (Simmons et al., 2011; T Storjohann, A Herrick, KA Mitzel, LE Davis, C Thompson, 2017), which is an interprofessional OSCE, IPSC can be utilized from the undergraduate to postgraduate period and into continuing professional development.

We clarified that the team impact differs depending on the videos. In particular, the performance of doctors and nurses playing key roles, which might affect the development of scenarios in interprofessional care conferences, may have had substantial influence on the scoring given to the other professionals by individual professionals who participated in the interprofessional conference. For example, in video 1, in which the physician commanded the other professionals, the score of the other professionals was low. In video 3, in which the nurse insisted that her contribution be accepted by

| Observation Items | ICC | 95% CI |
|-------------------|-----|-------|
| Patient centered | 0.13 | -0.11-0.4 |
| Interprofessional Communication | 0.39 | 0.19-0.66 |
| Role Contribution | 0.3 | 0.10-0.58 |
| Facilitation of Relationships | 0.53 | 0.32-0.76 |
| Understanding of Others | 0.42 | 0.21-0.68 |
| Decision Making | 0.34 | 0.15-0.62 |
| Total | 0.41 | 0.21-0.68 |

| Difference of freedom | Variance Components | Percent Variance % |
|-----------------------|---------------------|-------------------|
| Professionals (p)     | 14                  | 0.2465            | 15.70%            |
| Items (i)             | 11                  | 0.0609            | 3.90%             |
| Rater(r)              | 5                   | 0.0231            | 1.50%             |
| p*I                  | 154                 | 0                 | 0%                |
| p*r                  | 70                  | 0.1807            | 11.50%            |
| i*r                  | 55                  | 0                 | 0%                |
| p*i*r                | 770                 | 1.2005            | 76.30%            |

IPSC: Interprofessional Performance Scale in Conference
ICC: Intraclass correlation coefficients

Table 3. Developed IPFS and rater agreement using ICC

Table 4. G study in IPSC

the other professionals, the score of not only the nurse but also the MSW was low. This might be associated with the general understanding that nurses and MSW need to collaborate to support a patient’s discharge. This finding indicates that interprofessional performance among professionals whose boundaries are ambiguous may be mutually influential. In contrast, physical therapists and pharmacists can make a significant contribution by actively sharing their own professional knowledge about patients. Based on these views, it is meaningful that physicians and nurses should reflect on whether through their attitude they have a negative effect on other professionals, and therapists and pharmacists should focus on sharing their own opinions based on their own knowledge.

In G theory, we can consider the role of social identity theory in the case of the second largest source of variance i.e. the interaction of professionals and raters. Social identity theory focuses on social structural factors (Hogg et al., 2004; Ellemers and Haslam, 2012), such as medical hierarchy, that might affect an individual’s behavior, along with the actions expected of them by coded messages. Social identity attributes the cause of in-group favoritism to a psychological need for positive distinctiveness and describes situations in which in-group favoritism is likely to occur (Giannakakis and Fritsche, 2011). For example, doctors tend to assess other doctors more highly than other healthcare professionals. In

| The video contents                                                                 | Professionals | Max | Min | Median | Means | SD  |
|-----------------------------------------------------------------------------------|---------------|-----|-----|--------|-------|-----|
| Video 1: The physician commanded the other professionals, especially contradicted PT. The other healthcare professionals were eager to avoid displeasing the physician. | Physician     | 4   | 1   | 2      | 25.2  | 10.3|
|                                                                                   | Nurse         | 4   | 1   | 2      | 27.8  | 8.0 |
|                                                                                   | Pharmacy      | 4   | 1   | 2      | 29.0  | 8.6 |
|                                                                                   | PT            | 4   | 1   | 2      | 26.5  | 4.7 |
|                                                                                   | MSW           | 4   | 1   | 3      | 29.8  | 5.0 |
|                                                                                   | Group mean    | 4   | 1   | 2.2    | 27.7  | 7.3 |
| Video 2: The MSW made smooth questions for every healthcare professional as the role of moderator and collaborator to share constructive opinions. | Physician     | 4   | 1   | 4      | 43.8  | 3.6 |
|                                                                                   | Nurse         | 4   | 1   | 3      | 35.8  | 8.7 |
|                                                                                   | Pharmacy      | 4   | 2   | 3      | 37.7  | 2.8 |
|                                                                                   | PT            | 4   | 1   | 3      | 35.8  | 6.0 |
|                                                                                   | MSW           | 4   | 2   | 4      | 39.3  | 8.7 |
|                                                                                   | Group mean    | 4   | 1.4 | 3.4    | 38.5  | 6.0 |
| Video 3: The nurse insisted on emphasizing her role contribution to the other professionals, except for the physician. Of note, the MSW got nervous of the nurse and cannot play its own role. | Physician     | 4   | 1   | 3      | 35.2  | 7.2 |
|                                                                                   | Nurse         | 3   | 1   | 2      | 19.5  | 4.3 |
|                                                                                   | Pharmacy      | 4   | 1   | 3      | 33.2  | 4.2 |
|                                                                                   | PT            | 4   | 1   | 3      | 31.0  | 7.0 |
|                                                                                   | MSW           | 4   | 1   | 2      | 28.8  | 5.7 |
|                                                                                   | Group mean    | 3.8 | 1   | 2.6    | 29.5  | 5.7 |
|                                                                                   | Total         | 3.19| 6.0 |       | 31.9  | 6.0 |

SD; standard deviationIPSC; Interprofessional Performance Scale in Conference

Table 6. ANOVA using the 3 videos and 5 professionals’ total score of IPSC

| Source of variance                  | SS      | DF | MS    | F     | P    |
|-------------------------------------|---------|----|-------|-------|------|
| Inter Group of Video                | 371.91  | 2  | 185.96| 10.53 | 0.00 |
| Intra Group of Video                | 211.99  | 12 | 17.67 |       |      |
| Sum                                 | 583.90  | 14 |       |       |      |
| Inter Professionals in the Video    | 86.974  | 4  | 21.744| 0.438 | 0.779|
| Intra Professionals in the Video    | 496.926 | 10 | 49.693|       |      |
| Sum                                 | 583.900 | 14 |       |       |      |

ANOVA; a one-way analysis of varianceIPSC; Interprofessional Performance Scale in Conference

the other professionals, the score of not only the nurse but also the MSW was low. This might be associated with the general understanding that nurses and MSW need to collaborate to support a patient’s discharge. This finding indicates that interprofessional performance among professionals whose boundaries are ambiguous may be mutually influential. In contrast, physical therapists and pharmacists can make a significant contribution by actively sharing their own professional knowledge about patients. Based on these views, it is meaningful that physicians and nurses should reflect on whether through their attitude they have a negative effect on other professionals, and therapists and pharmacists should focus on sharing their own opinions based on their own knowledge.

In G theory, we can consider the role of social identity theory in the case of the second largest source of variance i.e. the interaction of professionals and raters. Social identity theory focuses on social structural factors (Hogg et al., 2004; Ellemers and Haslam, 2012), such as medical hierarchy, that might affect an individual’s behavior, along with the actions expected of them by coded messages. Social identity attributes the cause of in-group favoritism to a psychological need for positive distinctiveness and describes situations in which in-group favoritism is likely to occur (Giannakakis and Fritsche, 2011). For example, doctors tend to assess other doctors more highly than other healthcare professionals. In
contrast, to protect the positive in-group image, in-group members are more critical of in-group deviants than deviants of an outgroup. These findings indicate that members of several healthcare professional groups should be conscious of bias, especially in assessing other professionals in their own group.

This study has several limitations. First, the number of participants was low, including raters and professionals of different types in the 3 videos. Similarly, the sample size used for both the G studies was small. In addition, some raters had previously participated in a workshop on the development of the IPSC and had a strong shared understanding of how to apply it. We did not explore validity evidence from this source because this was an exploratory study and there were no valid observational items or scales of interprofessional performance. Additional validity evidence is required to ensure that this observation scale can be used across real multidisciplinary practices. Comparison with other variables such as self-assessment is also warranted. Moreover, a larger and more heterogeneous sample of learners should be tested to confirm the generalizability of the results presented here.

## Conclusion

Findings from this study have meaningful implications for the assessment of interprofessional performance in conferences. The validity evidence presented here provides initial support for the use of the IPSC as an indicator of interprofessional performance in conferences. Additional studies which replicate the procedures in this study using larger and more heterogeneous samples are required. On the basis of these findings, we hope that utilization of the IPSC can become more widespread.

## Take Home Messages
- We developed and evaluated the Interprofessional Performance Scale in Conference (IPSC) using the Messick’s unified framework.
- Developed IPSC included 12 items in 6 domains and was validated by watching 3 different types of videos.
- ICC was 0.45 for the overall score, and the G and phi coefficients were 0.86 and 0.84.
- IPSC can become more widespread.

## Notes On Contributors
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Declarations
The author has declared that there are no conflicts of interest.

Ethics Statement
The study protocol was approved by the Institutional Review Board of the University of Tsukuba (No.1066).

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Bibliography/References

Barr, H. Gray, R, Helme, M. Low, H, R. S. (2016) Interprofessional Education Guidelines. Fareham (UK): Centre for the Advancement of Interprofessional Education. Available at:
Reference Source
Bateman, C., et al. (2001) Bringing global issues to medical teaching. Lancet (London, England). Elsevier, 358(9292), pp. 1539-1542.
Reference Source
Bloch, R. and Norman, G. (2012) Generalizability theory for the perplexed: A practical introduction and guide: AMEE Guide No. 68. Medical Teacher. 34(11), pp. 960-992.
Reference Source
Boursicot, K., et al. (2011) Performance in assessment: Consensus statement and recommendations from the Ottawa conference. Medical Teacher. 33(5), pp. 370-383.
Reference Source
Brewer, M. L. and Jones, S. (2013) An interprofessional practice capability framework focusing on safe, high-quality, client-centred health service. Journal of Allied Health. 42(2), pp. e45-e49.
Reference Source
Carraclio, C., et al. (2016) Advancing Competency-Based Medical Education. Academic Medicine. 91(5), pp. 645-649.
Reference Source
Downing, S. M. (2003) Validity: On the meaningful interpretation of assessment data. Medical Education. 37(9), pp. 830-837.
Reference Source
Downing, S. M. and Yudkowks, R. (2009) Assessment in health professions education, Assessment in Health Professions Education. Routledge; 1 edition.
Reference Source
Elemsers, N. and Haslam, S. A. (2012) Social identity theory’, in Handbook of Theories of Social Psychology. Thousand O. CA- Sage Publications Ltd. pp. 379-398.
Reference Source
Frenk, J., et al. (2010) Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. The Lancet. 376(9756), pp. 1923-1958.
Reference Source
Gardner, A., et al. (2008) From competence to capability: a study of nurse practitioners in clinical practice. Journal of Clinical Nursing. Blackwell Publishing Ltd. 17(2), pp. 250-258.
Reference Source
Giannakakis, A. E. and Fritsche, L. (2011) Social identities, group norms, and threat: On the malleability of ingroup bias. Personality and Social Psychology Bulletin. 37(1), pp. 82-93.
Reference Source
Gilbert, J. H. V, Yan, J. and Hoffman, S. J. (2010) A WHO Report: Framework for Action on Interprofessional Education and Collaborative Practice. Journal Of Allied Health. Edited by D. Hopkins. Association of Schools of Allied Health Professions. 39, pp. 196-197.
Reference Source
Hall, P., Weaver, L. and Grccau, P. A. (2013) Theories, relationships and interprofessionalism: learning to weave. Journal of Interprofessional Care. 27(January), pp. 73-80.
Reference Source
Haruta, J., et al. (2018) Development of an interprofessional competency framework for collaborative practice in Japan. Journal of Interprofessional Care. Taylor & Francis. pp. 1-8.
Reference Source
Hogg, M. A., et al. (2004) The social identity perspective: Intergroup relations, self-conception, and small groups. Small Group Research. 35(3), pp. 246-276.
Reference Source
Lobst, W. F., et al. (2010) Competency-based medical education in postgraduate medical education. Medical Teacher. 32(8), pp. 651-656.
Reference Source
Rogers, G. D., et al. (2017) International consensus statement on the assessment of interprofessional learning outcomes. Medical Teacher. 39(4), p. : 347-359.
Reference Source
Sandberg, S., et al. (2015) Defining analytical performance specifications: Consensus Statement from the 1st Strategic Conference of the European Federation of Clinical Chemistry and Laboratory Medicine. Clinical Chemistry and Laboratory Medicine. 53(6), pp. 833-835.
Reference Source
Simmons, B., et al. (2011) Assessment of interprofessional learning: the design of an interprofessional objective structured clinical examination (IOSCE) approach. Journal of Interprofessional Care. 25(1), pp. 73-74.
Reference Source
Sordahl, J., et al. (2018) Interprofessional case conference: impact on learner outcomes. Translational Behavioural Medicine. 8(6), pp. 927-929.
Reference Source
Storjohann, T, Herrick, A, Mitzel, KA, Davis, LE, C Thompson, K. B. (2017) Simulated IOSCE with pharmacy and physician assistant students-a quantitative study. Pharmacotherapy. 37(10), pp. 154-154.
Reference Source
Thistlethwaite, J. (2015) Assessment of Interprofessional Teamwork - An International Perspective', in Leadership and Collaboration. London: Palgrave Macmillan UK, pp. 135-152.
Reference Source
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Felix Silwimba
University of Lusaka

This review has been migrated. The reviewer awarded 5 stars out of 5

The term interprofessional performance caught my attention and made me read through the article. I then realised this article is applicable to my situation as well. Even though my practice is in a middle-low income country where healthcare delivery is basic in nature. They are multiple interdisciplinary teams working to provide comprehensive healthcare to individuals and communities. Unfortunately, to larger extent they work towards undermining each other. Using this approach in the context of this environment could contribute significantly to harmonize multidisciplinary relations for better individual and community health outcomes. I recommend this study for a wider application across the globe.

Competing Interests: No conflicts of interest were disclosed.

Reviewer Report 16 March 2019

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Balakrishnan Nair
Centre for Medical Professional Development and University of Newcastle

This review has been migrated. The reviewer awarded 4 stars out of 5

Inter-professional collaboration is the only way to provide efficient patient centred care for majority of
patients. However it is difficult to assess this in practice. So this study to validate a well known tool is an excellent initiative. Adult learn by reflection and the videos, they used, are an excellent way of doing this. The statistical analysis is well done and the article is well written.

**Competing Interests:** No conflicts of interest were disclosed.

Reviewer Report 14 March 2019

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**Gerard Flaherty**

National University of Ireland Galway

This review has been migrated. The reviewer awarded 3 stars out of 5

The authors provide a psychometric report on the development and validation of an original assessment tool which they believe could have applications in the assessment of interprofessional learning in practice. The study methodology is rigorous and the design of the IPSC scale (termed “IPCS” in the final paragraph of the introduction) is based on a sound theoretical framework. I wonder to what extent the finalised instrument serves its original purpose, to assess interprofessional competency. I agree with its proposed use as a “reflection tool”. It may prove valuable in allowing multidisciplinary learners to self-assess their own learning as attendees at case conferences (incorrectly termed “care conference” in paragraph 2 of Page 6) and in this context, it could facilitate group debriefing sessions involving learners from diverse disciplines. I could see it being used as an assessment tool in a double video station in an OSCE, for example. The student would view a clip from a simulated case conference and then discuss it with an examiner at the succeeding station. The authors should expand on the possible utility of the IPSC in the discussion. In relation to the content validation, it is of note that 64% of the participants were male. The authors should comment on this gender imbalance and whether it would influence the validity of the ratings. Finally, some minor typos/corrections which the authors can easily address: (1) Abstract, Introduction: Change “validity” to “validate”; (2) No need to underline the domains in column 1 of Table 1; (3) Page 6, paragraph 2: Change Table 2 to Table 3; (4) In the caption for Table 3, change “IPFS” to “IPSC”; (5) I found Table 5 and the preceding paragraph very confusing. Why are the mean and median so different? It was on a 4-point Likert scale so should the mean also not lie between 1 and 4, or have I misinterpreted the table?; (6) Provide footnotes for the 5 acronym headers (SS....P) in Table 6; (7) It would be interesting to view a summary, perhaps in a single table, of the qualitative data from the workshops referred to briefly under “Consequences” on Page 9. Overall, this was a well conducted study which describes the development of a potentially useful assessment/reflective method in the setting of multidisciplinary case conferences, a very rich but under-utilised source of interprofessional learning.
Competing Interests: No conflicts of interest were disclosed.