

**Impact of E-Learning and Role-Play-Based Training on Psychology Students' Communication Skills:****A feasibility study****Abstract**

**Background:** Given the importance of communication skills in the psychologist-patient relationship, several training programs have been proposed. Cumulative microtraining (CMT) has shown positive impacts on communication skills in previous studies.

**Method:** The aim of this naturalistic pre-post study was to test the feasibility of a hybrid CMT program and to obtain preliminary data on its impact on communication skills in French-speaking third-year psychology students. The training included an e-learning curriculum and role-plays. Pre-post measures included peer-to-peer role-plays recorded and then self-assessed by participants themselves using the Calgary Cambridge Grid (N = 38) and assessed by an independent rater (N = 29) with a checklist focused on objective behaviors and the CARE questionnaire measuring perceived empathy.

**Results:** Results show increases in most communication skills at different levels. Most skills assessed by the independent rater, increase significantly: summarizing ( $\chi^2 = 14.35; p < .001$ ), paraphrase ( $t = 2.48, p = 0.01$ ), and structure ( $t = 5.47, p < .001$ ). All categories of self-reported measures largely increased after the training (all  $ps < .001$ ). Empathy and trust assessed by an independent rater, increased after the training (all  $ps < .05$ ).

**Conclusion:** This study brings new evidence of the impact of CMT including e-learning and role-plays on both self-rated and assessed by an independent rater measure of communication and empathy in a population of French-speaking students. These findings highlight the importance to implement such training in initial training despite costs involves. It demonstrates the feasibility of its inclusion in university curriculum, facilitated by the adaptation of theoretical aspects of teaching in e-learning.

**Keywords :** Communication – Cumulative Microtraining - Academic training – Psychology – Empathy

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

### Introduction

This study assessed the impact of a well-known communication skills training program (cumulative microskills training) on performance among third-year psychology students. In psychology, several meta-analyses have reported that relational skills have a significant impact on treatment outcomes [e.g. 1,2]. One of these components is empathy, defined in a therapeutic relationship as: "engaged curiosity, in which the clinician's cognitive aim of understanding the helpee's individual perspective is supported by affectively engaged communication"[3]. Several meta-analyses have noted that empathy has a substantial impact on therapeutic outcomes [4]; with a moderate effect size ( $d = 0.58$ ; [5]).

Empathy is a complex, multivariate phenomenon [6]. However, it seems that how the clinician communicates with the patient plays a fundamental role. Indeed, by rephrasing the client's feelings and thoughts, the clinician demonstrates a concern for understanding the patient's perspective, which improves the quality of the relationship and therapeutic outcomes [7]. To do so, the clinician must develop a clear understanding of helpee's perspective, which requires to allow space to speak and to concretize patient's thoughts and feelings, or in other words to explore them. Finally, in order or the helpee to perceive empathy, the clinician must be able to reflect his or her comprehension to the helpee [7]. This operationalization of empathy into communicative skills is referred as "empathic communication" in the literature. [8].

This empathic communication requires a number of skills. Some authors group them into two categories: listening skills and regulation skills (Ivey & Authier, 1978; see [9], for a detailed description). Listening skills can be non-selective or selective. Non-selective skills allow clinicians to communicate active listening via various behaviors (e.g., silence, minimal encouragement). Selective listening skills are varied and more discourse-oriented (e.g., asking questions, paraphrasing). Regulation skills, on the other hand, help to induce a high-quality collaboration by clarifying the goals of the clinical encounter. They also help to make the structure or reason for certain questions explicit

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

(e.g., with think-alouds) [9]. This type of behavior supports the creation of a quality partnership with the patient and have a major impact on the patient's trust in the clinician [10].

Several studies conducted among health professionals indicate that these basic communication skills need to be trained and are not acquired spontaneously [11–13]. In psychology, this training is required for the European Registered Psychologist degree [14]. Several types of training have been developed with good results, such as the communication skills training program [15] and cumulative microskills training (CMT) [16,17]. Cumulative microtraining (CMT) was developed by Lang and Van der Molen [17] and is derived from Ivey's microcounseling method [19]. Communication skills are divided into several specific skills and each skill is developed in one session: (1) minimal encouragements, (2) asking question, (3) paraphrasing, (4) reflection of feeling, (5) concretization, (6) summarizing, (7) situation clarification. Seven sessions are planned and each session is organized similarly around a specific skill: theoretical information; video illustration and analysis of the video; exercises; role-playing followed by feedback; and identification of learning points [17].

The efficacy of this pedagogical method has been proven over the years and presented in numerous studies, which have been summarized in several reviews [e.g. 20,21]. One meta-analysis revealed significant increases in communication skills, with a strong effect over all dependent variables taken together ( $d = 1.16$ ) [17]. More specifically, the effects were moderate for self-reported experience and large for knowledge and behavior. However, these effects were calculated on the basis of studies with different categories of trainees and not specifically on initial training students.

According to Miller's Pyramid, four levels of assessment should be considered in order to acquire a precise idea of a training program's impact on communication skills. At the base is the Knowledge stage ("*Knows*"), corresponding to knowledge of what is needed to perform a function. The second stage concerns Competence ("*Knows how*"); indeed, more than knowing things, it is important to know how to put them into practice. The third stage is Performance ("*Shows how*"),

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

which indicates how the participant implemented the skill in practice. The fourth and final stage, and the most difficult to assess, is Action ("*Does*"), which measures whether the skills are transferred into practice when the student is working independently with a patient. Van der Molen et al.'s [17] meta-analysis confirms the impact of CMT on the Knowledge ( $d = 1.72$ ) and Performance stages ( $d = 0.70$ ) for all trainees combined. More recent studies have confirmed the effect of this training also on the third stage [21,22]. In addition, improvements were also observed in relationship components such as helpee's satisfaction and perceived empathy [22,23]. Thus, the positive impact of CMT is no longer in question, at least on the first levels of evidence of the Miller pyramid. However, it is difficult to implement in university curricula considering the resources needed and the ever-increasing number of students [24]. At the same time, the structured approach of CMT provides solid foundations for adapting this training to self-instruction programs [24].

Therefore, some studies have tested the adaptation of CMT in a self-instruction program, in which the student is autonomous during all the CMT sessions except the sessions involving role-plays. A comparison study among 193 psychology undergraduates showed very large effect size for the self-instructed group in knowledge and performance. However, the role-playing part was provided for groups of 3 to 6 students in the self-learning condition whereas they were 9 to 12 in the other condition. This could have had an impact on these results as participants in the self-instruction group may have received more feedbacks than in the other group facilitating improvements. In addition it also could have reduce cost-effectiveness benefices of self-instructed theory [25]. In another pre-post controlled study [24], 285 undergraduate students were assigned to a control condition, supervised training condition or self-instruction training condition. Improvements were found in self-efficacy, knowledge, video exercises on the skills and self-rated transfer into practice one year after in both training conditions. Effect sizes were large for knowledge and self-efficacy. However, the study took place at the Open University of the Netherlands, which has a very diverse adult population with a mean age of 38.6 years. Transferability of the results to a general undergraduate population therefore requires caution [24].

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

In general, the value of including role-playing in programs is well established. They are particularly effective in improving feelings of self-efficacy [26], an important variable because of its positive effects on motivation, learning and performance [26]. However, previous meta-analyses have questioned the ability of students to reliably assess their own communication skills, given the differences from external assessors' ratings. In fact, most studies found no or low correlation between these two [15,27].

Nevertheless, most studies ask students to rate their skills based on their overall impression. None includes self-assessment based on objective, structure observation. Student self-assessment based on video based on video recordings might be more objective and therefore more reliable. In all cases, therefore, it seems important to maintain different assessment perspectives in order to draw reliable conclusions.

### **Purpose and Hypotheses**

To sum up, the importance of communication skills training in psychology curricula is well documented. However, the cost of the resources necessary to implement this type of training makes it difficult to include in university curricula. A hybrid approach that combines self-training and supervised training has shown encouraging results [24,25] but has not yet been tested with objective measures in undergraduate students. With this study, we sought to provide evidence of the feasibility and preliminary data on the effectiveness of a 30-hour CMT training program combining e-learning and role-playing integrated into the third year of the undergraduate psychology program. Effectiveness was tested first via independent rater assessment of 1) objective student's communication skills, and 2) perceived empathic attitude with a validated questionnaire that is widely used to assess patients' perception of physicians' empathy (CARE; [28]). These primary outcomes were obtained by means of role-playing games recorded before and after the intervention. As a secondary outcome, we also analyzed students' self-assessments, asking them to analyze their filmed performance using a structured grid (Calgary-Cambridge grid, [29]). More exploratory, we asked students to rate their sense of self-efficacy.

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

Regarding primary outcomes, we expect an increase in adequate communication skills and in empathetic attitude. We hypothesize that the measures of communication skills and empathic attitude will be correlated. For secondary outcomes, we expect an increase in adequate communication skills as assessed by students. Given the use of a structured grid, we also assumed a positive correlation between self-rated and measure assessed by an independent rater. Regarding exploratory outcomes, we expect an increase in self-efficacy among students regarding their ability to conduct a clinical interview.

### **Method**

#### **Study Design**

This naturalistic pre-post study took place in a third-year psychology course for credit. In this university, the course is mandatory for all student registered in 3<sup>rd</sup>-year psychology study (N = 219). The study was approved by the ethics committee of the Faculty of Psychology at the University of Liège.

#### **Participants**

An invitation to use the data was send to third year psychology students enrolled in the course. Forty-four participants consented to the use of their self-report (38 females, 6 males, ranging from 20 to 24 years old,  $M = 21.6$ ;  $SD = 0.89$ ). Thirty consented to the use of all the data related to the course (video recordings and self-report assessments). One was excluded due to the poor technical quality of the video, leaving 29 (26 females, 3 males; ranging from 20 to 24 years old;  $M = 21.44$ ;  $SD = 0.83$ ).

#### **Training Program**

The e-learning portion included elements of CMT that can be adapted to a self-instruction method: theoretical instructions, analysis of video models, and written exercises [24]. E-learning was organized in three different sessions and inspired by the work of Van der Molen et al. [12]. Students had to complete the e-learning individually.

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

Regarding the role-play's sessions the training supervisors were all psychologists, specializing in either psychotherapy or psychological communication, all received a oral briefing about the structure and the content of each session and had access to the e-learning.

In addition, during the sessions, the trainers provided clinical situations to the students, which were identical for all groups to ensure similar training for all participants. During all the role-playing sessions, the roles of the helper and the helpee were taken in turn by the students in the groups.

The content of both the e-learning sessions and the role-plays is presented in greater details in table 1 in appendices.

### **Measures**

Participants had to record a short role-play video illustrating a psychological interview (around 10 minutes) at the beginning and end of the lessons. Participants had to play the role of a psychologist during a role-play with an actor-helpee they had chosen, who was free to choose the theme of the counseling encounter. At the end of the course, based on the videos, students had to assess their use of communication skills with the Calgary-Cambridge grid [29].

### ***Primary outcomes***

**Communication Skills Assessed by an Independent Rater.** The rater, a PhD psychotherapist (FK) blind to the pre-post condition of the participants, assessed objective communication skills (e.g., paraphrase, reflection of feeling) based on the video recordings. Each communication skill used during the counseling encounter was counted (See table 3 in appendices).

**Consultation and Relational Empathy scale.** The Consultation and Relational Empathy scale (CARE; [28]), a 10-item questionnaire, was used to measure perceived relational empathy. Items are rated on a 5-point Likert scale (1 = *Poor*; 5 = *Excellent*) with the addition of a "not applicable" option. Total scores range from 10 to 50, with higher scores indicating higher perceived empathy. The scale was slightly adapted for psychologists and external raters. Internal reliability of the scale is high (Cronbach's alpha = 0.93).

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

**Visual Analogue Scale – Trust in the Helper.** The raters' trust in the student-helper was assessed with the following question: "On a scale of 1 to 9, how much would you, as a helpee, trust the participant and follow a treatment he or she offered you?"; where "1" identified an absence of trust and "9" represented a clinician who inspired trust. This scale was also fulfilled by the independent rater.

### ***Secondary outcomes***

**Self-Reported Communication Skills.** The self-report grid was adapted from the Calgary-Cambridge guide [29]. The adapted grid includes 35 items divided into five factors assessing: (1) Preparing for the encounter; (2) Initiating the encounter; (3) Collecting information; (4) Structure; (5) Relationship building (See table 2; appendices). For all items, participants had to assess whether the described skill was "Not mastered," "In the processes of being mastered," or "Mastered."

### ***Exploratory outcomes***

**Self-Efficacy.** A visual analogue scale (VAS) ranging from 0 to 10 was used to examine participants' feeling of self-efficacy (or expected self-efficacy) while holding a counseling encounter before and after the training.

### **Statistical Analyses**

Analyses were carried out using JASP 0.14.1. For communication skills assessed by the independent rater, given the low number of interventions in certain categories, some variables were transformed into dichotomous variables. Indeed, variables with no or at most 1 or 2 behavioral instances were transformed into binomial variables (i.e., absent/present).

Normality was checked and respected for all continuous variables, whether observational or self-reported. Descriptive statistics for normal variables were reported as means and standard deviations, and the proportion of "presence" was reported for binomial variables.

Various tests were performed to test the hypothesis that results would improve after the training. Chi-squared tests were performed for dichotomous variables. Paired sample T-tests were

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

performed for continuous variables. Effect sizes are reported according to the statistical test: Phi ( $\phi$ )<sup>1</sup> for Chi-squared tests, and Cohen's  $d$  ( $d$ )<sup>2</sup> for paired sample T-tests.

A correction for multiple testing was then applied with the help of a Benjamini-Hochberg procedure.

To test the hypothesis that there would a positive correlation between different measures, Z-scores for the difference between T2 and T1 were calculated for each variable and Pearson correlations were performed.

## Results

### *Primary outcomes*

**Communication Skills assessed by an independent rater.** For continuous variables, paired sample T-tests were conducted (Table 2). The results were significant for four variables, suggesting an increase in appropriate proposals; structure; and appropriate paraphrases; as well as a large decrease of the use of questions meant to change the subject. All results remain significant after the Benjamini-Hochberg correction. For binomial variables, Chi-squared tests (Table 1) revealed significant changes in four variables, suggesting an increase of the use of: introduction skills, appropriate reflection of feelings; and summaries; and a decrease in inappropriate paraphrases. However, after the Benjamini-Hochberg comparison, the "summaries" variable was the only one to remain significant.

Table 1

---

<sup>1</sup> Kim (2017) suggested that  $\phi = 0.1$  is a small effect size,  $\phi = .30$  a moderate effect size, and  $\phi = .50$  a large effect size.

<sup>2</sup> Cohen (1992) suggested that  $d = .2$  should be considered a small effect size, while  $d = .5$  represents a medium effect size and  $d = .8$  a large effect size.

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

### **Consultation and Relational Empathy scale**

A paired sample T-test was conducted on the CARE scale results [28] and revealed a significant increase in empathy after the training.

### **Trust in the helper**

A paired sample T-test was conducted on the VAS for trust in the helper and revealed a significant increase in trust after the training.

### **Correlations between communication skills assessed by an independent rater and perceived empathy and trust in the helper**

The Pearson correlation was calculated to test the relationships between changes in communication skills and (1) changes in CARE scores ( $r = 0.47$ ;  $p = 0.005$ ); and (2) changes in trust in the helper ( $r = 0.34$ ;  $p = 0.04$ ). These correlations are moderate according to Cohen's (1988) convention.

Table 2

### ***Secondary outcomes***

#### **Self-Reported Communication Skills (N = 30)**

Paired sample T-tests were conducted for each five factors of the Calgary-Cambridge grid (table 3) and revealed significant effects of time suggesting that students' self-assessments were significantly better after the training for all factors. All results remain significant after the Benjamini-Hochberg correction.

#### **Correlations between Self-Reported Measures and Measures assessed by an independent rater**

A Pearson correlation was calculated to test the relationship between self-reported and objective measures and revealed a significant and moderate correlation ( $r = 0.41$ ;  $p = 0.03$ ).

Table 3

### ***Exploratory outcomes***

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

### **Self-Efficacy (N = 44)**

Paired sample T-tests were conducted on the VAS assessing self-efficacy and did not reveal any significant difference (T1:  $M = 5.16$ ,  $SD = 1.16$ ; T2:  $M = 5.13$ ,  $SD = 1.7$ ), suggesting that students' self-efficacy did not change after the training [ $t(31)$ ;  $p = 0.24$ ;  $d' = -0.13$ ].

### **Discussion**

The aim of this naturalistic pre-post study was to test both the feasibility of CMT combining e-learning and role-plays and its impact on the mastery of communication skills. The training was included in the curriculum for third-year psychology students and was assessed with measures at different levels. As primary outcomes, communication skills were assessed by an external expert before and after the training based on recorded role-play depicting a counseling encounter. The external rater also assessed relational components (empathy and trust). Regarding secondary outcomes, participants' self-reports using the Calgary-Cambridge grid has been analyzed. Regarding primary outcomes, the results show that the variability in the use of communication skills and the relational components were significantly higher after the CMT training than before. Regarding secondary outcomes, analyzes showed increases for all subscales of the Calgary Cambridge grid as self-reported by participants. Finally, exploratory outcomes revealed no change in students' self-efficacy regarding their ability to conduct a psychological meeting after the training. These results are discussed in more detail below.

For primary outcomes, measures assessed by an independent rater, the vast majority of changes confirmed the results reported by previous studies [17]. Regarding communication skills, appropriate skills, such as structuring, and summaries improved after the training with large to very large effect sizes; the effect sizes for appropriate paraphrases, appropriate propositions, self-introduction and appropriate reflection of feelings were small to moderate. On the other hand, inappropriate communication skills – questions aiming to change the subject, inappropriate paraphrases and inappropriate silences – showed a medium to large decrease. However, observed changes in appropriate reflection of feelings, helper's introduction to the helpee, inappropriate

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

paraphrases and inappropriate use of silence do not remain significant after the Benjamini-Hochberg correction, indicating possible false positive results. Post Hoc analyses on the variable "reflection of feeling" revealed lack of statistical power (15%). This study should be replicated with larger samples.

One unexpected result concerns the lack of any increase in the skill "asking questions that aim to go into a subject in more depth." More surprisingly, a significant decrease is observed if the T-test is reproduced with the hypothesis that there is a difference between T1 and T2 ( $p = 0.02$ ;  $d = 0.47$ ). This decrease could be explained by the greater variety of skills used at T2 compared with T1. Indeed, pre-post role-plays were limited to a duration of 10-minutes. Statistical analyses confirmed that this instruction was followed. In addition, the number of verbal interventions by the participants remained statistically unchanged between T1 and T2. Thus, increases in interventions such as paraphrases or reflections of feelings, among other things, came at the expense of questions that aim to investigate a subject in more depth. Since these two communication skills are related to empathy [23], this observation is congruent with the improvement in perceived empathy and trust in the helper [23]. Moreover, these techniques are more natural in an interview than the systematic posing of questions, which favors the therapeutic alliance. However, this statement needs to be verified with a larger sample, given the non-significance of the increase in reflection of feeling after the Benjamini-Hochberg correction. The lack of changes in other variables could be explained by (1) the lack of opportunities (e.g., clarifications); (2) the lack of power (e.g., interruptions); or (3) a ceiling effect (e.g., greetings).

Regarding secondary outcomes, the increase in self-assessed communication skills, is congruent with previous research, both studies using fully supervised training and studies of self-instructed CMT programs [17,24]. The effect sizes found in this study are similar to or higher than those observed in other studies.

Regarding exploratory outcomes, no significant differences were observed in participants' self-efficacy. This result was not expected given the impact of training based on role-plays on self-efficacy in previous studies [26]. However, this lack of change could be explained by the unskilled-

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

unaware pattern [30], which reveals that self-efficacy is often overestimated in an unmastered domain, but decreases as skills in that domain are acquired. The learning of communication skills during the training may help participants to become more aware of their actual abilities, which could create this situation. Moreover, in Belgium, students in their third year of psychology studies have never engaged in any kind of counseling meetings as a helper. This first experience may have led them to perceive new difficulties that they did not anticipate at first. Some of the written feedback provided by students seems to support this explanation, with a participant explaining: "I would have liked to have been able to deal with emotionally charged situations as well as with certain sensitive subjects (rape, attempted suicide, etc.). My level of confidence and self-efficacy to conduct an interview in a real situation has increased significantly, but I still feel helpless when faced with certain topics or a person who presents a high level of distress. Advice and practice in this area should be incorporated into the scheme."

Finally, our exploratory hypothesis regarding the positive correlation between self-rated and measures assessed by an independent rater is supported. The addition of assessments based on videos might help students to make more accurate self-assessments. Moreover, the correlation is significant but still moderate; this emphasizes the importance of multiple sources of assessment, as previously mentioned [31]. Correlations between communication skills assessed by the independent rater and perceived empathy and trust were also confirmed. These correlations support the positive impact of communication skills use on empathy perceived by the interlocutor ~~supporting the impact of the use of communication skills use on perceived empathy~~ [9]. Since communication skills are active ingredients of perceived empathy, it is important to train psychology students in them before their first internship, as proposed in this study.

The main limitations of this study are related to its naturalistic design. A control group could not be included for ethical reasons. Indeed, as the CMT was integrated in the curriculum of third-year students, a control group with participants having a similar level of skills would have been difficult to obtain without depriving some student from the learning of competences. A waiting list was also not

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

feasible as the CMT program was included in the curriculum. However, previous studies of CMT did not find any pretest effects and training groups improved more than control groups [32]. Another limitation is the low acceptance rate of participation in the study by students (44 out of 219) could impact the generalizability of our results. Indeed, it is possible that only the most motivated or confident students accepted. However, the fact that this training was successfully implemented with a cohort of 219 students is further evidence of its feasibility. A third limitation concerns the standardization of pre-post role-plays. Considering that all third-year students took the courses, it was impossible to standardize the pre-post role-plays due to a lack of logistical, human and financial resources. However, this lack of standardization gave the simulated patients the opportunity to choose the problems they wanted to discuss, which may have made the role-plays more naturalistic. In addition, students were instructed to avoid too sensitive situation (e.g. trauma situation) in favor of more daily life situations (e.g. difficulties in studies). Compliance with this instruction was verified with success, the themes were restricted to low severity difficulty (relationship difficulties, phobias, work/school difficulties, moderate cognitive impairment and depressive feelings). However, other variables such as the patient actor characteristics (e.g., shyness, extroversion) might have created differences preventing full standardization. Fourth limit regards the measures assessing the quality of the relationship (i.e., the CARE and the VAS assessing trust in the helper) were assessed by an independent rater. This prevents us from any conclusion regarding the impact of CMT training on the quality of the relationship with a real helpee. A fifth limitation regards the lack of control regarding the background of participants and more specifically, their experience in the field of helping relationship before their enroll in psychology cursus. However, regarding the mean age and its standard deviation ( $SD=0.8$ ) is unlikely, and if there is any experienced student, this situation is not representative of our sample. A last potential limitation, also related to the sample could be the significantly higher number of female students compared to male students. However, this imbalance is representative of a classic class of psychology studies in French-speaking Europe [33–35]. The generalization of the results to male students is still question, however, given certain differences that may suspected. For example, a

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

previous study have revealed significant higher scores of empathy among females medical students compared to males as assessed by patient actor [36]. Finally, the limitation of the 10-minute duration for the role-plays may have had an impact on the representativeness of certain communication skills, causing a ceiling effect. Further studies should allow longer role-plays. Moreover, assessment tools that would allow assessment at different levels of Miller's Pyramid [37] should be added in further studies. For example, multiple-choice questionnaires could provide data regarding the Knowledge level and video exercises would inform us regarding the Competence level [8]. Regarding exploratory outcomes, more reliable tools to assess self-efficacy should be considered (e.g. SE-12 ; [38]). Finally, the perspective of the person being helped must also be taken into account in order to obtain results from all types of potential evaluators [15]. Nevertheless, the increase in communication skills was replicated across two different perspectives, which supports the reliability of our data.

### Conclusion

These results provide further evidence to support the feasibility and effectiveness of implementing a 30-hour CMT training program combining e-learning and role-plays in university programs for health care students. In addition, in this study the theoretical aspects of CMT training were implemented in the form of e-learning. These results supports earlier results regarding effectiveness of CMT and bring news evidence regarding its impact on the actual performance (i.e. "Show how" level evaluation [37]) among regular psychology students. Moreover, it provides evidence regarding the feasibility of implementing CMT hybrid training in large cohorts of university students.

### Supporting Information

"This study has been funded by the University of Liege. Preliminary data from this article has been presented at the "Anonymous version" in the form of a poster. This poster is registered in a pre-publication server at the following reference: "Anonymous version."

### References

- [1] M.J. Lambert, D.E. Barley, Research summary on the therapeutic relationship and psychotherapy outcome, *Psychotherapy*. 38 (2001) 357–361. <https://doi.org/10.1037/0033-3204.38.4.357>.
- [2] J.C. Norcross, M.J. Lambert, Psychotherapy Relationships That Work III, *Psychotherapy*. 55 (2018) 303–315. <https://doi.org/10.1037/pst0000193>.
- [3] J. Halpern, From idealized clinical empathy to empathic communication in medical care, *Med. Heal. Care Philos.* 17 (2014) 301–311. <https://doi.org/10.1007/s11019-013-9510-4>.
- [4] R. Elliott, A.C. Bohart, J.C. Watson, L.S. Greenberg, Empathy, *Psychotherapy*. 48 (2011) 43–49. <https://doi.org/10.1037/a0022187>.
- [5] R. Elliott, A.C. Bohart, J.C. Watson, D. Murphy, Therapist Empathy and Client Outcome: An Updated Meta-Analysis, *Psychotherapy*. 55 (2018) 399–410. <https://doi.org/10.1037/pst0000175>.
- [6] J. Decety, Empathy in Medicine: What It Is, and How Much We Really Need It, *Am. J. Med.* 133 (2020) 561–566. <https://doi.org/10.1016/j.amjmed.2019.12.012>.
- [7] W.. Miller, T.. Moyers, *Effective Psychotherapists : clinical skills that improve client outcomes*, The Guilfo, New York, 2021.
- [8] M. Jaeken, E. Zech, C. Brison, L.L. Verhofstadt, N. Van Broeck, M. Mikolajczak, Helpers' self-assessment biases before and after helping skills training, *Front. Psychol.* 8 (2017) 1377. <https://doi.org/10.3389/fpsyg.2017.01377>.
- [9] H. Van der Molen, G. Lang, P. Trower, *Psychological Communication: Theories, Roles and Skills for Counsellors*, Eleven Int, Utrecht, 2014.
- [10] O. Asan, Z. Yu, B.H. Crotty, How clinician-patient communication affects trust in health information sources: Temporal trends from a national cross-sectional survey, *PLoS One*. 16 (2021) 1–15. <https://doi.org/10.1371/journal.pone.0247583>.
- [11] S. Kurtz, J. Silverman, J. Draper, J. van Dalen, F.W. Platt, *Teaching and Learning*

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

- Communication Skills in Medicine, Radcliffe Publishing Ltd, 2017.  
<https://doi.org/10.1201/9781315378398>.
- [12] K. Aspergren, P. Lonberg-Madsen, Which basic communication skills in medicine are learnt spontaneously and which need to be taught and trained?, *Med. Teach.* 27 (2009) 539–543.  
<https://doi.org/10.1080/01421590500136501>.
- [13] S. Richards, G. Ruch, P. Trevithick, Communication skills training for practice: The ethical dilemma for social work education, *Soc. Work Educ.* 24 (2005) 409–422.  
<https://doi.org/10.1080/02615470500096928>.
- [14] EFPA, European Certificate in Psychology, (2013). [http://www.europsy-efpa.eu/sites/default/files/uploads/EuroPsy\\_Regulations\\_July\\_2013.pdf](http://www.europsy-efpa.eu/sites/default/files/uploads/EuroPsy_Regulations_July_2013.pdf).
- [15] C.E. Hill, M. Roffman, J. Stahl, S. Friedman, A. Hummel, C. Wallace, Helping skills training for undergraduates: Outcomes and prediction of outcomes, *J. Couns. Psychol.* 55 (2008) 359–370.  
<https://doi.org/10.1037/0022-0167.55.3.359>.
- [16] S.B. Baker, T.G. Daniels, Integrating Research on the Microcounseling Program: A Meta-Analysis, *J. Couns. Psychol.* 36 (1989) 213–222. <https://doi.org/10.1037/0022-0167.36.2.213>.
- [17] H.T. Van der Molen, G.N. Smit, M.A. Hommes, G. Lang, Two Decades of Cumulative Microtraining in The Netherlands: An Overview, *Educ. Res. Eval.* 1 (1995) 347–378.  
<https://doi.org/10.1080/1380361950010403>.
- [18] G. Lang, H.. Van der Molen, *Methodiek van gesprekstraining.*, Nelissen, Baarn, 1992.
- [19] A. Ivey, *Microcounseling: Innovations in interviewing.*, Springfield, IL: Charles C Thomas, 1971.
- [20] T. Daniels, Overview of research on microcounseling: 1967-present, in: A.. Ivey, M.. Ivey (Eds.), *Intentional Interviewing Couns. Your Interact. Resour. [CD-ROM].*, Brooks/Cole, Brooks/Cole, Pacific Grove, 2003.
- [21] J. Kuntze, H.T. Van Der Molen, M.R. Born, Increase in counselling communication skills after basic and advanced microskills training, *Br. J. Educ. Psychol.* 79 (2009) 175–188.  
<https://doi.org/10.1348/000709908X313758>.

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

- [22] M. Jaeken, E. Zech, N. Van Broeck, L. Verhofstadt, Se former à la communication en contexte d'entretien, in: N. Nader-grosbois, O. Luminet, S. Vanden Broucke (Eds.), *Articul. Clin. Des Outil. Nouv. à La Dispos. Du Clin.*, Presses Universitaires de Louvain, Louvain, 2014: pp. 33–44.
- [23] A.E. Ivey, T. Daniels, Systematic Interviewing Microskills and Neuroscience: Developing Bridges between the Fields of Communication and Counseling Psychology, *Int. J. List.* 30 (2016) 99–119. <https://doi.org/10.1080/10904018.2016.1173815>.
- [24] M.A. Hommes, H.T. Van der Molen, Effects of a Self-instruction communication skills training on skills, self-efficacy, motivation, and transfer, *Eur. J. Open, Distance E-Learning.* n1 (2012) 1–11.
- [25] J. Schönrock-Adema, H.T. Van Der Molen, K.I. Van Der Zee, Effectiveness of a Self-Instruction Program for Microcounseling Skills Training, *Teach. Psychol.* 36 (2009) 246–252. <https://doi.org/10.1080/00986280903173132>.
- [26] M. Van Dinther, F. Dochy, M. Segers, Factors affecting students' self-efficacy in higher education, *Educ. Res. Rev.* 6 (2011) 95–108. <https://doi.org/10.1016/j.edurev.2010.10.003>.
- [27] D. a Davis, P.E. Mazmanian, M. Fordis, R. Van Harrison, K.E. Thorpe, L. Perrier, Accuracy of physician self-assessment compared with observed measures of competence : A systematic review, *JAMA.* 296 (2006) 1094–1102. <https://doi.org/10.1001/jama.296.9.1094>.
- [28] S.W. Mercer, M. Maxwell, D. Heaney, G.C.M. Watt, The consultation and relational empathy (CARE) measure: Development and preliminary validation and reliability of an empathy-based consultation process measure, *Fam. Pract.* 21 (2004) 699–705. <https://doi.org/10.1093/fampra/cmh621>.
- [29] S. Kurtz, J. Silverman, The Calgary-Cambridge Referenced Observation Guides: an aid to defining the curriculum and organizing the teaching in communication training programmes, *Med. Educ.* 30 (1996) 83–89. <https://doi.org/10.1111/j.1365-2923.1996.tb00724.x>.
- [30] J. Kruger, D. Dunning, Unskilled and unaware of it: How difficulties in recognizing one's own incompetence lead to inflated self-assessments, *J. Pers. Soc. Psychol.* 77 (1999) 1121–1134.

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

- <https://doi.org/10.1037//0022-3514.77.6.1121>.
- [31] C.E. Hill, M.J. Lambert, Methodological issues in studying psychotherapy processes and outcomes., in: M.J. Lambert (Ed.), *Handb. Psychother. Behav. Chang.*, 5th ed, Wiley, New York, 2004: pp. 84–136.
- [32] G.N. Smit, De beoordeling van professionele gespreksvaardigheden: Constructie en evaluatie van rollenspel-, video- en schriftelijke toetsen [The assessment of professional communication skills: Construction of simulations, video tests and paper-and-pencil tests]., Baarn, 1995.
- [33] C. Gravet, Rapport sur l'état de l'égalité de genre 2019, (2019) 16.  
<https://web.umons.ac.be/app/uploads/2020/01/Rapport-sur-l'état-des-lieux-2018-2019-FINAL-1.pdf>.
- [34] Uliege, Les femmes et les hommes à l'ULiège, (2022).  
[https://www.uliege.be/cms/c\\_17265003/fr/les-femmes-et-les-hommes-a-l-uliege#:~:text=On compte%2C en 2022%2C 29,hommes\) pour 16%25 en 2010](https://www.uliege.be/cms/c_17265003/fr/les-femmes-et-les-hommes-a-l-uliege#:~:text=On compte%2C en 2022%2C 29,hommes) pour 16%25 en 2010).
- [35] Académie de recherche et d'enseignement supérieur (ARES), INDICATEURS DE L'ENSEIGNEMENT SUPÉRIEUR, (2017).
- [36] K. Berg, J.F. Majdan, D. Berg, J. Veloski, M. Hojat, Medical students' self-reported empathy and simulated patients' assessments of student empathy: An analysis by gender and ethnicity, *Acad. Med.* 86 (2011) 984–988. <https://doi.org/10.1097/ACM.0b013e3182224f1f>.
- [37] G. Miller, The assessment of clinical skills/competence/performance, *Acad. Med.* 65 (1990) 63–67. <https://doi.org/10.1097/00001888-199009000-00045>.
- [38] M.K. Axboe, K.S. Christensen, P.E. Kofoed, J. Ammentorp, Development and validation of a self-efficacy questionnaire (SE-12) measuring the clinical communication skills of health care professionals, *BMC Med. Educ.* 16 (2016) 1–10. <https://doi.org/10.1186/s12909-016-0798-7>.
- [39] H.-Y. Kim, Statistical notes for clinical researchers: Chi-squared test and Fisher's exact test, *Restor. Dent. Endod.* 42 (2017) 152. <https://doi.org/10.5395/rde.2017.42.2.152>.
- [40] J. Cohen, Quantitative methods in psychology : A power primer, *Psychol. Bull.* 112 (1992) 155–

159. <https://doi.org/10.1037/0033-2909.112.1.155>.

### Tables

**Table 1**

*independent rated measures – Chi-Squared Tests (N=30)*

	Proportion of presence at T1	Proportion of presence at T2	$\chi^2$	$p$	$\varphi$
Greeting the helpee	13.79	62.07	2.07	0.15	0.19
Introduction	93.10	100	4.88	0.03	0.29
Inappropriate silences	24.14	6.90	3.29	0.07	0.24
Repetitions	27.59	41.38	1.22	0.27	0.15
Inappropriate paraphrases	37.93	13.79	4.41	0.04	0.28
Appropriate reflection of feelings	24.14	55.17	5.84	0.02	0.32
Inappropriate reflection of feelings	6.90	13.79	0.75	0.39	0.11
Clarifications	34.48	37.93	0.08	0.79	0.04
Interruptions	27.59	17.24	0.89	0.35	0.12
Summaries	13.79	62.07	14.35	<b>&lt;.001</b>	0.5

*Note.* Bold characters indicate  $p$ -values that remain significant after applying a Benjamini-Hochberg correction for multiple comparisons.

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

**Table 2***independent rated measures– Paired Sample T-Tests (N=30)*

	T1 – Mean (SD)	T2 – Mean (SD)	t(28)	p	Cohen's d
Investigating in more depth	15.72 (7.66)	10 (5.03)	3.97	1	0.74
Initiating	7.31 (4.08)	3.83 (1.75)	5.07	<b>&lt;0.001</b>	0.94
Minimal encouraging	22.31 (18.48)	24.17 (12.32)	-0.62	0.27	-0.17
Appropriate proposals	1.14 (0.833)	1.66 (1.655)	-2.42	<b>0.011</b>	-0.45
Structure	1.24 (1.43)	3.97 (1.92)	-5.47	<b>&lt;.001</b>	-1.02
Appropriate Paraphrases	3 (1.75)	4.21 (2.81)	-2.48	<b>0.01</b>	-0.46
<b>Trust in the helper</b>	3.69 (1.97)	5.24 (2.13)	-2.973	<b>0.003</b>	-0.55
CARE	30.069 (5.41)	33.483 (4.42)	-2.782	<b>0.005</b>	-0.517

Hypothesis: T1&lt;T2

*Note.* Bold characters indicate *p*-values that remain significant after applying a Benjamini-Hochberg correction for multiple comparisons.

## CMT'S IMPACT ON PSYCHOLOGY STUDENTS' COMMUNICATION SKILLS

**Table 3***Self-Assessment – Paired Sample T-Tests (N=44)*

	T1 – Mean (SD)	T2 – Mean (SD)	<i>t</i> (28)	<i>p</i>	Cohen's <i>d</i>
					–
Initiation	9.78 (2.33)	13.76 (1.401)	13.62	<b>&lt; .001</b>	–2.03
Preparation	3.4 (1.3)	4.93 (1.34)	–9.93	<b>&lt; .001</b>	–1.48
Collecting information	17.2 (5.29)	26.64 (3.74)	–13.5	<b>&lt; .001</b>	–2.01
					–
Structure	7.18 (2.96)	12.44 (2.501)	13.14	<b>&lt; .001</b>	–1.95
Building the relationship	4.87 (7)	22.61 (3.73)	–9.24	<b>&lt; .001</b>	–1.38

*Note.* Bold characters indicate *p*-values that remain significant after applying a Benjamini-Hochberg correction for multiple comparisons.