Mastery of communication skills. Does intelligence matter?
Jeroen Kuntze\textsuperscript{a,*}, Henk T. van der Molen\textsuperscript{b}, Marise Ph. Born\textsuperscript{c}

\textsuperscript{a}Department of Psychology and Educational Sciences, Open University, The Netherlands
\textsuperscript{b}Faculty of Social Sciences, Erasmus University Rotterdam, The Netherlands
\textsuperscript{c}Department of Psychology, Erasmus University Rotterdam, The Netherlands

Received 14 July 2016; accepted 1 August 2016

Abstract

\textbf{Background:} Insight in the influence of intelligence on the mastery of communication skills is important for improving the microcounselling method, an effective training programme for acquiring these skills.

\textbf{Method:} Participants were 323 bachelor psychology students. The participants’ level of verbal, spatial and numerical intelligence was determined. Participants followed either a course in basic skills or a course in advanced skills. Their level of mastery of these skills was assessed with a video test.

\textbf{Results:} Both training programmes proved to be effective in training communication skills. As expected, numerical and spatial intelligence were no significant predictors for the mastery of these skills. Verbal intelligence did matter for the mastery of basic communication skills, but only when students are not acquainted with the use of these skills.

\textbf{Discussion:} Students profit from training these skills, regardless of their intelligence level.

\& 2016 King Saud bin AbdulAziz University for Health Sciences. Production and Hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

\textbf{Keywords:} Communication skills; Assessment; Intelligence; Training; Education

1. Introduction

For many psychologists professional interviewing is one of the key components of their profession. Therefore psychology curricula offer their students training programmes in communication skills. Moreover, the mastery of these skills is one of the requirements to be considered for the diploma of a registered European psychologist.\textsuperscript{1} A successful training method for the acquisition of these skills is microcounselling.\textsuperscript{2-5} Several studies\textsuperscript{6-13} and meta-analyses\textsuperscript{14-17} found large overall effect sizes for this method. Improving this method, however, still remains important. For instance, the training method was adjusted to the use of new computer techniques.\textsuperscript{18-19} In the context of improving this training method it is also important to gain insight into factors that might influence the acquisition of communication skills. One such a factor might be intelligence.

Nowadays there is reasonable consensus that intelligence is the best predictor of work performance, based on the outcomes of several longitudinal studies\textsuperscript{20-27} and meta-analyses.\textsuperscript{28-30} General intelligence predicts, apart from working performance, also training success.\textsuperscript{31}

http://dx.doi.org/10.1016/j.hpe.2016.08.002
2452-3011/© 2016 King Saud bin AbdulAziz University for Health Sciences. Production and Hosting by Elsevier B.V. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
Students and soldiers scoring high on general intelligence tests learned more from the same training programme than persons scoring low on general intelligence. This finding was confirmed by other studies and a meta-analysis. Apart from being an unsurpassed predictor of work performance, general intelligence also is the best predictor of training success.

Therefore, one would expect intelligence also to predict success in communication skills training. However, studies investigating whether intelligence predicts success in communication skills training are scarce. Nonetheless, understanding the possible effect of intelligence on the mastery of these skills could help improve training programmes for the acquisition of these skills. Therefore, the focus of this study is on intelligence as predictor of the mastery of communication skills after a basic and advanced training in these skills.

After Spearman's distinction between general intelligence or the g-factor and specific intelligence or the s-factor, intelligence research primarily has concentrated on tests for general intelligence, because this was thought to be the best indicator of someone's true intelligence. However, since the second half of the 20th century researchers also attended to more specific abilities, for instance verbal intelligence or spatial intelligence. Specific job demands, e.g. bookkeeping, not only appeal to general intelligence, but also to specific abilities, e.g. numerical intelligence. According to Lubinski, general intelligence can be divided into three more specific ability domains: verbal, numerical and spatial intelligence. The aggregation of these three separate abilities should give a good impression of someone's general intelligence. In this study we will maintain Lubinski's distinction and investigate verbal, numerical and spatial intelligence as predictors of the mastery of communication skills.

Only a few studies have investigated these relationships. These studies have concentrated mostly on the correlation of verbal intelligence with communication skills. For instance, verbal intelligence admission tests predicted medical students' mastery of communication skills. Well-developed verbal intelligence at early age predicts well-developed communication and social skills later on in life. Finally, found that students scoring high on verbal intelligence also scored higher on behavioural tests for communication skills.

Students in this study followed a microcounselling training programme in communication skills, also known as microskills. This means that the complex skill of professionally interviewing a client is unravelled into small meaningful communication skills. Following Ivey and Authier and Egan, Lang and Van der Molen distinguished seven basic communication skills, namely minimal encouragements, asking questions, paraphrasing, reflection of feeling, concreteness, summarizing and situation clarification and five advanced skills, namely advanced accurate empathy, confrontation, positive relabelling, examples of one's own and directness.

These skills fit within Egan's helping model of three stages: (1) problem clarification, (2) gaining new insights and (3) strategies for treatment. The goal of the first stage is to clarify the problem of the client. In this stage helpers mainly use the basic communication skills. During the second stage, gaining new insights, helpers try to have clients gain new insights in their situation, predominantly using the five advanced communication skills. Finally, in the third stage, strategies for treatment, client and helper seek strategies to solve the client's problems.

The basic communication skills are often taught in the first or second bachelor year of a psychology curriculum and the advanced communication skills in consecutive years. Subjects of the present study were psychology students who in their first bachelor year followed a course in basic communication skills and in their second bachelor year a course in advanced communication skills. These courses were built up according to the Cumulative Microtraining (CMT) method. In this method students first receive theoretical instruction about one communication skill (e.g. summarizing) and its function in a professional interview. Next, video clips show examples of inadequate and adequate performance of the skill to the students (modelling). Subsequently, students exercise the skill separately (like ‘dry swimming’). For instance, with regard to the basic skill ‘asking questions’ students have to try to change a closed question (‘Do you feel sad?’) into an open question (‘How do you feel?’), after which they practice the skill in a role-play with another student. Finally, fellow-students and the trainer give feedback on the student's performance in the role-play and the student formulates learning points according to this feedback. While students practice one or two new skills in each session, CMT's ultimate purpose is to integrate the communication skills that have been dealt with up to that moment in the training programme. Both courses aim at increasing the students' adequate application of the (basic or advanced) communication skills.

According to the studies that found positive relationships between verbal intelligence and communication
2. Method

2.1. Participants

A total of 323 bachelor students of a psychology curriculum at a large Dutch university participated in this study; 182 participants were in their first year of the bachelor programme, 141 were in the second year of that programme. The average age of the first year students was 19.5 (SD=2.1) and 80% of them were female. The second year students’ average age was 20.3 (SD=1.8) and 81% were female.

2.2. Instruments

The participants’ verbal, numerical and spatial intelligence were measured with three tests that are part of the Drenth Test Series Higher Level, a Dutch intelligence test battery often used in the Netherlands. The participants’ mastery of the basic and advanced communication skills was assessed with the Counseling Communication Skills Progress Test (CSPT).

2.2.1. Verbal Analogies (VA)

The VA is a verbal analogies test and assesses verbal intelligence. It consists of 40 multiple choice items and measures to what extent participants can reason with words. They have to determine how words are related, for instance ‘… is to calf, as horse is to…’. Participants have 40 minutes for answering the 40 items. The authors report a split-half reliability of .87 and a KR-20 of .77.

2.2.2. Numeric series (NS)

Numerical series estimates the participants’ numerical intelligence. It has 26 items, each presenting a series of numbers. The participant has to choose from four numbers, which number logically follows the last number of the series. For instance: 1, 3, 6, 10, 15, 21, ?

Possible answers: 26, 27, 28, 29, 30.

The test takes 30 minutes and for this test the authors report a stability coefficient of .87 and a split-half reliability of .73.

2.2.3. Test for Non-Verbal Abstraction (TNVA)

The TNVA assesses spatial intelligence. It consists of 40 items. Each item shows four figures with a sort of resemblance. The participant has to choose, out of six other figures, those two that are most similar to the first four figures. Participants have 20 min to answer the items. The items gradually increase in difficulty. For this test the authors found a stability coefficient of .81 and a split-half reliability of .77.

2.2.4. Counselling Communication Skills Progress Test (CSPT)

The counselling communication skills progress test is a video based behavioural test, established according to the results of Smit and Van der Molen, who investigated different methods for the assessment of communication skills. The CSPT assesses the participants’ level of mastery of the communication skills. It has forty-two items. Each item is a video clip in which a client, played by an actor, tells something concerning his or her problem. After watching each clip participants write down literally what they would say to the client, having received the instruction to use a communication skill (e.g. ‘Give a paraphrase in an appropriate manner’).

The first 30 items assess the level of mastery of the seven basic communication skills and the next twelve items the level of mastery of the five advanced communication skills. The number of items for the assessment of the basic skills is higher than the number of items for the assessment of the advanced skills, because there are more basic skills than advanced skills and because the assessment of an advanced skill takes more time than the assessment of a basic skill.

Three trained assessors using an instruction guide developed for the assessment of the application by the students of every communication skill evaluated the participants’ answers. This guide is based on the skill definitions in Lang and Van der Molen and on expert counsellors’ specifications for the requirements of an adequate answer, a moderately adequate answer and an inadequate answer. Students acquired two points for an adequate answer, one point for a moderately adequate answer and zero points for an inadequate answer. In the end, mean scores can be calculated on the Basic Skill Factor (BSF) and the Advanced Skill Factor (ASF), the two underlying dimensions of the CSPT. The range of the scores on these two dimensions is 0–2.
Table 1
Mean scores on the CSPT of freshmen (no training), 1st year students (training basic skills) and second year students (training advanced skills).

<table>
<thead>
<tr>
<th></th>
<th>Freshmen (T0)</th>
<th>1st year students (T1)</th>
<th>2nd year students (T2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=182</td>
<td>n=182</td>
<td>n=141</td>
</tr>
<tr>
<td>BSF</td>
<td>.45</td>
<td>1.41</td>
<td>1.57</td>
</tr>
<tr>
<td>ASF</td>
<td>.09</td>
<td>.19</td>
<td>.87</td>
</tr>
</tbody>
</table>

BSF Mean score on the Basic Skill Factor (range 0–2).
ASF Mean score on the Advanced Skill Factor (range 0–2).

In order to control for testing effects two comparable versions of the CSPT were developed. There were no significant differences in the students’ scores between these two versions. Cronbach’s $\alpha$ for both versions was high (.91 and .92) and interrater-reliabilities ranged between .89 and .97,11,13 Finally, age and gender had no significant influence on the CSPT-scores.

2.3. Procedure

For this study we used data of 182 first year students who took the three intelligence tests in their first year of the bachelor psychology curriculum. They received the CSPT two times, first, at the start of their study psychology as freshmen, roughly three weeks after the start of the academic year (T0) and second, six months later in their first year, just after they had followed a course in basic communication skills (T1). Furthermore, we gathered data of 141 second year students who took the three intelligence tests in their first year of the bachelor psychology curriculum. They received the CSPT after six months in their second year, when they just had finished a course in advanced communication skills (T2). The basic communication skills training consists of five sessions, spread over five weeks and the advanced communication skill training has four sessions, spread over four weeks. The first year and second year students took the CSPT as a formal examination after respectively the course in basic communication skills and the course in advanced communication skills. Minimal scores to pass the examination were determined for both groups.

3. Results

First, the training effects of both courses in communication skills were determined. To calculate the effect size of the course in basic communication skills the mean scores of the first year students on the Basic Skill Factor at T0 and T1 were analysed using a repeated measures analysis. To evaluate the effect of the course in advanced communication skills the mean scores of the first year students on the Advanced Skills Factor at T1 were compared with the mean scores of the second year students on this factor at T2. The mean scores on the CSPT of all students are displayed in Table 1.

The results in Table 1 show that first year students score higher on both the BSF and the ASF at T1 in comparison with their scores on these factors when they were freshmen at T0. These within-subjects differences on both the BSF and the ASF were significant across time, respectively $F(1, 181)=1779.8; p < .001$ and $F(1, 140)=33.1; p < .001$.

Having followed the basic communication skills training first year students improved most on the Basic Skill Factor. The effect size ($d$) was 4.43. This is a large effect according to Cohen.46,47 After this course first year students showed moderate progress on the Advanced Skill Factor, $d=.6$, but this is still significant.

Furthermore, the mean scores in Table 1 reveal that second year students score higher on both factors than first year students. These between-subjects differences on the BSF and the ASF were significant, respectively $T(327)=-5.9; p < .001$ and $T(327)=-22.8; p < .001$. Second year students score highest on the BSF. However, the highest mean difference between first year and second year students is on the ASF, which leads to an effect size ($d$) of 2.5, which is a large effect. The mean difference on the BSF between first year and second year students is to be considered as a moderate effect size ($d$) of .6.

Next, regression analyses were performed to investigate whether verbal, numerical and spatial intelligence could predict the mastery of the basic and advanced skills of the first year students at T0 and T1 and whether these factors could predict success in training basic communication skills. Because of the high number of regression analyses a significance level of .01 was used. Table 2 shows the results.

As can be seen from Table 2 only the standardized regression weight of verbal intelligence on the BSF at T0 was significant ($\beta=.28; p=.001$). All other standardized regression weights of verbal, numerical and spatial intelligence on the BSF and the ASF at T0 and T1 were not significant. This means that from the three specific intelligence factors only verbal intelligence influenced the mastery of communication skills, but this influence applied to the basic communication skills alone and before the first year students received any training in these skills. Having received the course in basic communication skills verbal intelligent students did not score higher or lower than less verbal intelligent students. This seems to imply that less verbal...
intelligent students gained more of the course in basic communication skills than verbal intelligent students. However, the results displayed in the last two rows of Table 2 reveal that neither verbal intelligence nor numerical or spatial intelligence predicted the contrast scores between T0 and T1 significantly. So, as expected, success in communication skills training was not influenced by numerical or spatial intelligence. However, contrary to our expectation, it also was not predicted by verbal intelligence.

Finally, regression analyses were performed to investigate if the second year students’ scores on the BSF and ASF could be predicted by verbal, spatial or numerical intelligence after following the course in advanced communication skills. The results are displayed in Table 3. Again, since the number of regression analyses is high, a significance level of .01 was used.

Table 3 shows that verbal, numerical and spatial intelligence did neither significantly predict the scores on the Basic Skill Factor nor on the Advanced Skill Factor. Standardized regression weights ranged from −.13 (numerical intelligence on ASF2; \( p = .12 \)) to .19 (spatial intelligence on BSF2; \( p = .04 \)). So, verbal, numerical and spatial intelligence did not influence the mastery of basic and advanced communication skills of second year students after a course in advanced communication skills.

### 4. Discussion

The main aim of this study was to investigate whether the mastery level of communication skills and progress in mastery of those skills after communication skills training could be predicted by verbal, numerical and spatial intelligence. It was expected that verbal intelligence would positively, and that numerical and spatial intelligence would not relate to the level of mastery and training success in these skills.

First, the effect sizes of a basic communication skills and an advanced communication skills microcounseling training programme were determined. A large effect size was found for the course in basic communication skills with respect to the mastery level of these skills. On the mastery level of the advanced skills this course had a moderate effect. The course in advanced communication skills showed a large effect on the level of these skills and a moderate effect on the basic communication skills. Although in this study no control group and, with respect to the course in advanced skills, no pre-test was used, these findings correspond with results found in other studies that did use such designs7,8,11-13 and with effect sizes reported by several meta-analyses.14-17 Therefore, it can be concluded that the course in basic communication skills and the course in advanced communication skills have positive effects on the students’ mastery level of these skills.

Second, the relationship between verbal, numerical and spatial intelligence and the mastery level of communication skills was investigated. As expected, numerical and spatial intelligence did neither predict the mastery level of basic or advanced communication skills, nor progress in the mastery of these skills. Verbal intelligence, however, did predict the mastery level of basic communication skills, but only when students had not received any training in these skills. Yet, after the course in basic or advanced communication skills, verbal intelligence would positively, and that numerical and spatial intelligence would not relate to the level of mastery and training success in these skills.
intelligence did not influence the mastery level of basic communication skills anymore. Verbal intelligence did neither predict success in training basic or advanced communication skills, nor did it predict the mastery level of the advanced communication skills before or after the course in basic or advanced communication skills. So, the results seem to imply that verbal intelligence is of some importance in the application of basic communication skills, but only before a professional training in these skills. In other words, verbal intelligence seems to matter in unfamiliar situations, as applying basic communication skills is an unfamiliar situation for freshmen when they are tested on their pre-training basic level. This corresponds with the idea that intelligence is ‘adaptability to new situations’ or the ability to ‘respond to new situations which [people] have not practiced’. However, when students do practice basic communication skills the influence of verbal intelligence disappears. An explanation for the fact that not a similar sort of pattern was found with regard to the mastery level of advanced communication skills - verbal intelligence did not predict the pre-training mastery level of advanced communication skills - might be that applying these skills is a complex matter. The low means on the performance of these skills before and after the course in basic communication skills seem to correspond with this idea. Finally, verbal intelligence did not predict progress in the mastery of basic communication skills after following a course in these skills. From an educational point of view this can be regarded as a positive finding. It seems that students, regardless of their level of verbal intelligence, profit from the basic communication skills training programme.

4.1. Limitation of the study

An important limitation of this study lies in the homogeneity of the group of participants. It consisted of academic psychology students only. Possibly, using a more heterogeneous sample with regard to the level of verbal intelligence, for instance by including students from lower and higher vocational studies, could show more influence of verbal intelligence on the level of mastery in communication skills.

4.2. Future research

Future research should reiterate this study and use a more heterogeneous sample. Further, it is recommended to investigate whether other variables are possible moderators between intelligence and the mastery level of communication skills. For instance, study motivation could moderate the relationship between intelligence and the acquisition of these skills.

Disclosure

Ethical approval: Non Applicable.
Funding: None.
Other disclosure: None.

References