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VALIDATED INTERPERSONAL CONFIDENCE QUESTIONNAIRE TO MEASURE THE IMPACT OF IMPROVISATION TRAINING

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Abstract

Theatre-based improvisation includes a model of constructive communication, which has been applied to education, and in fields requiring interpersonal competencies. Here, we present a validation study of the Interpersonal Confidence Questionnaire (ICQ) developed to measure self-reported interpersonal confidence, that is, beliefs regarding one's capability related to effective social interactions. Confirmatory factor analysis (n = 208) confirmed the 18-item measurement model of ICQ as satisfactory, with six factors contributing to interpersonal confidence: performance confidence, flexibility, listening skills, tolerance of failure, collaboration motivation, and presence. The questionnaire showed discriminatory power, acceptable composite reliability, and strong test–retest reliability. The immediate and long-term impact of six improvisation interventions (n = 161) were measured using ICQ. Improvisation interventions resulted in improvements to interpersonal confidence, performance confidence, and tolerance of failure relative to controls, and an improved performance confidence persisted over time. This study provides initial evidence on the validity and reliability of the 18-item, 6-factor ICQ as a self-report measurement of interpersonal confidence, which may increase following improvisation training.

Keywords: Improvisation, interpersonal confidence, performance confidence, tolerance of failure, questionnaire validation

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1. Introduction

A theatre-based improvisation method[1] lends itself to move from an on-stage performance to serving as a tool to pursue nondramatic purposes. As an art form, improvised games or plays are created spontaneously on stage without a manuscript, commonly spiced by suggestions from the audience. At the other end of the improvisation continuum, we find an applied form of theatre art with specific goals, such as enhancing communication or creativity at work (Aadland et al., 2017; Pereira Christopoulos et al., 2016; Sawyer, 2004, 2006). Whether a genre of performance theatre or an instrument applied to various contexts, improvisational activity requires participants collaborate with one another rather than focus on their own ideas, goals, or egos (Lobman, 2005).

By definition, the core characteristic of improvisation is the lack of preparation (the Latin root of the word improvisation 'improviso', means 'unforeseen; not studied or prepared beforehand'). Given this lack of preparation, improvisers must resort to each other's instant ideas and environmental cues to proceed through a scene together. Thus, the core component of improvisation is mutual and unconditional support towards any idea the co-improviser presents. This generates psychological safety, since there is no need to fear mistakes nor failure resulting in the loss of social status or social rejection (Gerber, 2009; Vera & Crossan, 2005). Mistakes are not evaluated as errors, but merely as unexpected events directing the scene differently than anticipated (Barrett, 1998; Vera & Crossan, 2005). Thus, improvisation trains individuals to abandon anticipating forthcoming events and to resist the temptation to plan what should happen next. In other words, improvisation encourages individuals to focus on the present and to act together in a flexible manner. Combined with mutual support, the elements of connection and collaboration are at the forefront in improvisational mindset.

Viola Spolin and Keith Johnstone in particular developed methods to develop this mindset. Spolin (1999) created her training method in the 1950s in an attempt to encourage immigrant youth to integrate into American society. In the 1960s, Johnstone (1985, 1999) pursued sparking spontaneity and creativity among actors by coaching them to abandon their need to be funny or clever and to accept any idea without evaluating it as good or bad (Drinko, 2013a). In subsequent decades, these intertwined methods have evolved to represent the global improvisation scene of today. The current field of improvisation embraces a large variety of on-stage forms, from theatre sports competitions to full-length plays as well as applied forms that utilise the improvisational skill set as a tool to benefit personal growth, education, or business (Aadland et al., 2017; Benjamin & Kline, 2019; Kirsten & du Preez, 2010; Schwenke et al., 2020; Vera & Crossan, 2004).

The focus on interdependence and adaptability might explain why improvisation has been applied to fields where collaboration is vital, and which require a tolerance for uncertainty. For example, in the field of education, improvisation has been recommended as a tool to develop teachers' interaction skills (Graue et al., 2015; Lehtonen et al., 2016; Lobman, 2006; Sawyer, 2004, 2006; Toivanen et al., 2011) and creativity when teaching (Aadland et al., 2017; Lobman, 2005, 2014; Sawyer, 2012). Drinko (2013b) and Lobman (2006) argue that improvisation enhances listening skills and situation-focused sensitivity, leading

[1] We refer to a method originating from the medieval Commedia dell' arte, developed further by, for instance, Konstantin Stanislavski in Europe, Viola Spolin (1999) in the United States and Keith Johnstone (1985) in United Kingdom and Canada.

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to a heightened perception of subtle verbal and nonverbal cues from pupils and, ultimately, to better ensemble collaboration. Furthermore, medical education (Gao et al., 2018; Hoffmann-Longtin et al., 2018), clinical social work and psychotherapy (Romanelli et al., 2017; Romanelli & Tishby, 2019), marketing skills (Mourey, 2020), public speaking competence (Casteleyn, 2019), and organisational creativity (West et al., 2017) have all reportedly benefitted from improvisation training.

What, then, are the core components of improvisation, specifically the set of skills that can be taught, learned, and applied in such diverse contexts? Some were already mentioned, such as spontaneity, collaboration, support, flexibility, trust, listening skills, and tolerating mistakes. However, no canonised curriculum for improvisation exists, although the method is continually evolving. Varying lists of basic principles of improvisation have been put forth (e.g. Aadland et al., 2017; Berk & Trieber, 2009; Ratten & Hodge, 2016; Trotter et al., 2013), with rough consensus outlining the core components. For example, Zondag et al. (2020) include trust, acceptance, attentive listening, spontaneity, storytelling, and nonverbal communication as the fundamentals of improvisation, while Schwenke et al. (2020) introduce rapid decision-making, risk-taking, presence, accepting ideas, trust, and collaboration as the set of primary skills and abilities.

Seppänen et al. (2019; see also Gillian-Daniel et al., 2020) argue that improvisation is influential in enhancing interpersonal confidence, that is, the belief regarding one's capabilities related to effective social interactions. Rather than the more general trait of self-confidence, interpersonal confidence refers to a situationally specific feature, focusing on social interactions. Additionally, rather than relating to trust among interacting partners as described by Dontsov and Perelygina (2014), here, interpersonal confidence refers to trust in oneself. Seppänen et al. distinguish the concepts of interpersonal skills and interpersonal confidence, since one might possess abundant knowledge about interpersonal behaviour as well as an ability to perform during social interactions while lacking the confidence to use these resources. However, interpersonal confidence might improve by providing training on the set of skills improvisation is likely to cultivate, such as listening and collaboration skills, flexibility, presence, trust, and tolerating mistakes. Seppänen et al. (2019) employed the 30-item Interpersonal Confidence Questionnaire (ICQ) developed by Novák (2017, 2020) and found that, relative to controls, participants with less interpersonal confidence initially benefitted more from applied improvisation intervention than participants with more initial interpersonal confidence.

Previous research on the impact of improvisation training relied on instruments measuring psychological factors such as self-concept (DeBettignies & Goldstein, 2019); divergent thinking, uncertainty tolerance, and affective wellbeing (Felsman et al., 2020; Hainselin et al., 2018); self-esteem, self-efficacy, and resilience (Schwenke et al., 2020); or social skills, social anxiety, depression, hope, and creativity (Felsman et al., 2018). In addition, the physiological impact of improvisation has been studied (Seppänen et al., 2020) using heart rate, skin conductance, facial muscle activity, electrocortical activity, and stress hormone cortisol as indices of change in social stress following an improvisation intervention. All of these factors reveal interesting and important effects from the applied use of improvisation on human behaviour and wellbeing. However, a valid and reliable instrument developed to specifically measure the core components of improvisation would advance research and further our understanding of the impact of improvisation training. In addition to the aforementioned ICQ, the Improvisation Evaluation Scale (Berk & Trieber, 2009) was developed to measure the self-reported effectiveness of improvisation exercises in a

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classroom context, while the Communication Skills Assessment Inventory (Becker, 2012) assesses preservice teachers' improvisation self-efficacy. Yet, these self-report scales remain unvalidated.

1.1. Problem statement

Theatrical improvisation includes a model of constructive communication which has been applied to education. However, no validated self-report instrument exists to measure the multidimensional skillset acquired through improvisation training.

1.2. Research questions

1) What are the psychometric properties of ICQ?
2) What are the immediate and long-term effects of improvisation training as measured using ICQ?

1.3. Aim of study

The aim of the current study is twofold. Since ICQ (Novák, 2017, 2020), developed to measure the effects of improvisation training using the core components of improvisation, remains unvalidated, we first aimed here to validate the questionnaire and examine its psychometric properties (composite and test–retest reliability and discriminatory power), as well as investigate the relationship of ICQ to other related psychological constructs. Second, we aimed to determine the immediate and long-term effects of improvisation training on interpersonal confidence using ICQ.

To investigate the relationship between self-esteem and interpersonal confidence, we used Rosenberg's Self-esteem Scale (RSE, Robins et al., 2001; Rosenberg, 1965). We hypothesised that a positive correlation exists between interpersonal confidence and self-esteem (one's perceived self-worth and self-acceptance), since one's thoughts and opinions of oneself include a social component (Gruenewald et al., 2004), possibly contributing to interpersonal confidence. We also contrasted interpersonal confidence with social phobia, since these two constructs should theoretically associate inversely with each other. We used the Mini-Social Phobia Inventory (Mini-SPIN, Connor et al., 2001; Ranta et al., 2012; Seeley-Wait et al., 2009) for the comparison, hypothesising that an inverse relationship exists between interpersonal confidence and social phobia. In terms of the effects of improvisation training, we hypothesised that interpersonal confidence increases following an improvisation intervention.

2. Validation of the Questionnaire

The development of ICQ was reported in Novák (2017). In summary, when constructing the questionnaire, ICQ statements were created by an improvisation instructor (second author) at the University of Turku in 2016 to assess the level of anxiety or confidence experienced during various social interactions. The statements reflected the components of social interactions, which improvisation training might hypothetically influence (e.g., listening and collaboration skills, flexibility, and status behaviour[2]). Both

[2] In improvisation, status behaviour is understood as various verbal and nonverbal behaviours indicating the social dominance of a person (Johnstone, 1985, pp. 33–39; Mason et al., 2014). Status behaviour is often subtle and subconscious, while status exercises during improvisation training help individuals become aware of and manipulate

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positive and negative statements were created, with a minimum of two items related to each component. The face and content validity of the items were evaluated by two professors of psychology, while a group of undergraduate students and persons with no experience in improvisation commented on the items. The unambiguity of the statements was examined, and poorly worded items were corrected. The final 30-item questionnaire consisted of randomly mixed positively and negatively worded statements rated on a Likert scale from 0 to 5 (0 = strongly disagree, 5 = strongly agree). The questionnaire was administered to 16 student teachers three times during a pilot improvisation intervention related to the development of ICQ (Novák, 2017). The negative ICQ statements were reversed to reflect positive statements and a summation variable was calculated producing each participant's mean ICQ score (0–5). Higher scores indicated a higher interpersonal confidence.

2.1. Sample

For this study, a sample (n = 208) for validating ICQ was pooled from several improvisation courses (a 10-week, a 7-week, and four 5-week courses; see Figure 1). The data from the 10- and 5-week courses provided a new dataset, while the data from the 7-week course were utilised in Seppänen et al.'s (2019) intervention study. The entire sample consisted of undergraduate students recruited from nine universities in Finland (161 female, 40 male, and 7 other) ranging in age from 19 to 48 years (M = 26.87, SD ± 6.4). Participants enrolled either in an improvisation course aimed at enhancing social interaction skills or in a wait-listed control group. Students received course credit for participation in the study. All participants signed an informed consent form and completed an online demographic questionnaire, the original 30-item ICQ, and the Rosenberg's Self-esteem Scale among other questionnaires, which excluding the Mini-SPIN, lie beyond the scope of this specific study.

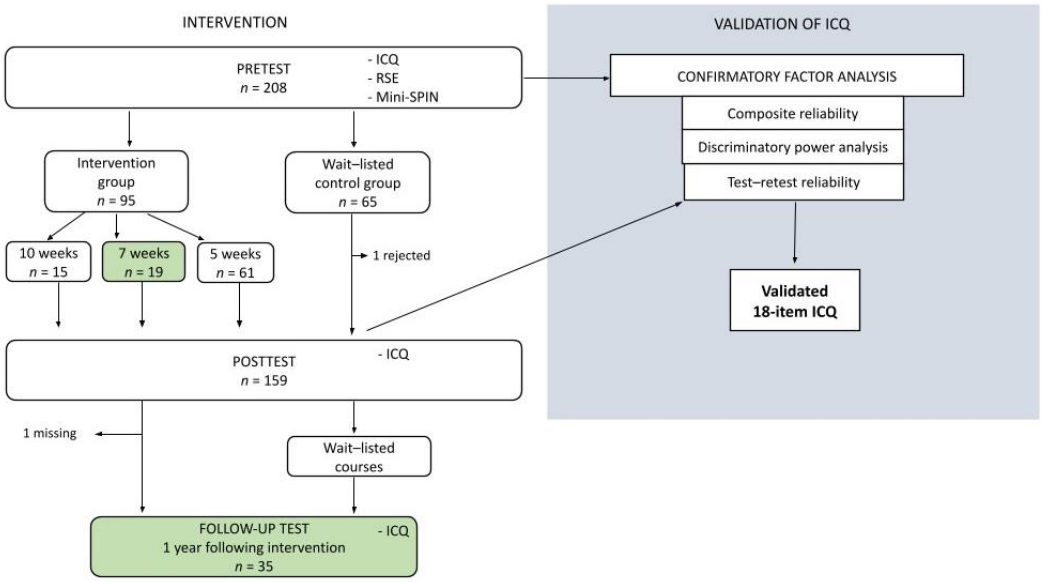

Figure 1. Study design and subsamples. Green shading indicates the subsample used in Seppänen et al., 2019

one's status behaviour. Therefore, status is not a permanent feature of an individual, but can be chosen and displayed according to situational requirements.

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2.2. Confirmatory factor analysis (CFA)

We used IBM's SPSS for Windows (version 27) and IBM's SPSS AMOS (version 27) for all statistical analyses. Based on the literature and their professional experience, the first and second authors constructed a measurement model which clustered the 30 statements of ICQ along 8 dimensions (factors) reflecting the components of improvisation in the context of social interactions. These factors were labeled as follows: 1. performance confidence, 2. flexibility, 3. listening skills, 4. tolerance of failure, 5. trust, 6. collaboration motivation, 7. status behaviour, and 8. presence. Table 1 shows this hypothesised factor structure of ICQ. A confirmatory factor analysis (CFA) was performed to validate the eight-factor measurement model of the questionnaire.

Table 1. The hypothesised factor structure of the Interpersonal Confidence Questionnaire (ICQ)

1. Performance confidence
28. I am afraid of making mistakes when I perform.*
3. When I am delivering a presentation, I focus primarily on keeping myself together.*
27. I am anxious about saying something wrong.*
4. During a presentation, it disturbs me if my cheeks blush or my hands shake.*
5. I often contemplate for a long time what I have spoken out loud somewhere.*
2. Flexibility
20. I am open to change.
22. I usually want things to be done in the most familiar way.*
13. I take risks in my life.
7. I am afraid of sudden changes to my plans.*
25. I have the courage to take chances when dealing with new situations.
15. I am confident for the future; things tend to work out.
3. Listening skills
6. When I talk to others, I take the other speakers into account.
21. I am a good listener.
12. I give other people positive feedback.
16. Usually, I do not listen to what other people talk about.*
9. I sometimes talk over others and do not wait for my turn.*
4. Tolerance of failure
10. I easily take things personally.*
11. I find it difficult to receive criticism.*
1. I do not mind what other people think of me.
14. If I have made a mistake, I take it with a sense of humor.
5. Collaboration motivation
2. I prefer to work within a team.
18. I find it easier to work alone than with someone.*
6. Trust
8. I enjoy attention from other people.
30. I can easily trust strangers.
29. I have the courage to throw myself into situations that require physical contact.
7. Status behaviour
24. I generally adjust my opinions during group work.
19. I usually assume the leading role in a group.
17. I often make sure that I have done things correctly.*
8. Presence
23. I find it difficult to focus on being present in the here and now.*
26. I can easily concentrate on the task at hand.

Note: *Scale to be reversed.

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Multiple fit indices were used to estimate the model fit using the following criteria: 1. the ratio of chi-square to degrees of freedom (χ^2/df, between 1 and 3); 2. the Comparative Fit Index (CFI, > 0.90); 3. the Tucker Lewis Index (TLI, > 0.90); 4. the root mean square error of approximation (RMSEA, < 0.06); and 5. the standardised root mean square residual (SRMR, < 0.05). Factor loadings < 0.5 were discarded from the model as well as items with standardised residual covariances exceeding 1.96 (Cabrera-Nguyen, 2010), which resulted in the omission of 10 items. Since only one item representing the factors of trust and status behaviour, respectively, remained, these individual items were omitted as well[3]. The final 18-item, 6-factor measurement model of ICQ (Figure 2) demonstrated a satisfactory model fit (χ^2/df = 1.52, CFI = 0.94, TLI = 0.93, RMSEA = 0.05, SRMR = 0.05).

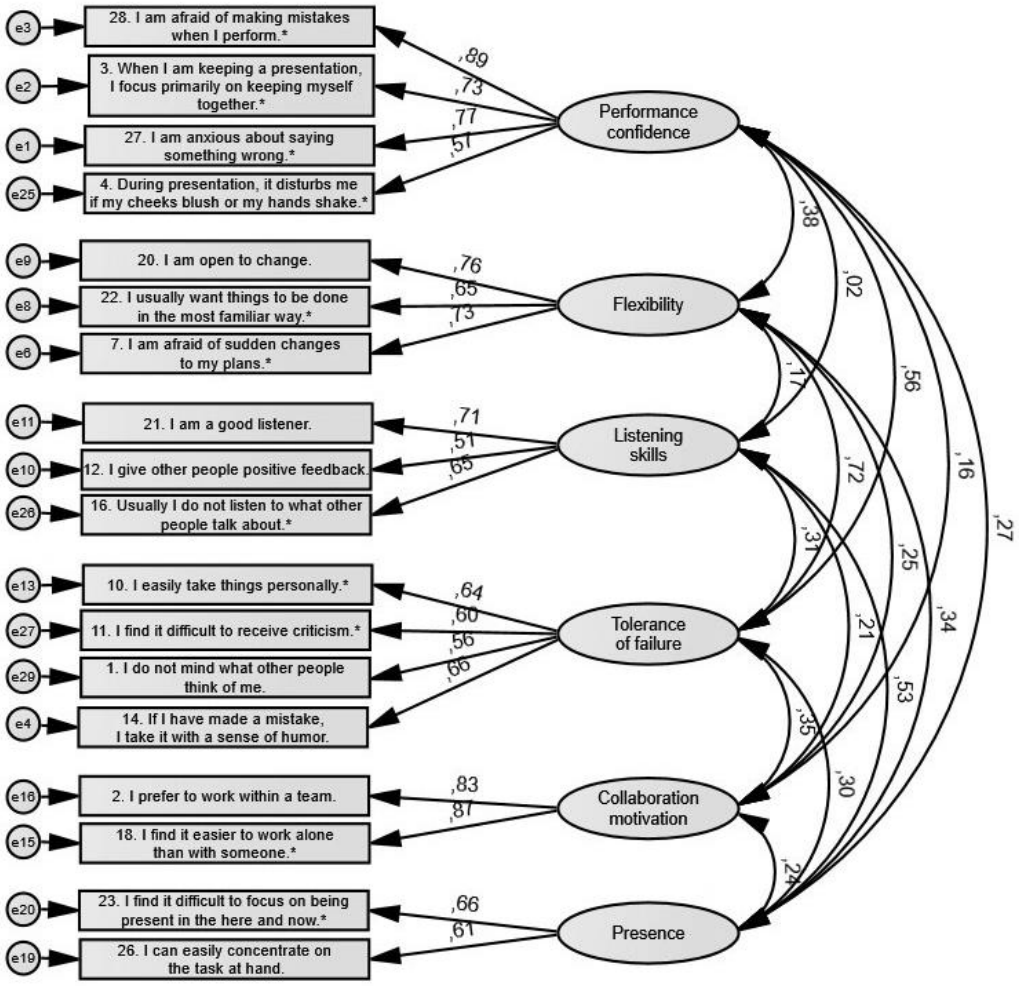

Figure 2. The 18-item, 6-factor measurement model of the Interpersonal Confidence Questionnaire (ICQ). The small circles on the left signify the error terms, the squares provide the original individual statements, and the ovals signify the ICQ factors. Factor loadings are depicted with arrows from factors to statements, and the correlations between factors are indicated by the curved multidirectional arrows on the right

[3] One item could be representative of a specific factor, assuming a strong theoretical justification. Here, Q29, which focused on physical contact, was not deemed adequate to represent trust, nor did Q19, indicative of a high status, represent the entire scope of status expression. Improvisation training does not aim to enhance either high- or low-status behaviour but seeks instead to improve the flexibility of status behaviour depending on contextual requirements.

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2.3. Composite reliability

The internal consistency of the six factors were examined by calculating their composite reliability (Raykov, 1997) using Microsoft Excel. Excluding presence, the factors reached the cut-off value of 0.60 (Table 2), indicating an adequate internal consistency.

Table 2. Composite reliability of the ICQ factors

Factor	Composite reliability
Performance confidence	0.83
Flexibility	0.76
Listening skills	0.66
Tolerance for failure	0.71
Collaboration motivation	0.84
Presence	0.57

2.4. Test–retest reliability

In total, 65 control group participants repeated ICQ approximately 8 weeks (M = 8.5, SD ± 3.7) after the initial administration. We used the Spearman's correlation analysis to establish the test–retest reliability (i.e., stability over time) of ICQ between measurements. The Spearman's rho for the 18-item questionnaire ($rs = 0.853$, $p < 0.01$) revealed a strong association between measurements.

2.5. Discriminatory power

The discriminatory power of ICQ was examined using the contrasting groups method following Richaud et al. (2017). We conducted an independent samples t-test to determine if a difference in means existed for participants with the highest interpersonal confidence scores (upper quartile) relative to participants with the lowest interpersonal confidence scores (lower quartile). The lower and upper quartiles differed in the 18-item ICQ [t (96) = -24.691, $p < 0.001$].

2.6. Relationship of interpersonal confidence between self-esteem and social phobia

The relationship between interpersonal confidence and self-esteem was determined using the Pearson's correlation coefficient. A positive correlation was observed between the 18-item ICQ and Rosenberg's Self-esteem Scale ($r = 0.550$, $p < 0.001$).

A subsample (102 female, 28 male, and 6 other; age $M = 26.6$; SD ± 6.2) of the study also completed the Mini–Social Phobia Inventory (Mini-SPIN). A Pearson's correlation coefficient analysis revealed a negative correlation between the 18-item ICQ and Mini-SPIN ($r = - 0.661$, $p < 0.001$).

3. Impact of Improvisation Training Measured by the 18-Item ICQ

3.1. Measures

The original 30-item ICQ was administered at three time points (T1, pretest; T2, posttest; and T3, follow-up test one year following the intervention). The impact of the improvisation training was examined

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utilising the 18-item ICQ and its factors performance confidence, flexibility, listening skills, tolerance of failure, collaboration motivation, and presence.

3.2. Participants

Two subsamples of the sample utilised in CFA were used to study the impact of improvisation training (Figure 1). First, to test the immediate effect of improvisation training, we used a subsample (n = 160) consisting of those participants who completed ICQ both before (T1) and after (T2) improvisation training. Participants (124 female, 32 male, and 4 other; ranging in age from 19 to 48 years [M = 26.6, SD ± 6.3]) were pooled from several improvisation courses conducted by the first and second authors. The intervention group (n = 95) participated in a 10-week (n = 15), a 7-week (n = 19), or 5-week (n = 61) improvisation course. The wait-listed control group (n = 65) completed ICQ for the second time after equivalent periods (10 weeks, n = 15; 7 weeks, n = 18; and 5 weeks, n = 32).

Second, to test the long-term effects of improvisation training, we used a follow-up subsample consisting of participants who completed ICQ before (T1), after (T2), and one year (T3) following the improvisation intervention [n = 35; 31 female, 3 male, and 1 other; ranging in age from 20 to 40 years (M = 27.6, SD ± 6.6)]. The intervention group of this subsample participated in a 7-week (17.5 h) improvisation course, the results of which appear elsewhere (Seppänen et al., 2019). The control group participated in a shorter two-day (8 h) improvisation course after the intervention study. Thus, the data from T1 and T2 were the same as that in Seppänen et al. (2019), analysed here using the 18-item ICQ. The follow-up data (T3) relied on a new dataset.

3.3. Interventions

Following the pretest, two teachers specialised in theatrical improvisation conducted the intervention (a 7-week course by the first author and 5- and 10-week courses by the second author). Lessons lasted 2.5 hours each for the 7-week course and 2 hours each for the 5- and 10-week courses. Participants were taught the basics of improvisation, including spontaneity, presence, tolerating mistakes, accepting and continuing ideas, group creativity, and status expression (interpersonal power and nonverbal interaction, such as eye contact, facial expressions, gestures, and body posture) (Barrett, 1998; Drinko, 2013b; Johnstone, 1985, 1999; Lobman, 2006; Sawyer, 2004, 2012; Spolin, 1999; Vera & Crossan, 2005). More specific details regarding the 7-week improvisation training appear in Seppänen et al. (2019). The most important content was comparable to the 5-week course. The 10-week course targetted student teachers, during which the three last meetings consisted of teacher students themselves teaching improvisation exercises to one another.

3.4. Data analyses

Statistical analyses were performed using IBM's SPSS for Windows (version 27.0). The negatively worded statements were converted to positive statements, and summation variables of the 18-item ICQ and its factors were calculated. An independent samples t-test was performed to test the age difference between research groups. To identify the immediate effects of the improvisation intervention on interpersonal

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confidence, performance confidence, flexibility, listening skills, tolerance of failure, collaboration motivation, and presence, we conducted a two-way analysis of variance (ANOVA) for mixed measures including TIME (pretest and posttest) as a within-group factor and GROUP (intervention group and control group) as a between-group factor. Paired-samples t-tests were performed as follow-up tests. We also used Bonferroni corrections to address the problem of multiple comparisons. We set the alpha level at 0.05 for all statistical analyses, while estimates of the effect size are reported using the partial eta squared (ηp^2).

To identify the long-term effects of the improvisation intervention, we adopted the Johnson–Neyman procedure (JN) (Johnson & Neyman, 1936; Potthoff, 1964; Preacher et al., 2006) following Seppänen et al. (2019). JN determines the levels of the pretest where the posttest values differ between research groups, producing a continuous 'region of significance' (D'Alonzo, 2004; Ji, 2016; Johnson, 2016; Tunca, 2016). Since Seppänen et al. found a heterogeneous treatment effect from the improvisation intervention benefiting those with lowest pretest ICQ scores most, we used the same JN method to study whether this effect remained one year later. A CAHOST–Excel workbook developed by Carden et al. (2017) was used to calculate the JN region of significance.

3.5. Results

An independent samples t-test detected no difference related to the mean age between the intervention and control groups at the pretest [$t(160) = -0.274$; $p = 0.785$].

3.5.1. Immediate impact of improvisation training

To study the immediate impact of improvisation training, an ANOVA for mixed measures revealed a TIME x GROUP interaction for the 18-item ICQ [F (1, 158) = 12.400; $p < 0.001$; $\eta p^2 = 0.073$] and for the factors of performance confidence [F (1, 158) = 13.858; $p < 0.001$; $\eta p^2 = 0.081$] and tolerance of failure [F (1, 158) = 5.525; $p = 0.020$; $\eta p^2 = 0.034$]. For flexibility, there was a marginally significant interaction [F (1, 158) = 3.238; $p = 0.074$; $\eta p^2 = 0.020$]. Adjacent paired t-tests indicated that interpersonal confidence (Figure 3a) increased from the pre- to the posttest for the intervention group [$t(94) = 5.377$; $p < 0.001$], but not for controls [$t(64) = 0.621$; $p = 0.537$], a finding similar to performance confidence (Figure 3b) [intervention group: $t(94) = 5.752$; $p < 0.001$; controls $t(64) = 0.766$; $p = 0.446$] and tolerance of failure (Figure 3c) [intervention group: $t(94) = 3.607$; $p < 0.001$; controls: $t(64) = 0.338$; $p = 0.736$]. For collaboration motivation (Figure 3f), there was a significant main effect for TIME [F (1, 158) = 12.208; $p = 0.001$; $\eta p^2 = 0.072$], but no interaction for GROUP, indicating that the level of collaboration motivation increased from the pre- to posttest irrespective of the research group.

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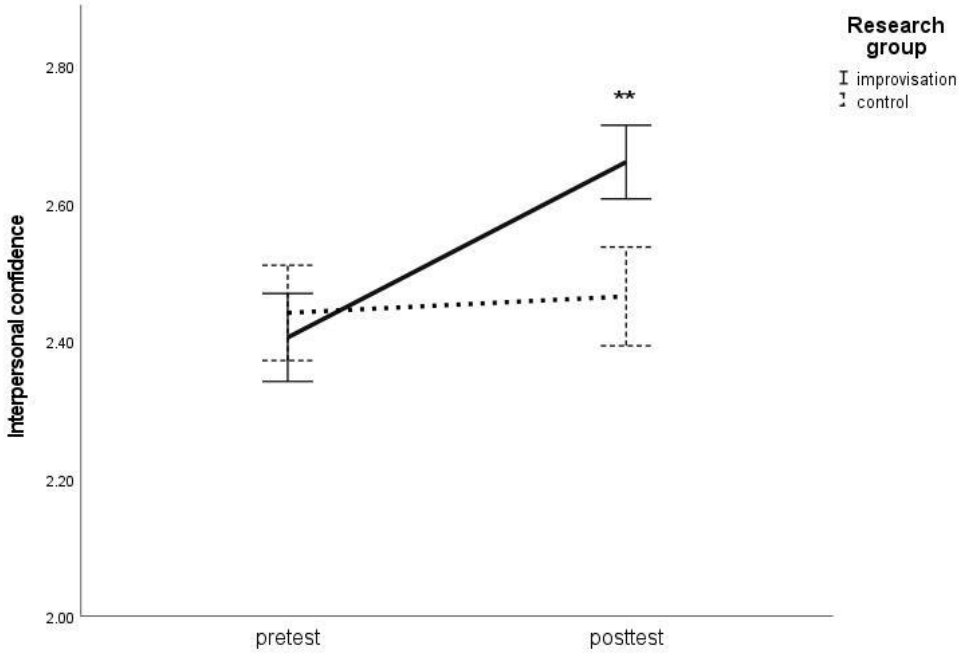

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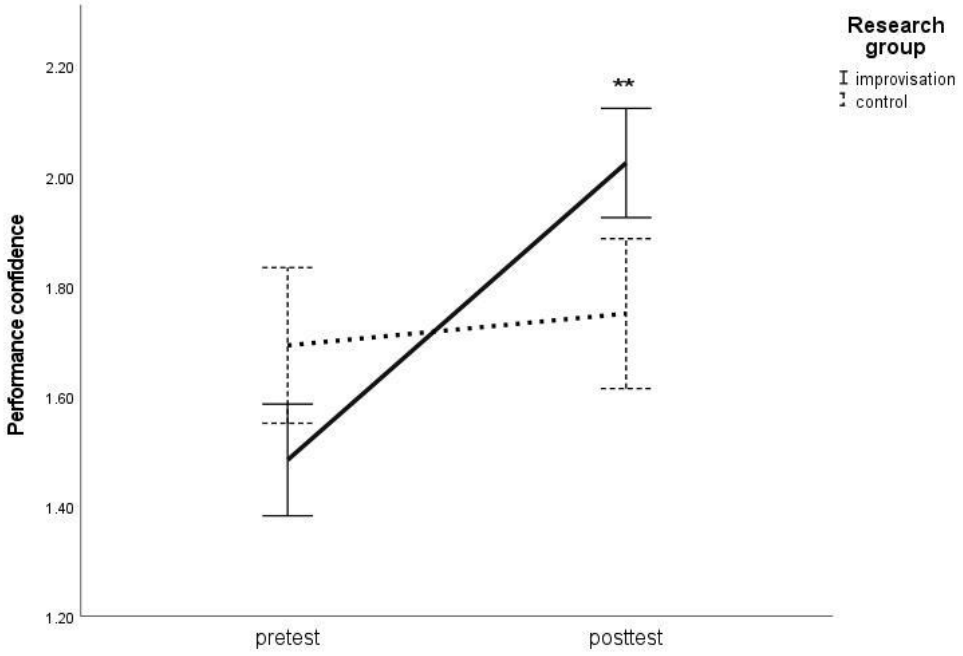

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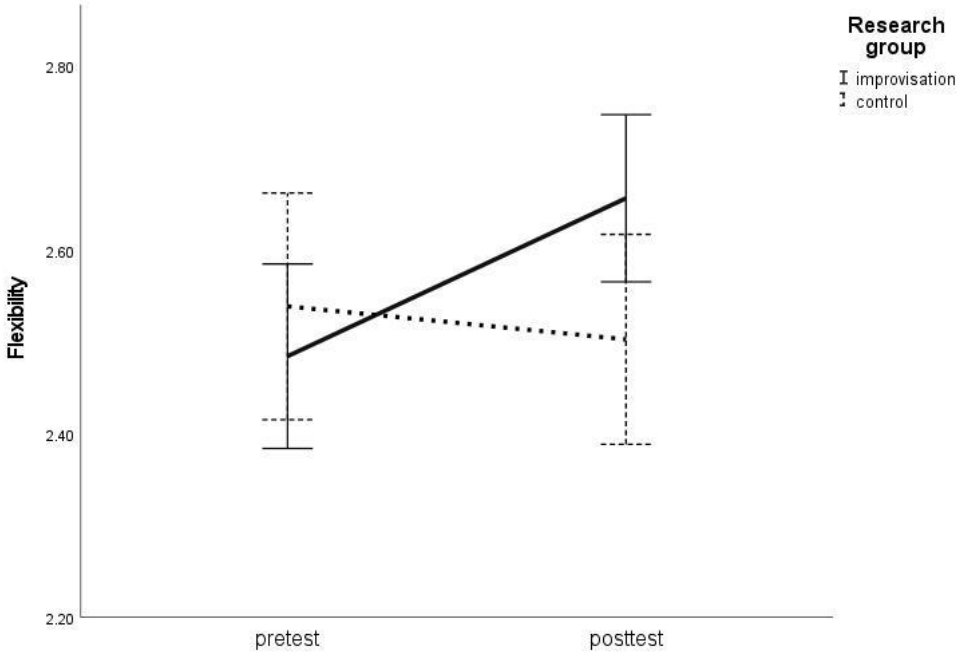

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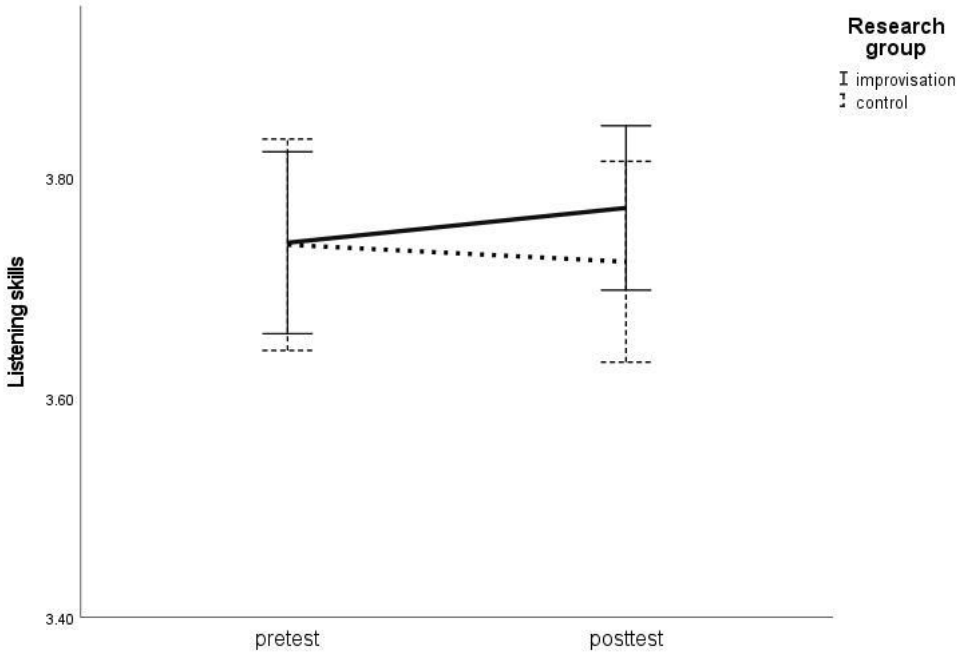

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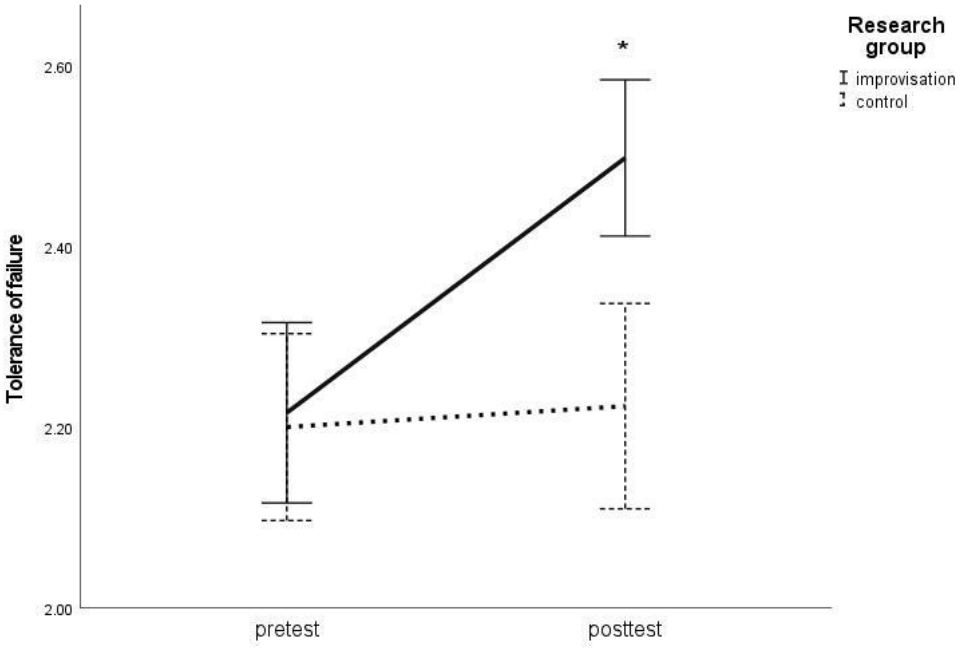

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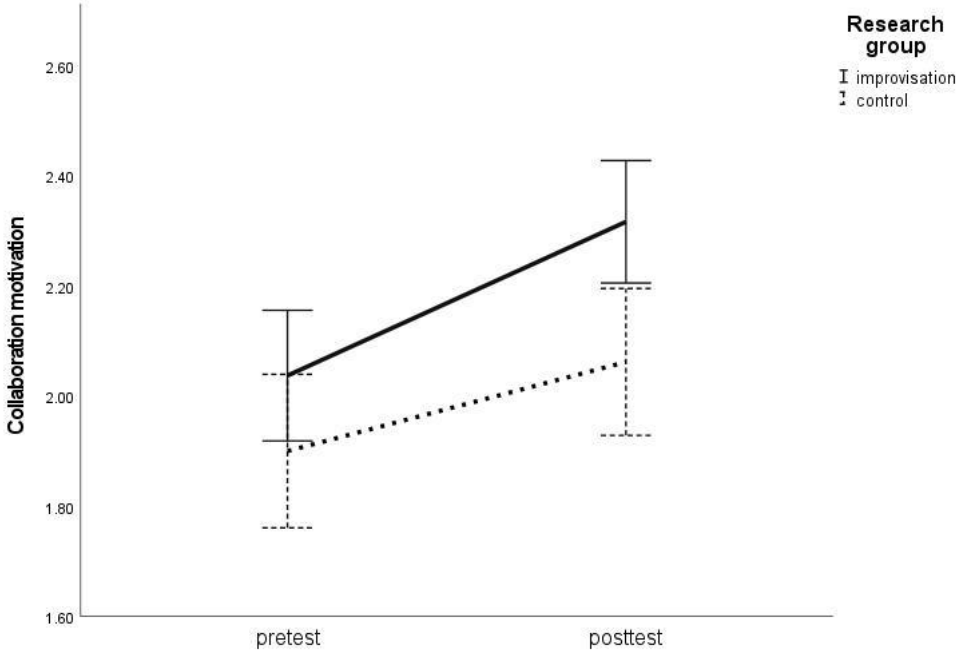

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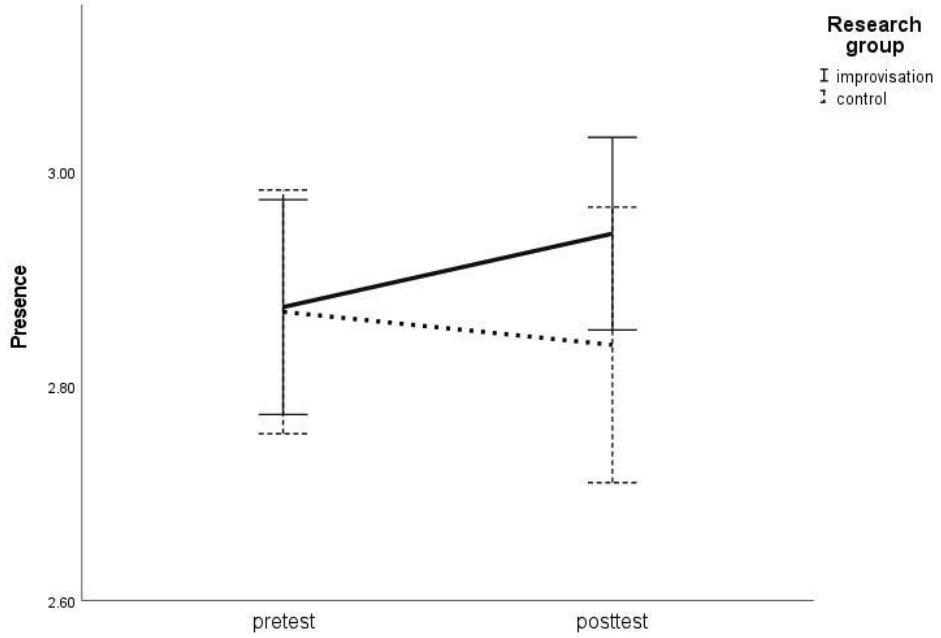

(g)

Figure 3. a) Interpersonal confidence as measured by the a) 18-item ICQ, b) performance confidence, c) flexibility, d) listening skills, e) tolerance of failure, f) collaboration motivation, and g) presence before and after improvisation training. $^{**}p < 0.001$, $^{*}p < 0.05$; error bars: ±1 SE

We conducted an additional ANOVA for repeated measures to identify whether the pretest scores differed from one another, since differential treatment effects among factors raised the question of the impact of their initial level. The ANOVA revealed a main effect for the pretest scores [F (6, 954) = 124,644; $p < 0.001$; $\eta p^2 = 0.439$] and adjacent pairwise comparisons indicated that the pretest differed ($p < 0.05$ for all) excluding ICQ versus flexibility ($p = 1.00$) and collaboration motivation versus tolerance of failure ($p = 0.549$).

3.5.2. The long-term impact of improvisation training

Table 3 provides the regions of significance for the differences between experimental groups revealed through the JN analyses.

Table 3. Johnson-Neyman regions of significance for the differences between experimental group

	Region of significance	
	T1 vs. T2	T1 vs. T3
Interpersonal confidence	1.23–2.74	-
Performance confidence	0.04–2.51	< 1.96
Flexibility	-	-
Listening skills	-	-
Tolerance of failure	-	-
Collaboration motivation	-	-
Presence	-	-

Note. The range of the Interpersonal Confidence Questionnaire is 0–5. Region of significance reveals the range of pretest values, where the difference between research groups at posttest (T2) and follow-up test (T3) is significant.
Abbreviations: T1 = pretest, T2 = posttest, T3 = follow-up test

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The JN analysis for the 18-item ICQ at T1 versus T2 (Appendix B1a) indicated a significant increase in interpersonal confidence relative to controls among participants with pretest scores falling within the range of 1.23 to 2.74 (n = 8), but not for those with lower (n = 1) or higher pretest scores (n = 10). No region of significance was observed at T1 versus T3 (Appendix B1b). The mean values for interpersonal confidence at the pre-, post-, and follow-up tests appear in Figure 4.

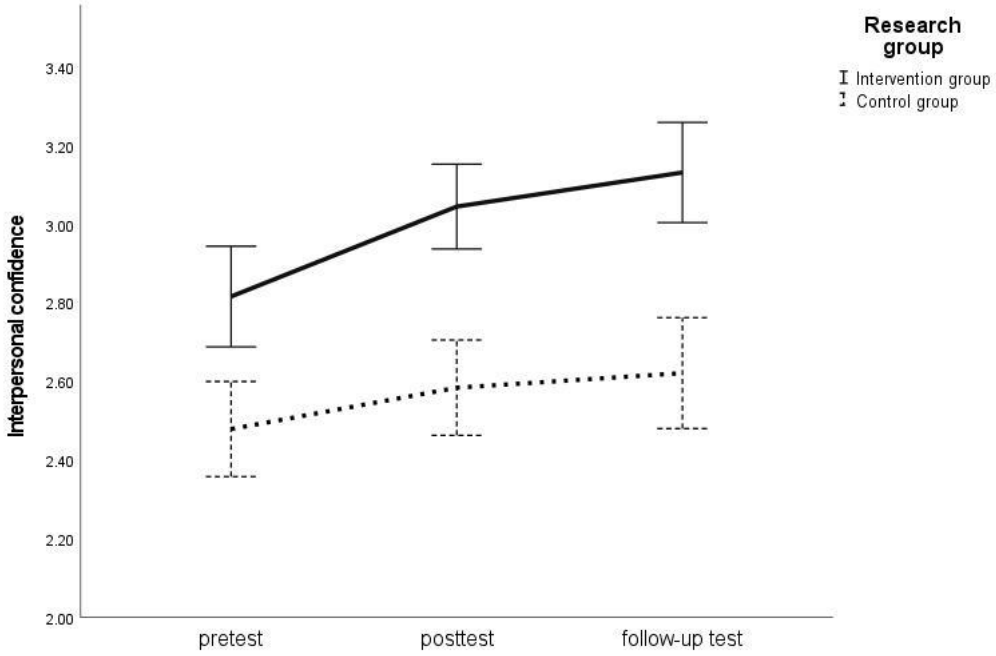

Figure 4. Mean values of interpersonal confidence at the pre-, post-, and follow-up tests (one year). Error bars: ±1 SE

The JN analysis for the ICQ factor performance confidence at T1 versus T2 (Appendix B2a) indicated a significant increase relative to controls for participants, with the pretest performance confidence score ranging from 0.04 to 2.51 (n = 16), excluding those with lower (n = 1) or higher pretest scores (n =2). At T1 versus T3 (Appendix B2b), participants with a low pretest performance confidence (<1.96, n = 14) exhibited an increased performance confidence relative to controls, which was not found among those with high pretest scores (n = 4). These results indicate that, relative to controls, the increase in performance confidence was significant for participants in the intervention group with low pretest scores and that this effect persisted for one year. Mean values for performance confidence at the pre-, post-, and follow-up tests appear in Figure 5.

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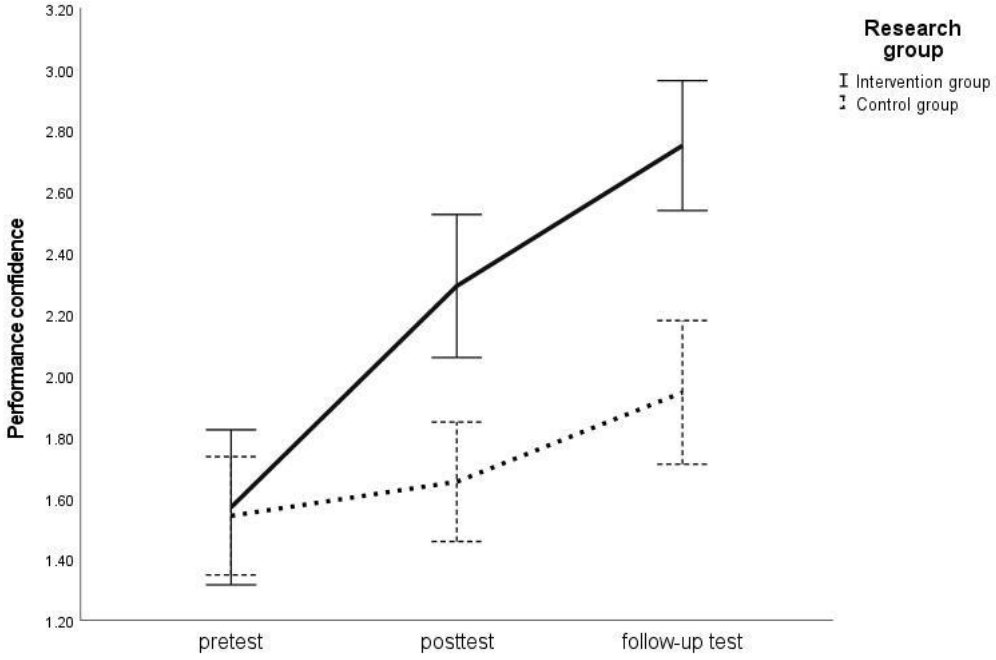

Figure 5. Mean values for performance confidence at the pre-, post-, and follow-up tests (one year). Error bars: ±1 SE

The JN analysis identified no areas of significance for the factors flexibility, listening skills, tolerance of failure, collaboration motivation, and presence, indicating no differences between the research groups at T1 versus T2 or at T1 versus T3.

4. Discussion

To our knowledge, no validated self-assessment instruments exist to measure the multidimensional skill set acquired through improvisation training. Therefore, this study addressed this methodological gap by validating the Interpersonal Confidence Questionnaire (ICQ), developed by Novák (2017, 2020) to evaluate the impact of improvisation training. Additionally, we investigated the immediate and long-term impact of improvisation interventions using ICQ.

The concept of interpersonal confidence refers to a situationally specific context, focusing on social interactions rather than on the more general trait of self-confidence (Seppänen et al., 2019). Similarly, tools such as the Scale of Perceived Social Self-Efficacy (Smith & Betz, 2000) and the Scale of Perceived Empathetic and Social Self-Efficacy (Di Giunta et al., 2010) measure the social dimension of self-efficacy in general. Self-efficacy, a concept developed by Bandura (1977, 1982), refers to the belief in one's capacity to manage environmental demands and perform successfully in a given task (e.g., for family–teacher communication, see De Coninck et al. (2020); for negotiating during role-play simulation, see Duchatelet et al. (2021)). Accordingly, ICQ targets the measurement of an individual's perceived capability related to effective social interactions rather than possessing social skills.

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4.1. Psychometric properties of ICQ

The results of this study provide an 18-item scale of interpersonal confidence across six factors: performance confidence, flexibility, listening skills, tolerance of failure, collaboration motivation, and presence. The composite reliability of the factors was adequate, excluding the 0.57 value for the factor presence, which approached the cut-off limit of 0.6. This factor might benefit from the inclusion of additional statements to assess presence in ICQ. The level of interpersonal confidence remained stable across the relatively long test–retest interval of 8 weeks, indicating a high test–retest reliability. ICQ also exhibited a discriminatory power since the mean values between the highest and lowest percentiles differed significantly. The Pearson's correlation coefficients revealed a positive correlation between interpersonal confidence and self-esteem, measured using the Rosenberg Self-Esteem Scale. However, the medium correlation (r = 0.550) might indicate that the Rosenberg Self-Esteem Scale may assess more general and ICQ more situation-specific and socially focused aspects of self-related opinions. Finally, interpersonal confidence and social phobia, measured using Mini-SPIN (Connor et al., 2001; Ranta et al., 2012; Seeley-Wait et al., 2009), revealed an expected inverse relationship.

4.2. Impact of improvisation training on interpersonal confidence

We used the 18-item ICQ to study the immediate and long-term impact of improvisation training on interpersonal confidence and its factors performance confidence, flexibility, listening skills, tolerance of failure, collaboration motivation, and presence. As expected, our results revealed improvements to interpersonal confidence, performance confidence, and tolerance of failure for the improvisation group relative to controls at the posttest. The improvement in flexibility was marginally significant. Interestingly, collaboration motivation increased irrespective of improvisation training. One possible explanation for this unexpected result relates to the overall collaboration experience, since university training might have included group assignments for all students during the research period. Thus, the control group also might have gained experience with and motivation for collaboration through group work. Another explanation relates to the questionnaire itself. Collaboration motivation was measured using two statements, whereas performance confidence and tolerance of failure relied on four statements, respectively. Perhaps these four-item factors more accurately assessed the feature and its change following the intervention. This observation might explain also the missing result for the two-item factor presence, which showed the lowest composite reliability score. In terms of listening skills, the lack of the hypothesised increase in the improvisation group might relate to the ceiling effect. In this case, the pretest score for listening skills was relatively high (M = 3.7; SD ± 0.80) using a Likert scale ranging from 0 to 5. Furthermore, the initial level for listening skills was highest relative to other factors. Thus, it is possible that there was less potential for improvement within listening skills.

Results from the 18-item ICQ agreed with previously reported pretest–posttest findings measured using the original 30-item ICQ (Seppänen et al., 2019). At the posttest, both scales detected a differential effect from improvisation training on interpersonal confidence resulting in a stronger benefit to participants with low pretest scores. However, this effect disappeared one year later. Perhaps the development of interpersonal confidence ceased once improvisation training ended (none of the participants reported

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attending improvisation courses following the intervention). Yet, since the wait-listed control group participated in a shorter improvisation course following the study period, attending a course possibly confounded our results by diminishing the between-group difference.

In terms of ICQ factors, improvisation training enhanced performance confidence relative to the control group, and this between-group difference persisted for one year. Again, participants with low initial levels of performance confidence gained the most benefit from the intervention. For the other factors, no between-group differences at the post- nor follow-up tests were identified within this subsample. Possibly, the statistical power was insufficient here to reveal intervention effects.

Why then did the improvisation intervention influence performance confidence? Participant motivation might explain this outcome. The improvisation course advertisement mentioned a special target group, 'persons struggling with performance anxiety', although other interested individuals were also accepted into the course (excluding those with previous experience with improvisation training). Perhaps, the primary motivation for attending the improvisation course was to alleviate performance anxiety, which might have led participants to challenge themselves to take risks encouraged by the psychologically safe atmosphere and supportive improvisation group, eventually leading to an increased performance confidence. Some support for this explanation is provided by the lower initial level of performance confidence versus other factors. Thus, there might have been more potential for a change in performance confidence relative to other factors. This finding agrees with studies on the impact of improvisation training (DeBettignies & Goldstein, 2019) and drama education (Wright, 2006) on school children's self-concept, that is, how students perceive their status and abilities. They found a positive training effect, but only among children who began with relatively lower levels of self-concept. While self-concept represents a more general construct than performance confidence, these results suggest that the gains from interventions may be related to the initial level of the targeted psychological construct.

Additionally, the enhanced performance confidence endured for one year regardless of the discontinuation of improvisation training, possibly reflecting a transfer effect. Student teachers confront performance situations frequently in their studies (e.g., presentations and teaching practice). Perhaps, improved performance confidence transferred from the improvisation training context to their everyday life–performance situations, such that the benefits persisted.

The results of this study offer practical implications for fields where interpersonal competencies are required, such as in the context of education. According to Coppens (2002), a teacher should establish a safe space where pupils can experiment and learn, and be continually ready to integrate unexpected contributions from pupils and the environment. While planning lessons is a crucial component of a teacher's professional skills, responsiveness plays an equally important role—that is, readiness to abandon a plan and intuitively shift the course of a lesson according to the situational challenges. This situational sensitivity and responsiveness as well as intuitive thinking can be practised through applied improvisation (Aadland et al., 2017). As Sawyer (2011) states, great teaching requires both structuring elements and improvisational brilliance.

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4.3. Limitations of the study

This study has several limitations. Further research is needed to investigate the psychometric qualities of ICQ in more detail. As such, future research should examine the convergent, divergent, and predictive validity of ICQ. In addition, it would be interesting to examine the association between interpersonal confidence and interpersonal communication competence (Rubin & Martin, 1994), a close yet more general concept reflecting aspects of interpersonal behaviour. Moreover, the results here should be replicated and extended to different cultures, since these results cannot be generalised beyond Finnish culture. We present here an English translation of the scale (Appendix A1, in Finnish see Appendix A2), which requires validation among international respondents. Despite these limitations, the present study contributes to the literature in educational research and offers practical implications for fields where interpersonal competencies are required.

4.4. Conclusions

This study provides initial evidence of the validity and reliability of ICQ as a self-report measure of interpersonal confidence. In addition to providing a useful tool[4] to determine the impact of improvisation training in future, ICQ may be used as a screening tool to identify individuals who might benefit the most from the training—that is, persons with low interpersonal confidence. Our results demonstrated that improvisation training promoted interpersonal confidence, performance confidence, and tolerance of failure relative to a control group. One year later, performance confidence persisted at a higher level than that found among the control group. These results extend our understanding of the impact of improvisation training, demonstrating that a relatively short improvisation intervention might enhance interpersonal confidence, specifically among those who most need it.

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[4] Usage of ICQ is possible and most welcome using this article as a reference.

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Appendix A1. Interpersonal Confidence Questionnaire (ICQ)

What do you think about these statements?

0 = strongly disagree, 1 = disagree, 2 = somewhat disagree, 3 = somewhat agree, 4 = agree, 5 = strongly agree

1. I do not mind what other people think of me.
2. I prefer to work within a team.
3. When I am delivering a presentation, I focus primarily on keeping myself together.*
4. During a presentation, it disturbs me if my cheeks blush or my hands shake.*
5. I am afraid of sudden changes to my plans.*
6. I can easily concentrate on the task at hand.
7. I find it difficult to receive criticism.*
8. I give other people positive feedback.
9. If I have made a mistake, I take it with a sense of humor.
10. Usually I do not listen to what other people talk about.*
11. I find it easier to work alone than with someone.*
12. I am open to change.
13. I easily take things personally.*
14. I usually want things to be done in the most familiar way.*
15. I find it difficult to focus on being present in the here and now.*
16. I am a good listener.
17. I am anxious about saying something wrong.*
18. I am afraid of making mistakes when I perform.*

*Scale to be reversed.

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Appendix A.2. Interpersonal Confidence Questionnaire in Finnish

Mitä ajattelet väittämistä?

0 = täysin eri mieltä, 1 = eri mieltä, 2 = melko eri mieltä, 3 = melko samaa mieltä, 4 = samaa mieltä, 5 = täysin samaa mieltä

1. En välitä siitä, mitä muut minusta ajattelevat.
2. Teen mieluiten töitä tiimissä.
3. Kun pidän esitystä, keskityn ensisijaisesti pitämään itseni koossa.*
4. Esiintyessäni minua häiritsee, jos punastun tai käteni tärisevät.*
5. Pelkään äkkinäisiä muutoksia suunnitelmissani.*
6. Minun on helppo keskittyä käsillä olevaan tehtävään.
7. Minun on vaikea ottaa vastaan kritiikkiä.*
8. Annan muille positiivista palautetta.
9. Otan huumorilla vastaan mokailuni.
10. En yleensä jaksa kuunnella mitä muut ihmiset puhuvat.*
11. Minusta on helpompi tehdä töitä yksin kuin jonkun kanssa.*
12. Suhtaudun avoimesti muutoksiin.
13. Otan helposti asiat henkilökohtaisesti.*
14. Haluan, että asiat tehdään useimmiten tutulla tavalla.*
15. Minun on vaikea keskittyä olemaan läsnä tässä ja nyt.*
16. Olen hyvä kuuntelija.
17. Jännitän, että sanon jotain väärin.*
18. Pelkään mokaavani esiintyessäni.*

*Asteikko käännettävä.

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Appendix B

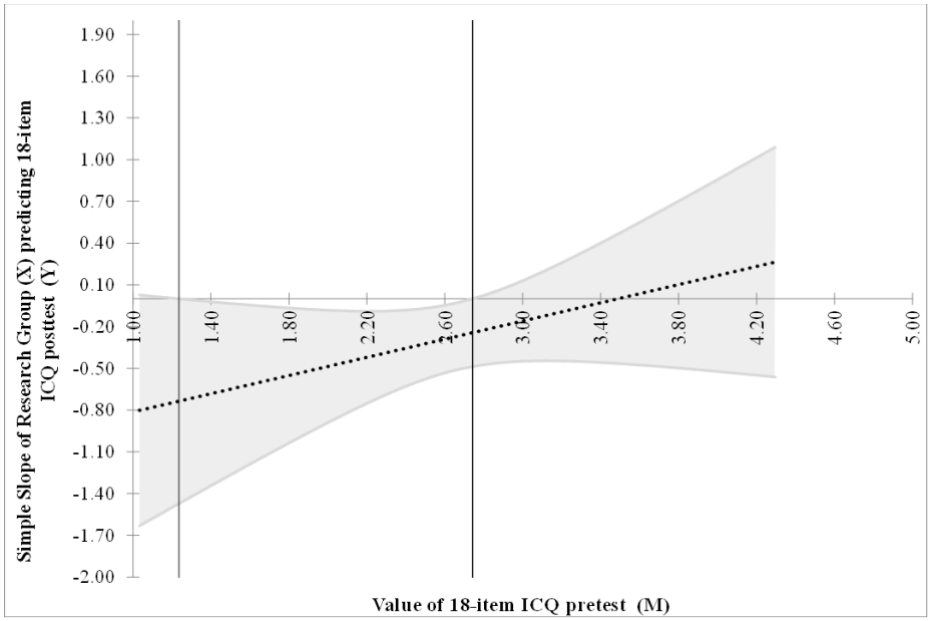

Figure B1a

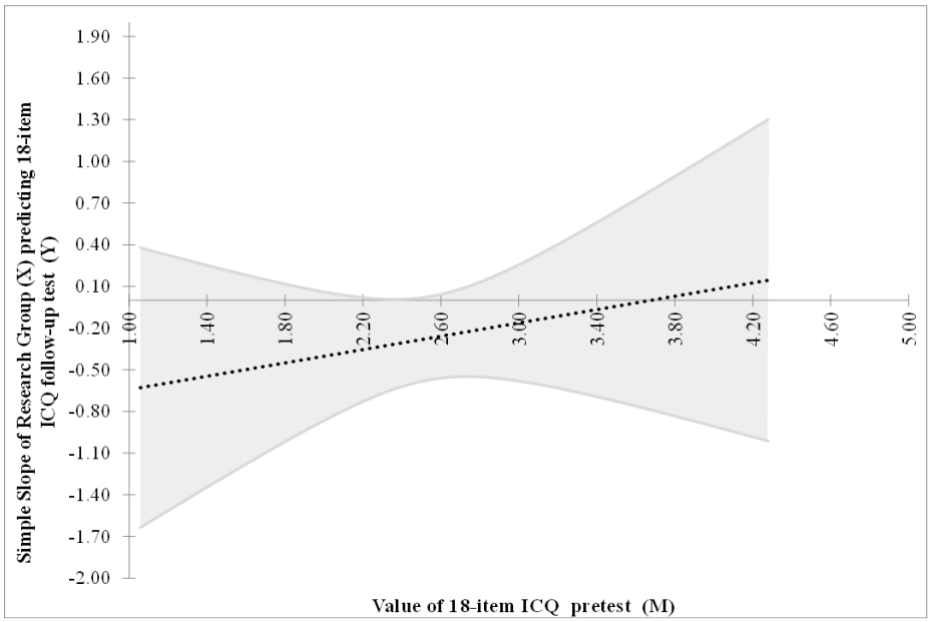

Figure B1b

Figure B1. Johnson–Neyman plot of the 18-item Interpersonal Confidence Questionnaire (ICQ).

The horizontal axis represents the pretest values of the 18-item Interpersonal Confidence Questionnaire (ICQ) and the dotted line represents the regression line for the research group predicting a) the posttest and b) follow-up test values for interpersonal confidence. The shaded area indicates the 95% confidence intervals (CIs). a) Posttest: the CI slope crosses over the significance barrier at 1.23 and 2.74, indicating a significant between-group difference when the pretest value falls between 1.23–2.74. b) Follow-up test (one year following the intervention): no region of significance, indicating no between-group difference

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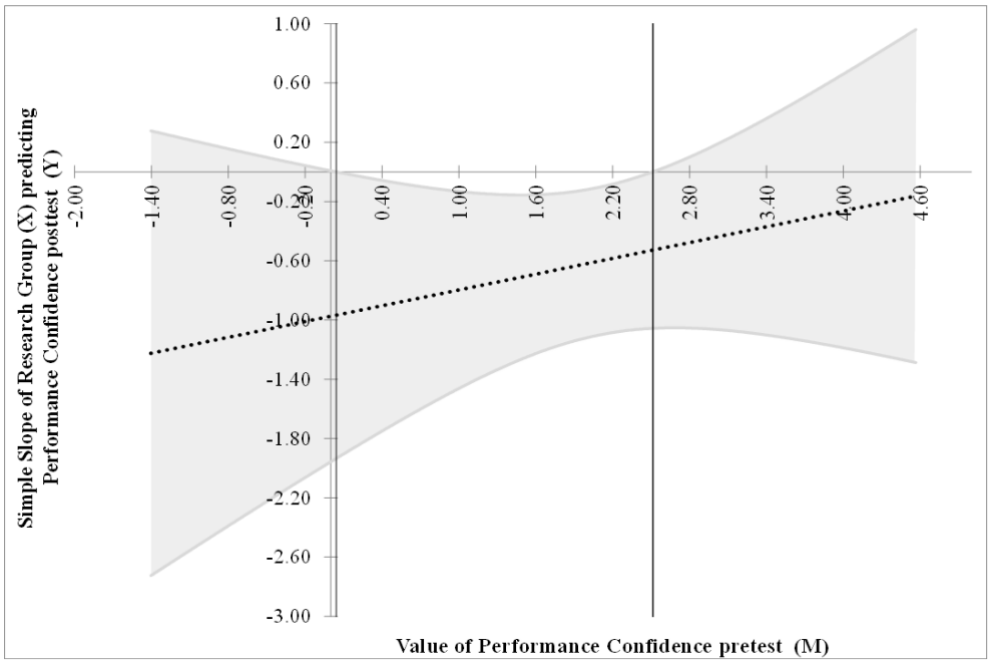

Figure B2a

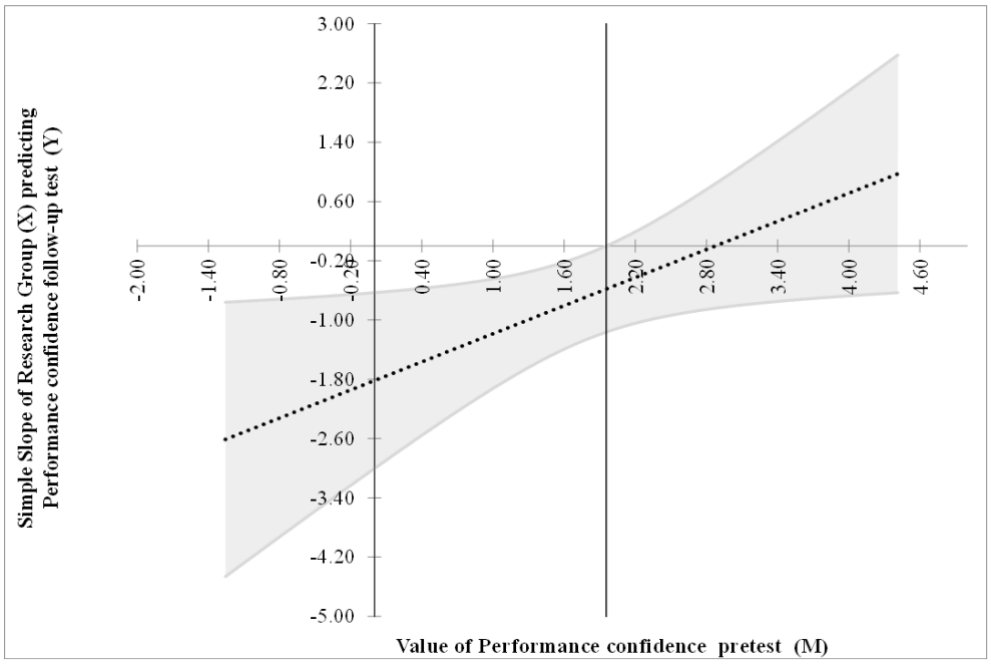

Figure B2b

Figure B2. Johnson–Neyman plot of the performance confidence factor.

The horizontal axis represents the pretest values for performance confidence and the dotted line represents the regression line of the research group predicting a) the posttest and b) follow-up test values for performance confidence. The shaded area indicates the 95% confidence intervals (CI). a) Posttest: the CI slope crosses over the significance barrier at 0.04 and 2.51, indicating that the difference between research groups is significant when the pretest value falls between 0.04–2.51. b) Follow-up test (one year following the intervention): the CI slope crosses over the significance barrier at 1.96, indicating that the difference between research groups is significant when the pretest value is less than 1.96