The relation between knowledge and skills assessments in psychotherapy training:

Secondary analysis of a randomized controlled trial

Peter Eric Heinze, Florian Weck, Ulrike Maaß, Franziska Kühne

University of Potsdam, Clinical Psychology and Psychotherapy, Potsdam, Germany

Author note

Peter Eric Heinze received his MSc from the University of Potsdam. He is currently a PhD-student at the University of Potsdam and a psychotherapist in training at the training institute of the University of Potsdam. His areas of professional interest include psychotherapy preferences, therapeutic competence and training as well as narcissism.

Florian Weck received his PhD in clinical psychology from the University of Mainz and his postgraduate degree from the Goethe University Frankfurt. He is currently a Professor for clinical psychology and psychotherapy at the University of Potsdam as well as supervisor and research director of the psychotherapy training institute of the University of Potsdam. His areas of professional interest include psychotherapy competence, psychotherapy training and supervision as well as health anxiety.

Ulrike Maaß received her PhD in personality psychology at the Humboldt University (Berlin, Germany). She is currently a postdoctoral researcher at the University of Potsdam. Her areas of professional interest include clinical supervision, psychotherapy competence and training.
Franziska Kühne received her PhD in clinical psychology from the University of Hamburg and her postgraduate degree from the University of Potsdam. She is currently a postdoctoral researcher at the University of Potsdam and head of the outpatient clinic of the University of Potsdam. Her areas of professional interest include psychotherapy competence and training, psycho-oncology and obsessive-compulsive disorder.

Correspondence concerning this article should be addressed to Franziska Kühne, University of Potsdam, Clinical Psychology and Psychotherapy, Karl-Liebknecht-Straße 24-25, 14476 Potsdam, Germany. Email: dr.franziska.kuehne@uni-potsdam.de. Phone: +49 331 9772096

Declaration of interest: none

Acknowledgements

We would like to thank Dr. Brian Bloch (University of Münster, Germany) for his English language editing of the manuscript.

The study was funded by the German Research Foundation (Deutsche Forschungsgemeinschaft [DFG]; postmaster@dfg.de) to Florian Weck (PI, WE 4654/10–1) and Franziska Kühne (PI, KU 3790/2–1). The DFG was not involved in the study design, data collection, management, analysis, and interpretation, in the writing of the report, the decision to submit the report for publication, and has no ultimate authority over any of these activities.

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to ethical restrictions.
Abstract

Background: Although the assessment of therapists’ competence is often conceptualized in a hierarchical model, the model’s implications are underresearched. This study thus focuses on the association between theoretical knowledge and applied knowledge on one side, and communication and therapy skills on the other.

Method: N = 69 psychology students took part in a psychotherapy training study including role-plays with standardized patients. The training interventions included reading treatment manuals and watching model videos. We measured theoretical knowledge using multiple-choice questions (MCQ), applied knowledge using case vignettes (CV), and psychotherapy skills in videotaped sessions with standardized patients (SP) using independent competence ratings.

Results: Theoretical knowledge correlated significantly with practical competences (r = .28 - .36, p < .05) and predicted post-intervention skills in SP interactions (β = .21 - .35, p < .05). Applied knowledge was significantly correlated with practical competences (r = .31 - .54, p < .05), and predicted post-intervention skills in one out of two treatment conditions (β = .47, p < .001).

Discussion: The results underline the importance of theoretical knowledge and applied knowledge in psychotherapy training in the early career of therapists. The discussion focuses on methodological aspects, and on implications for future studies and training.

Keywords: Psychotherapy Competence, Training Study, Multiple Choice, Competence Ratings

Public Significance Statement: This study shows that theoretical knowledge and applied knowledge of trainee therapists is associated with practical skills in role-play interactions with simulated patients. Our findings underline the need for evidence-based theoretical training in order to promote competent and skillful treatment.
Introduction

Psychotherapy competence may be defined as “the extent to which a therapist has the knowledge and skill required to deliver a treatment to the standard needed for it to achieve its expected effects” (Fairburn & Cooper, 2011, p. 374). In their framework, Roth & Pilling (2007) also highlighted the importance of knowledge and skills by pointing out that “Clinicians need background knowledge relevant to their practice, but it is the ability to draw on and apply this knowledge in clinical situations that marks out competence” (p. 10). In line with these quotations, Barber and colleagues (2007) conceptualized, amongst other things, communication, knowledge, technical skills, clinical reasoning, emotions and values as important aspects of competence. Following any of these authors, clinical knowledge and therapy skills are integral components of psychotherapy competence. However, it remains an empirical question how knowledge and skills interact, and whether knowledge acquisition precedes realizing skills, or not.

The assessment of psychotherapy competence

For competence assessment, Muse & McManus (2013) drew on a framework used for the medical professions (Miller, 1990). At the first assessment level of clinical knowledge, practitioners need to know basic information about, among other issues, mental health, etiology, diagnostics, treatment rationale and interventions. At the second assessment level of the framework, therapists need to be able to know how to apply their knowledge in specific therapy settings, for specific participants or disorders. At the third assessment level, therapists should show how to implement their skills in controlled, standardized settings. Fourth, therapists should display skillful behavior in sessions with real patients (“does”).

According to the authors (Muse & McManus, 2013), knowledge can be measured with the help of multiple-choice questions (MCQ) or essay questions. For assessments of practical understanding, clinical case vignettes (CV) or case reports are applicable. Standardized role-
plays with a simulated patient are typically used at the third level for the assessment of *practical application of knowledge/skill* (Kühne, Maaß & Weck, 2021). For *clinical practice assessments* at assessment level four, ratings of real patient sessions or patient outcomes are used (Muse & McManus, 2013). This overview conveys that no single method is sufficient for competence assessment, but that a multi-method approach is necessary (Muse & McManus, 2013).

However, the association between assessment levels was not part of most prior studies, and most focused on a single rather than on a multimethod assessment approach (Muse & McManus, 2013). Although Evers and colleagues (2022) included multiple competence levels, the study did not investigate the associations between them. Third, another recent study did not find associations between knowledge and practical skills for systemic counselling students (Henrich, 2021). However, the author tested for knowledge qualitatively, using a prompting task, and included twelve students only.

Taken together, few studies have empirically investigated the association between different levels of competence assessment to date. Therefore, the goal of this study was to identify their association using different assessment tools. We examined whether or not theoretical knowledge and applied knowledge (assessment levels 1 and 2) correlated positively with skills shown in role-plays with simulated patients (assessment level 3) at two different assessments both before and after a training intervention (research question 1). Moreover, we investigated whether or not pre-intervention theoretical knowledge and applied knowledge significantly predicted skills post-intervention (research question 2). We thus focused our investigation on the first three levels of competence assessment, i.e. *knows, knows how* and *shows how*. 
Methods

Procedure

For a thorough description of the study’s methodology, please refer to Kühne et al. (2022) and Kühne et al. (2020). In short, the study utilized two randomly counterbalanced training modules taken by all participants: a behavioral activation module and a cognitive intervention module. The trainings included reading a manual text, followed by either watching a video of a licensed, skillful psychotherapist (experimental group, n = 34) or watching a video unrelated to psychotherapy (control group, n = 35). Three measurements were taken: before the trainings, after the trainings, and at a three-month follow-up (not part of this analysis). The measurements included a video-recorded role-play with a simulated patient that was rated for competence, a multiple-choice questionnaire assessing theoretical knowledge, and clinical case vignettes for the assessment of applied knowledge. The study received a positive vote from the University of Potsdam’s ethics committee (9/2018).

Participants

Trainees

Participants were not eligible to take part in the study if they a) were currently in psychotherapeutic treatment or b) had insufficient German language skills. We recruited all participants via the university’s participant pool or postings on student mailing lists. Participants received course-credit or €40.

N = 69 psychology students (n = 56 female (81.16 %); n = 13 male (18.84%); mean age = 25.6, SD = 6.4, range = 17 – 47 years; n = 58 Bachelor psychology students (84.06%); n = 11 Master clinical psychology students (15.94%)) participated in the study and gave informed consent. Due to diverse experiences before and during their studies, the trainees were asked if they had previous experiences in treating mental health patients (yes/no; if yes, in what way) by means of a single item. Whereas 69.57% (n = 48) of the participants indicated having no
previous experience in treating mental health patients, 30.43% (n = 21) indicated having some form of experience (ranging from a 3-day internship to being a registered psychiatric nurse).

**Raters**

Two independent raters watched all \( N = 276 \) videos (\( n = 69 \) videos for each treatment condition at pre- and post-intervention measurement). Both raters were female, held a PhD in clinical psychology and were licensed psychotherapists (for 10 or 3 years, respectively). The raters were experienced in rating psychotherapy sessions for research. After receiving a ten-hour workshop to get acquainted with all measures and the study design, both raters rated the videos independently. To ensure agreement throughout the rating process, both raters participated in training sessions on a regular basis.

**Measures**

**Multiple-Choice Questions and Case Vignettes**

**Items.** We developed MCQs for the assessment of theoretical knowledge (level 1 of the assessment framework), and CVs to measure applied knowledge at assessment level 2 of the framework. As an example of a MCQ, participants were asked the following question: “Positive activities … (multiple-choice): a) … are called Type-B activities. b) … need to be planned. c) … require willingness for activity. d) … are objectively rated as pleasant. e) … should be balanced with neutral and unpleasant activities.” For CVs, we used short patient or therapy vignettes, and then asked applied questions (e.g., “How do you react to the patient’s concerns?” or “How do you proceed with the daily protocol the patient contributed?”). In total, participants filled in ten MCQs and three CVs per measurement point and treatment condition. All items had five response options. The item pool included both single-choice and multiple-choice items. We labeled multiple-choice questions in the item stem. They could include from two to five correct answers (i.e., three to zero distractors). For all questions, we instructed participants to tick the correct options.
Development. Since the training study material was based on a treatment manual (Hautzinger, 2013), we developed the MCQs and CVs based on the training texts used in the intervention groups (see procedure). For each section of the manual text, we (two licensed psychotherapists, one psychotherapist in training) deducted key goals that can be learned from reading the text (such as differentiating between short- and long-term consequences of behavior) as well as exemplary therapeutic behavior that indicates the competent implementation of skills. On this basis, we developed 40 MCQs and 22 CVs (20 MCQ and 11 CV for each condition) with five possible responses each. All items were piloted in a sample of \( n = 7 \) students who answered all questions after reading the manual text, and additionally rated each item on difficulty and suitability for the training study (ranging from 1 to 6). Sixteen MCQs were changed slightly, due to the feedback from participants, i.e. clarifying questions or exchanging ambiguous item stems or distractors. To adapt the workload for our study participants, we then included ten MCQs and three CVs per measurement point and treatment condition. We paralleled the items between measurement points by the number of right scores, difficulty and suitability ratings from the pilot study.

Scoring algorithm. We used the multiple true/false-method as our scoring method (i.e., participants receive one point for every correct answer ticked, and one point for every distractor not ticked, with a maximum possible score of five points per item (Muckle et al., 2011)). Some alternatives such as negative scoring or trapdoor techniques were not applicable, because we also included items without any distractors (i.e., all answers were correct). Furthermore, multiple true/false scoring yielded high item information for participants with low to medium proficiency, without any limitations concerning item analyses or reliability scores (Muckle et al., 2011). Moreover, in contrast to dichotomous scoring (true or false), multiple true/false-scoring enables inferring knowledge about every single answer option, thus also capturing even partial knowledge (Brassil & Couch, 2019). Since our study included student participants with
no or little prior knowledge in psychotherapy, this scoring method allows differentiating between participants with different levels of knowledge.

**Clinical Communication Skills Scale – short version**

The Clinical Communication Skills Scale (CCSS; Kühne, Heinze et al., 2021) measures basic psychotherapeutic and counseling communication skills, e.g., “The therapist discusses content and procedure for the current session” (item 11) or “The therapist clarifies imprecise patient statements” (item 32). Raters were instructed to evaluate the therapist using a four-point Likert scale (0 = *not at all appropriate*, 3 = *entirely appropriate*). We used the 14-item short version of the CCSS (CCSS-S; Maaß et al., 2022) in our current analysis. Reliabilities in the original study (Maaß et al., 2022), as well as in the current investigation, were excellent (α = .94, -.96). Intraclass correlations based on the CCSS-S mean scores between both independent raters were good (ICC(2,2) = .77).

**Cognitive Therapy Scale**

The Cognitive Therapy Scale (CTS; Young & Beck, 1980; Weck et al., 2010) is a widely established rating instrument for capturing therapist competence on a seven-point Likert scale (0 = *poor*, 6 = *excellent*). We only used 11 out of 14 items of the CTS, because items 1 (agenda), 7 (homework examination), and 12 (selection of appropriate strategies) were not applicable to our experiment. Reliabilities in our study were excellent (α = .96 -.97). Intraclass correlations based on the CTS mean scores between both independent raters were good (ICC(2,2) = .72).

**Data Analytic Approach**

As we conducted a secondary analysis, we did not determine the required sample size based on the hypotheses of this study. However, as an indicator of sufficient analytical power, a post-hoc power analysis revealed appropriate power for correlation analyses ($r = .30$, $\alpha = .05$ (one-tailed), $n = 69$, power = .83) and linear regression models ($f^2 = 0.23$, $\alpha = .05$ (one-tailed), $n = 69$, power = .99; Faul et al., 2009).
We report descriptive statistics for the MCQs and CVs. Both MCQs and CVs represent formative constructs (i.e. latent constructs described by various items covering different aspects and topics, using interchangeable items with no or little covariances) for which traditional measures of reliability are not meaningful (Bühner, 2011; Roberts & Thatcher, 2009). To test this prerequisite, we checked the intercorrelations between all items of a condition. Moreover, we report item difficulties and item discrimination indices.

To investigate the first research question, we used Pearson’s correlation coefficients to identify associations between the first three assessment levels (i.e. know, know how, and show how) separately for the pre- and post-intervention measurement. Furthermore, for the investigation of research question two, we performed linear regression models to predict competence by theoretical knowledge / applied knowledge. We included pre-intervention MCQ and CV scores as predictors, and post-intervention competence ratings as criteria. For all analyses, p-values below .05 were considered significant. We used the statistical software R v4.0.2 for all computations (R Core Team, 2022).

Results

Descriptive Statistics and Item Analysis

Descriptive statistics are presented in Table 1. On average, participants scored in the upper half of each measure. For example, the mean scores of the CTS translated to satisfactory competence.

Checking all 338 intercorrelations between all items, a small number of correlations crossed the threshold of medium effect sizes (r > .30) in both conditions (behavioral activation: n = 33, 9.76%; cognitive interventions n = 10, 2.96%), which points towards the assumption of formative constructs measured by MCQs and CVs.

Moreover, all MCQ and CV items had medium to high item difficulty indices (behavioral activation: MCQ: M = 75.2, SD = 11.4, range = 53.9 – 99.4; CV: M = 78.7, SD = 5.2, range = 70.7 – 83.8; cognitive interventions: MCQ: M = 69.9, SD = 15.1, range = 33.6 –
88.7; CV: M = 75.1, SD = 12.8, range = 59.1 – 93.6), indicating that most participants were able to identify the correct options and distractors. Item discrimination indices were fair (behavioral activation: MCQ: M = .26, SD = .17, range = -.16 - .46; CV: M = .23, SD = .08, range = .16 - .38; cognitive interventions: MCQ: M = .11, SD = .17, range = -.15 - .45; CV: M = .13, SD = .14, range = -.05 - .25). However, seven MCQ items as well as one CV item had a negative item discrimination score (behavioral activation: items c) and h) at pre-intervention, cognitive interventions: items f) and I) at pre-intervention, items a), c), g) at post-intervention), as well as one CV (cognitive interventions, item c) at post-intervention).

**Correlations between knowledge and skills assessments**

We computed Pearson’s correlations between MCQ scores, CV scores and the independent ratings on the CCSS-S and CTS for the pre- and post-intervention measurements. The results are depicted in Table 2. All correlations between the MCQ scores and both rating scales were significant for both study conditions (r = .28 - .36, p < .05). For the CV scores, the correlations with the communication and competence ratings were also significant (r = .28 - .54, p < .05), except for cognitive interventions at post-intervention measurement (CCSS-S: r = .08, p = .52; CTS: r = .13, p = .30).

**Regression Analysis**

We performed linear regression analyses with pre-intervention MCQ and CV scores as predictors, and post-intervention CCSS-S or CTS scores as criteria (see Table 3). For the behavioral activation condition, pre-intervention MCQ scores significantly predicted the post-intervention ratings (CCSS-S: β = .38, p < .01; CTS: β = .35, p < .01). However, the CVs did not significantly predict the communication skills and competence ratings after training (CCSS-S: β = .16, p = .15; CTS: β = .15, p = .18). R² for the CCSS-S and CTS models were .16 and .13, respectively.

For the study condition cognitive interventions, the pre-intervention MCQ scores again significantly predicted both the CCSS-S and CTS post-intervention ratings (CCSS-S: β = .21,
Moreover, the pre-intervention CV scores significantly predicted the post-intervention CCSS-S and CTS ratings (CCSS-S: $\beta = .47$, $p < .001$; CTS: $\beta = .43$, $p < .001$). $R^2$ for the CCSS-S and CTS models were .29 and .27, respectively.

**Discussion**

The current study aimed at identifying associations between different levels of psychotherapy competence assessment in the context of a training study for undergraduate psychology students with no or little psychotherapy experience. Overall, theoretical knowledge and applied knowledge significantly correlated with communication skills and with psychotherapy competences. Moreover, linear regressions showed that theoretical knowledge was predictive of communication skills and of therapy competences in later role-plays with simulated patients. However, applied knowledge was only predictive in one out of two conditions.

Our results empirically underline important assumptions of an often-cited assessment model (Muse & McManus, 2013; Miller, 1990). The assessments of theoretical knowledge and applied knowledge on one side, and practical skills on the other were interrelated, none seemed dispensable, and knowledge was even predictive for the assessment of subsequent skills. In comparison to implicit knowledge and skills, where therapists cannot verbalize their competence, explicit knowledge allows novice therapists to use the newly acquired knowledge deliberately and to translate it into action skills (Anderson et al., 2004). However, therapists need a broad basis of knowledge, because competence in a singular domain might limit their adaptability to new challenges, as well as the individualization of treatments (Betan & Binder, 2010). Therefore, subsequent studies could refer to observations of therapist behavior in patient sessions, include knowledge tests on broader mental health and treatment issues, and consider possible reciprocal influences between knowledge and skills.

Researchers have pointed out that psychotherapy education still lacks an empirical foundation, and that it is up to scientific studies, experiments and RCTs to identify methods
that are most effective for competence development (Frank et al., 2020; Rakovshik & McManus, 2010). Despite several authors identifying components of effective training such as modeling (Hill & Lent, 2006), feedback (Weck et al., 2021) or instructions (Hill & Lent, 2006), most psychotherapy training aims at the improvement of higher-level competence rather than at basic knowledge and skills (Beidas & Kendall, 2010). Furthermore, multi-component assessments, as implemented in the current study, may be used not only to ensure that novice therapists acquire the necessary knowledge and skills, but also for broad formative feedback in self-reflective or supervisory practice (Muse et al., 2022).

Limitations and Outlook

Despite the high standardization of the RCT including the training materials, role-play interactions as well as the measurement of different competence levels, there are some limitations to consider. First, the high level of standardization in our study also limits the generalizability of our results to other settings or skills. Since the current study had an assessment focus, another methodology would be necessary to investigate the development of psychotherapy novices on their way to proficiency. Second, improvable item difficulty and item discrimination indices suggested that the items were either rather easy to solve, or could not discriminate sufficiently between participants with different levels of knowledge. Therefore, in future studies, we recommend using pretested and validated questionnaires (Muse et al., 2022; Jungmann & Witthöft, 2021). Furthermore, the MCQs and CVs shared some commonalities such as the same response format (five options with distractors). According to the assessment framework (Muse & McManus, 2013), case vignettes should mostly be open-format. Therefore, the associations found in our study are probably higher than expected due to common methodology effects such as response bias or recognition effects. Future studies could therefore develop more realistic case scenarios, such as video vignettes, with an open response format (Muse et al., 2022).
Furthermore, communication skills and competence were not predicted by applied knowledge (as measured by three case vignettes) in the behavioral activation condition. Again, item characteristics and the low number of items influence the interpretability of results. Moreover, the explained variance was lower in the behavioral activation than in the cognitive intervention condition. Possibly, implementing behavioral activation related more to everyday experience, and thus enabled trainees to proceed more intuitively, which is why they referred less to specific CBT knowledge than in the other condition. Subsequent studies should shed more light on which strategies participants use, e.g. by using think-aloud techniques during a study.

Fourth, our design did not enable investigating all four assessment levels of the framework, as we did not include participants interacting with real patients. Future studies with more advanced psychotherapy students could shed light on the associations between all four assessment levels, and include ratings of real patient interactions. Furthermore, we join other authors in the call for more studies empirically investigating different methods of competence acquisition (Frank et al., 2020; Rakovshik & McManus, 2010). These could cover a broad range from naturalistic studies over the course of semesters with innovative educational programs, to randomized controlled trials investigating the effects of specific methods such as modeling, supervision or case conceptualizations on competence in (simulated) patient encounters.

As competencies inform both the assessment as well as training and supervision based on learning outcomes (Grus et al., 2016), the current study reveals a) how a competence-based framework can inform the whole research process, from conceptualization over training to assessment and publication, b) that - also at early stages of training - it is insufficient to target knowledge or skills alone, but that multi-method assessments are of value, and c) that simulated patient interactions are not only helpful for training, but also for the standardized assessment of psychotherapy skills.
Acknowledgements

We would like to thank Dr. Brian Bloch (University of Münster, Germany) for his English language editing of the manuscript.
References


https://doi.org/10.1016/j.brat.2011.03.005


https://doi.org/10.1037/a0015832

https://doi.org/10.1111/cpsp.12330

http://dx.doi.org/10.1037/tep0000126


https://doi.org/10.1037/ccp0000686

### Table 1

**Descriptive Statistics**

<table>
<thead>
<tr>
<th>Study Condition</th>
<th>Variables</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>BA</td>
<td>Theoretical knowledge (MCQs)</td>
<td>36.9</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>Applied knowledge (CVs)</td>
<td>11.7</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>Communication (CCSS-S)</td>
<td>1.8</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>Competence (CTS)</td>
<td>3.7</td>
<td>0.9</td>
</tr>
<tr>
<td>CI</td>
<td>Theoretical knowledge (MCQs)</td>
<td>32.5</td>
<td>3.8</td>
</tr>
<tr>
<td></td>
<td>Applied knowledge (CVs)</td>
<td>10.9</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Communication (CCSS-S)</td>
<td>1.9</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td>Competence (CTS)</td>
<td>3.6</td>
<td>1.0</td>
</tr>
</tbody>
</table>

*Note: $N = 69$. BA = Behavioral Activation. CI = Cognitive Intervention. MCQ and CV-scores calculated with multiple true/false-algorithm. MCQ = multiple-choice questions (sum scores from 0 to 50). CV = case vignettes (sum scores from 0 to 15). CCSS-S = Clinical Communication Skills Scale – short version (mean scores from 0 to 3). CTS = Cognitive Therapy Scale (mean scores from 0 to 6). For all measures, higher scores indicate better competence.*
Table 2

*Correlations between Competence Ratings with Assessments of Theoretical Knowledge and Applied Knowledge*

<table>
<thead>
<tr>
<th>Study Condition</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Independent</td>
<td>MCQ</td>
</tr>
<tr>
<td>BA</td>
<td>CCSS-S</td>
<td>.29*</td>
</tr>
<tr>
<td></td>
<td>CTS</td>
<td>.28*</td>
</tr>
<tr>
<td>CI</td>
<td>CCSS-S</td>
<td>.29*</td>
</tr>
<tr>
<td></td>
<td>CTS</td>
<td>.28*</td>
</tr>
</tbody>
</table>

Note: N = 69. MCQ and CV-scores calculated with multiple true/false-algorithm. MCQ = multiple-choice questions; CV = case vignettes; CCSS-S = Clinical Communication Skill Scale – short version; CTS = Cognitive Therapy Scale.

* p < .05. ** p < .01. *** p < .001.
Table 3

Linear Regression Models Predicting Post-Intervention Communication and Competence Ratings by Assessments of Pre-Training Theoretical Knowledge and Applied Knowledge

<table>
<thead>
<tr>
<th>Study Condition</th>
<th>Predictor</th>
<th>CCSS-S B (SE)</th>
<th>CCSS-S β</th>
<th>CTS B (SE)</th>
<th>CTS β</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA</td>
<td>Intercept</td>
<td>-0.85 (0.73)</td>
<td>-0.28 (1.20)</td>
<td>-0.69 (0.56)</td>
<td>-0.35 (0.87)</td>
</tr>
<tr>
<td></td>
<td>MCQ</td>
<td>0.06 (0.01)</td>
<td>0.38**</td>
<td>0.09 (0.03)</td>
<td>0.35**</td>
</tr>
<tr>
<td></td>
<td>CV</td>
<td>0.05 (0.04)</td>
<td>0.16</td>
<td>0.08 (0.06)</td>
<td>0.15</td>
</tr>
<tr>
<td>CI</td>
<td>Intercept</td>
<td>-0.69 (0.56)</td>
<td>-0.35 (0.87)</td>
<td>-0.69 (0.56)</td>
<td>-0.35 (0.87)</td>
</tr>
<tr>
<td></td>
<td>MCQ</td>
<td>0.03 (0.02)</td>
<td>0.21*</td>
<td>0.06 (0.02)</td>
<td>0.25*</td>
</tr>
<tr>
<td></td>
<td>CV</td>
<td>0.15 (0.03)</td>
<td>0.47***</td>
<td>0.21 (0.05)</td>
<td>0.43***</td>
</tr>
</tbody>
</table>


* p < .05. ** p < .01. *** p < .001.