Neurocognitive Mechanisms of Anti-Lingual & Accent Bias Stereotyping in Virtual Reality and the Sustainable Development of Linguistic Response

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Abstract. Raising awareness through Virtual Experiencing (RAVE) and a Cross-Cultural Perspective on Raising Awareness through Virtual Experiencing (C-RAVE) approaches are used in this article to promote awareness of concerns relating to linguistic stereotyping. Virtual Reality (VR) technology has completely changed several facets of modern life, including instruction, training and entertainment. We give a summary of the techniques employed to increase awareness of how stereotypes might distort our vision. The patterns of the answers provided by the participants demonstrate that the reported gender of the speaker in addition to the accent (native vs. non-native), has an impact on the respondents' assessments of performance. Additionally, we were able to show that the discussions and ideas produced by these response patterns led to a rise in self-awareness of language and stereotyping-related problems. The paper gives a general description of RAVE and examines how it may improve education, create empathy and foster good social change. Focus on a critique of our methodologies and place our work within a larger debate of strategies and efforts for how educational institutions might actively contribute to combating (language) discrimination and bias in many ways. The relevance of Raising Awareness by Virtual Reality and Cross-Cultural Raising of Awareness by Virtual Reality in fostering inclusion and understanding in a society that is becoming more sustainable globally connected is highlighted in the article's conclusion.

Keywords: Virtual Reality, Raising of Awareness through Virtual Experience (RAVE), Cross-Cultural Perspective, Sustainable Development, Empathy, Education, Social Change

1 Introduction

A fundamental cognitive desire to categorise, simplify, and understand the complicated world around us appears to be the root of stereotyping, which appears to be a widespread human inclination. Stereotyping is a method of assigning attributes, characteristics, and/or behaviour to individuals based on widespread, oversimplified views about the social groupings to which they belong [1]. Inadvertent in and out-group classifications, which are a prerequisite for social bias, prejudice, discrimination and structural inequalities are unfortunately also a result of this propensity. Stereotyping's apparent tendency to be implicit, unconscious, or automatic [2], is one of the more unsettling features of it. This, therefore, causes unintentionally biased judgements and/or behaviours—judgments and behaviours that we might not even be aware of—toward those who are seen to belong to a certain social category.

Implicit prejudice and stereotyping are expected to have a significant but often unacknowledged role in systemic discrimination in education, law enforcement, employment and healthcare sectors. Thus, the public is interested in learning how specialists in various disciplines may resist these inclinations. Although it is easy to point to research and data that demonstrate the negative impacts of stereotypes, bigotry and prejudice, considering the prospect that we may be a part of these systematic systems is something that many of us are reluctant to do [3]. This poses a significant pedagogical challenge. The so-called unconscious bias training like the sort detailed in this article can be useful in situations like these. Increasing target group members' knowledge of the intricate

processes and negative effects of unconscious prejudice and stereotyping, as previously mentioned, is unquestionably a crucial first step in combating these tendencies [4]. Here, we contend that an effective self-awareness-raising approach is the open demonstration of the effects of implicit stereotyping, illustrating how it genuinely may impact our judgements and perceptions. The creation of case activities has been the primary goal to increase public knowledge of specific implicit stereotyping concerns pertinent to various professional and educational contexts, as well as with the common goal of increasing public awareness of the impacts of implicit stereotyping [4,5, 26-30]. Giving an account of the results of some of our operations is the second goal of this research. We assess whether the activities have increased participants' self-knowledge of implicit bias and stereotypes as well as what specific features of this increased awareness respondents specifically mention in their narratives. We are especially interested in bringing up two issues language and stereotypes. Our investigation on "anti-linguistic stereotyping," or the process by which "attributions of a speaker's group membership trigger distorted evaluations of that person's speech [1]". In other words, stereotypes appear to influence how we perceive language. More precisely, we wish to show how hearer perception and evaluation of a language event may be influenced by language schemes and stereotypes, which are implicit and explicit preconceived assumptions about how a certain social category, like women, for example, behaves verbally [6]. This phenomenon is "a lens that directs and distorts cognition," and it seems that stereotyping causes us to pay attention to behaviours that support our previous assumptions and overlook behaviours that do not.

2 Methodology

Our approach is mainly intended to give accurate information for sociolinguistics, social psychology or other empirical studies aimed at elucidating the impacts of stereotyping. Instead, the primary goal of our concept is pedagogical, to effectively summarise the preconceptions of a particular group about a certain linguistic issue. The fundamental advantage of this approach is that group-generated data may be utilized as a springboard for self-awareness-raising exercises and exploratory group conversations [7,8]. Every one of our awareness-raising surveys has a similar overall layout. We start by introducing the group in question to the work at hand. The activity is "camouflaged" as an exercise related to the course or setting that the students/respondents are participating in since it is crucial to conceal the exercise's true purpose at this point. As a result, two guiding principles determine how the instances are designed: first, that they may be presented as plausible exercises in the environment in which they are utilized and second, that there is little chance that students or responders would learn the exercise's true objectives [9]. As soon as replies are gathered, the case activities' genuine intent is made clear.
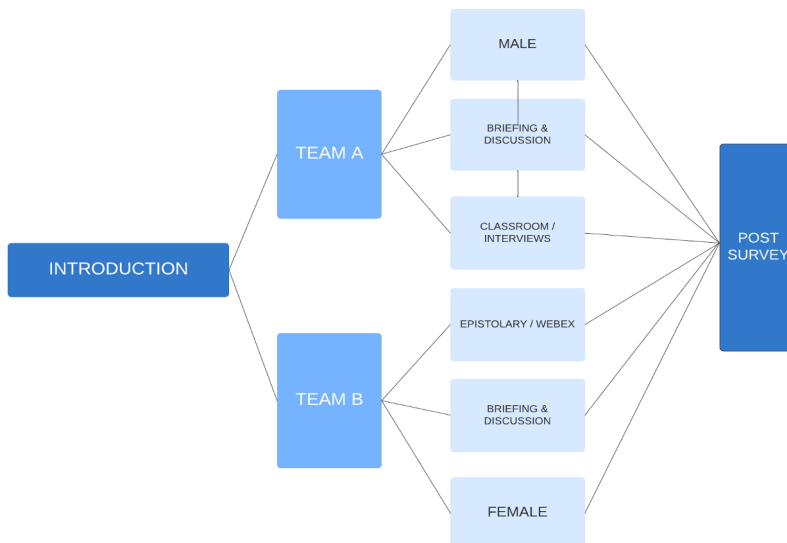

Fig. 1. Process overview – RAVE/C-RAVE.

Following the introduction, participants are given a list of questions that collects pertinent data about the respondents (such as age, sex and nationality); and creates an anonymous ID that allows us to follow up on information about a specific participant in the post-survey without realising who they are; baseline stereotype measures that can be followed up in the post-survey; and records and asks respondents about pertinent topics.

Additionally, this survey has a randomizer tool that divides the sample into two subgroups, one of which is shown as Team A and the other as Team B.

Before collecting the group for the debriefing and discussion session, we assess and summarise the data collected during the response phase. The survey setting is introduced, basic information regarding stereotyping effects is provided, the real design of the exercise is revealed and lastly, the results for the group are presented. Then, the group is divided into smaller discussion groups for a more in-depth discussion of the findings and pertinent issues. The group is then put back together and each subgroup is given a chance to make a presentation that summarizes their discussions and comments [10]. We encourage respondents to provide qualitative feedback and comments on how they saw the activity in the post-survey. By comparing responses to the question, "To what extent do you think that you are influenced by stereotypical preconceptions (conscious or unconscious) in your expectations and judgements of others?" we further attempt to quantify the self-estimation of stereotyping awareness-raising effects. Before and after the activity, a (0-100 scale, where 0 = not at all and 100 = very much so) was supplied. Notably, this query was also asked in the preliminary survey conducted before the experiment. Finally, we invite students to consider moral or other design-related problems [2-11]. We also inquired about their willingness to have their thoughts recorded in our research database.

2.1 Findings

Since the beginning of the survey, we have performed awareness-raising activities utilizing distinct case designs with over 120 respondents, in more than 60 student small groups from courses in language, teacher preparation, psychology, sociology and law, by the general framework stated above. Additionally, we engaged in C-RAVE activities with several teams of working language instructors. It has been called a matrifocal society, with women and girls enjoying many advantages over men and boys. A summary of the case design that was used in the survey is provided in the following sections. We chose only those scenarios for this example that directly address linguistic concerns.

2.2 Design

Language instructors have been one of our programmes' main target audiences. The majority of language teacher preparation contains sociolinguistics course modules, one of which will typically cover gender and language. The purpose of the following scenario, which was created to be utilized in situations like these, is to increase awareness of gender and conversational style stereotypes with a particular focus on conversational management [12]. A sociolinguistics course for teacher candidates used the case study as an exercise in which students were asked to listen to and respond to a conversation between two researchers about a piece about gendered and biased depictions of language in popular culture. Then, after hearing remarks on various elements of the dialogue one of the speakers' actions. We aimed for a collaborative, balanced dialogue in which neither of the two participants was dominating or hostile when we developed the screenplay. After the conversation was recorded, one of the actors' voices was digitally adjusted for pitch to create two different versions of the conversation: one in which Researcher A sounded like a male and the other one sounded like a female. Before the case activities, the "believability" of the manipulations—that is, if they sounded genuine and natural—was evaluated by a panel of our peers [3].

2.3 Response Patterns

In this exercise, participants were asked to assess Researcher A's language skills by rating statements (on a 7-point Likert scale) that emphasised more affiliative traits like showing attention, support and sympathy as well as assertive traits like taking up space, interrupting, being contradicting and arguing aggressively. Figure. 2 summarizes the general answer patterns of 120 respondents from classes of language instructors who in response patterns exhibit linguistic stereotyping tendencies in reverse [13]. While listeners on conversational characteristics linked to affiliative conversational styles, the female version tended to receive better marks (such as being supportive, signalling interest and not taking up too much space), listeners of the male version tended to give higher scores on assertive conversational features (such as taking space, interrupting and contradicting). Thus, research appears that stereotyping "directs and distorts cognition" [9-14-15] in such a way that while listening to the male version and vice versa, respondents pay particular attention to and take note of conversational conduct that is stereotypically associated with masculinity. Each of the classes had the same response pattern as that seen in Figure 2 who participated in the events and served as the catalyst for the post-survey conversations and reflections.
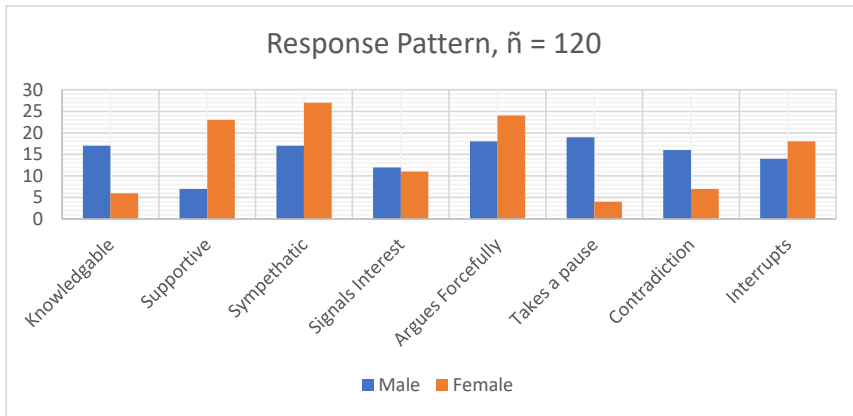
Fig. 2. Anti-Lingual Stereotyping

2.4 Debriefing discussions

The design's element of surprise and its implications for both more basic questions about stereotyping in society and more particular ones about professional practice were frequently discussed in the class. The crucial but challenging function that role play plays in influencing young people's conduct has been a frequent issue of discussion. Here, conversations have focused on common misconceptions about how boys and girls behave and interact in the classroom and how, if left unchecked or even encouraged by instructors, the use of such models might result in the stereotypes being true. There was broad agreement that it is critical to educate instructors about these issues and that each student should be regarded as an individual rather than a group representation.

2.5 Quantitative Self-estimation of awareness raising

We compared answers to the question "To what extent do you think you are influenced by stereotypical preconceptions (conscious or unconscious) in your expectations and judgements of others?" to obtain a numerical measurement of one's increased awareness of stereotypes as a result of the exercises [16]. both before and after the test. We compared the answers provided by 120 respondents on this question in both the pre-and post-surveys (before and following the activities). From 60.8 in the pre-survey to 58.2 in the post-survey, there was a significant average increase of 7.4 units ($p = 0.05$ in a two-tailed paired test). This outcome, in our opinion, is unequivocal proof that the activity raised participants' awareness of the short-term impacts of stereotyping on perceptions.

2.6 Qualitative Analysis of Open Post-survey Responses

In the post-survey, we included two generic and open questions such as, "What will you take with you from this "experiment" and the following discussions into your future profession?" to get a more qualitative perspective of how the activity had influenced the participants. "Were there any aspects of the design that worked particularly well, or not very well at all?" 118 of the 120 respondents who participated in the events and completed the post-survey responded to the first question. Our evaluation of the replies has led to paying attention to specifics like pronoun selection, often appearing verbs and nouns, the direct and indirect objects of the sentences and topics of supplementary clauses, for instance, it was attempted to clarify common themes and patterns in the replies (see Figure 3).
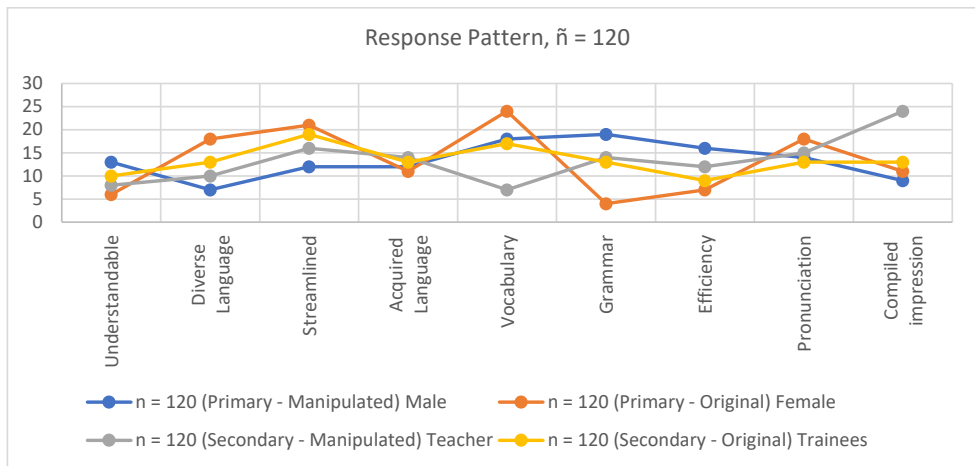
Fig. 3. Post survey responses

The second question, "Were there any aspects of the design that worked particularly well, or not very well at all?" received 91 replies. Out of them, 72 were extremely favourable: "Exciting!" "All worked great!" and "The accent manipulation was excellent. I was seriously duped! This is exactly how my father, who has a foreign accent, speaks!" The surprise factor was mentioned in several of the complimentary remarks (34): "You truly fooled me. Nice job. Additionally, the following important points were raised: 14 respondents voiced their displeasure with the actor's "performance," which some did not find to be authentic; 5 respondents noted that they had encountered technical difficulties; and 1 responded that the experiment might promote prejudice: "Asking us to judge someone based on pronunciation runs the risk of reproducing ideas that people from other countries are less intelligent [1-17]. Given the pervasive racism today, some people choose details from research findings rather than taking them completely in. In the debate that follows, we will revisit this criticism.

3 Accent Bias evaluation of oral language performance

3.1 Design

This example is intended to demonstrate how perceptions of a speaker's overall language proficiency may be impacted by prejudices associated with a non-native accent. The case was first contextualized as an evaluation exercise, with the respondents being informed that they would listen to an interview with an adolescent guy and then be asked to rate his language ability. This was done to conceal the case's true objective. Again, at this point, they were unaware that there were two different recordings of the same song. Additionally, participants were informed that their results would be addressed at a subsequent seminar [18]. According to the screenplay, a teen guy is being questioned about the linguistic climate at his place. The language is generally typical of young people: cautious, lots of invariant tags like "eh," "okay," "right," and "yeah," fragmented phrases and occasional grammatical errors brought on by false beginnings, certain vowel sounds that indicate whether an accent is native or not (more precisely, Non-European) frequently replicate the [:] sound, which is commonly reproduced more rounded and farther back as a [u:] sound (essentially a shift from u > o) was then altered to create two different versions of the sounds using cut-and-paste techniques. The only difference between the two versions was how the signal vowel sounds were spoken, which had no impact on comprehension [19].

3.2 Response Patterns

By rating statements (on a 7-point Likert scale) that directly addressed qualities like understandability, variability, language structure, adaptability to the context, vocabulary, fluency, grammar and pronunciation, respondents were asked to assess the interviewee's language performance. Figure 3 presents the overall answer patterns of 120 respondents who participated in the case activities (representing classes of elementary school teacher trainees and classes of secondary school language teacher trainees).

3.3 Debriefing discussions

How the results varied from the results and what this said about cultural differences in terms of preconceptions was a major topic of discussion during the debriefing sessions. These debates made it clear that forceful conversational tactics like arguing, interrupting and taking up conversational space were seen as feminine rather

than stereotypically masculine. This may help to explain why the responses differ in the two contexts: When listening to the female version and vice versa [20-21], both respondent groups concentrate on and make note of conversational characteristics that are stereotypically linked with female conduct. However, there are variances in these gender preconceptions between the two environments, which explains variations in response patterns. However, more in-depth research is required before we can draw any definitive conclusions about how gender stereotypes change the cultures in the two settings. The debates also covered how gender stereotypes may result in unequal standards of behaviour and treatment for boys and girls in educational settings [13-22-23]. There was universal agreement that teachers had a specific responsibility to play when it came to understanding how gender stereotypes may create destructive feedback loops. The debates that resulted from these response patterns were mostly focused on concerns about objectivity in student evaluation. Participants noted that they gave the altered version favourable ratings because they presumed the speaker was a non-native speaker and that his language abilities were good "for being a non-native [24]." The unaltered version was not evaluated using these standards, which has sparked debates about the objectivity of assessments and how crucial it is that a grade accurately represents a student's proficiency in a language, whether they are native speakers or not. The use of summative assessments as a pedagogical tool was also discussed throughout the sessions. Many students argued that from a formative (but not a summative) perspective, it made sense to evaluate the same performance differently depending on whether it was delivered by a native or non-native speaker. Many people claim that applauding someone's linguistic proficiency while taking into consideration his or her language requirements and ought to continue doing so. constantly in the language classroom [4-10].

3.4 Quantitative self-estimation of awareness-raising

When asked "To what extent do you think that you are influenced by stereotypical preconceptions (conscious or unconscious) in your expectations and judgements of others," 72 respondents provided matching answers. both before and after the exercises, in the pre-and post-survey. From 56.5 in the pre-survey to 60.3 in the post-survey, there was a significant average gain of 13.8 points ($p = 0.03$ in a two-tailed paired test). This outcome, in our opinion, shows that the respondents' self-awareness has grown because of the exercise. 138 people responded to the question "To what extent do you think that you are influenced by stereotypical preconceptions (conscious or unconscious) in your expectations and judgements of others," and we were able to match their answers. both before and after the exercises, in the pre-and post-survey. From 55.8 in the pre-survey to 63.5 in the post-survey, there was a significant average gain of 7.7 points ($p = 0.000$ in a two-tailed paired test). Once more, we interpret this outcome as proof that the respondents' level of self-awareness rose as a result of the exercise.

3.5 Qualitative analysis of open post-survey responses

Seventy-two of the 97 respondents responded to the query "What will you take with you from this 'experiment' and the following discussions into your future profession?" in the follow-up survey. When these answers were analysed qualitatively. In 65 of 72 comments, many facets of raising awareness were mentioned: "I have learned that I should never judge someone without knowing them [...] yes, I used to!" "The experiment opened my eyes!" and "I've learned that stereotypes can skew our thinking and judgement." Similar to the sample, numerous responses made particular mention of cognitive and behavioural (judgements, biases and perceptions) characteristics that may be impacted by stereotyping: I've discovered that it's important to give people a chance before passing judgment on them based just on appearance. Additionally, there were some obvious discrepancies between the two groups' replies. First, the sample had a lower prevalence of precise references to self-reflection (i.e., in the first person singular). The collective first person (we, our and us) was used in more than half of the responses (42/72) in the reflections. Examples include "It showed something that maybe we fail to see and pay attention to in our everyday lives and how such preconceptions really can affect others and the whole society" and "How preconceived notions tend to affect our judgement." Second, more respondents (22/72) than Non-native respondents (12/118) mentioned cross-cultural aspects: "I've learned that language and culture can colour our perceptions," "I have learned that stereotyping is different in different countries," and "I have learned that the society is very different from that of the Non-native society." Finally, of the 72 responses, 32/72 specifically mentioned gender stereotyping ("It made me aware of the different perceptions and the thinking processes based upon female and male gender stereotypes") and 23/72 specifically mentioned educational contexts: "This exercise will enable us as teachers to change the way we think about people, especially our pupils." and "We need to stop using stereotypical thinking, especially if we do so when working with students daily." they were the main components of the usual response, which may be summarised as follows: "The exercise has made us aware/see/conscious of our gender prejudices and assumptions and how they differ. Boy and gender stereotypes must end, especially in the classroom. The second query, "Were there any aspects of the design that worked particularly well, or not very well at all?" received 43 answers. 37 of them were extremely enthusiastic, stating things like, "It was wonderful!" and "It was incredibly intriguing! I was astounded at how prejudiced we are. The few negative comments mostly focused on network problems.
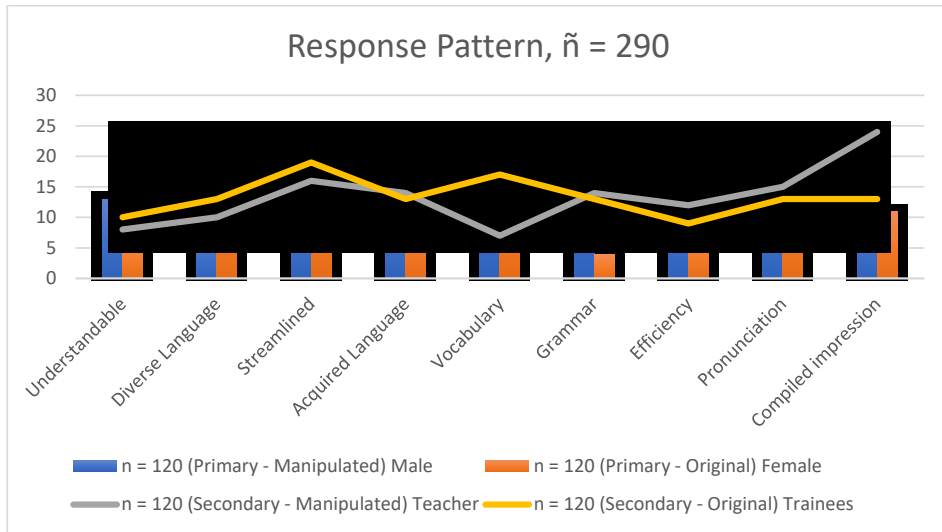
Fig. 4. Accent Bias Evaluation (Response Pattern)

Answers to the post-survey question "What will you take with you from this 'experiment' and the following discussions into your future profession?" were provided by a total of 88 of the 120 respondents. in the follow-up survey. These replies' qualitative examination produced findings that were remarkably similar to those of Lingual and accent Bias Stereotypes: The experiment opened my eyes to the prejudices that may exist among instructors and 121 of the 138 replies emphasised various elements of raising awareness, including "I have become aware of how we can evaluate students unconsciously based on their accents only" and "The experiment has opened up my eyes to the preconceptions that may exist among teachers." Similar to previous cases, several responses specifically mentioned cognitive and behavioural components (judgements, prejudices and perceptions) and some responses mentioned how stereotyping may impact assessments and grading in the latter (24/138). Thus, the normal response may be summed up as variations on the following information: The experiment aided in my awareness, observation, focus and consideration of how stereotyping might influence my behaviours generally and my evaluation/grading specifically. Finally, only 8/138 respondents specifically mentioned stereotypes based on ethnicity or native vs. non-native accents. On all categories except pronunciation, the modified version—the version altered to sound non-native—was assessed substantially more positively. In other aspects, respondents thought that a non-native speaker was easier to comprehend, had a more diverse language, more organised arguments, better language adaptation, a broader vocabulary and used more proper grammar [2-25]. Overall, primary teacher candidates gave both versions of the performance a higher rating than secondary school language candidates did. These answer patterns were consistent throughout all nine groups and served as the basis for the conversations that followed the debriefing and the post-survey reflections.

4 Conclusion

Overall, the results were positive and we were able to demonstrate that our approach increases awareness of how stereotypes might influence our perceptions and judgements in general as well as in particular. With diverse course programmes with people, we have now completed several awareness-raising initiatives. Case activity evaluations have typically been quite favourable. One of the method's greatest advantages is that it allows us to identify distinct stereotyping tendencies for a certain group and environment, which has also sparked extremely focused and pertinent conversations. While our approaches have been quite effective in generating awareness and dialogues regarding stereotyping connected to a wide range of topics in different learning environments, we are also able to point out several shortcomings. First, the juxtaposed binary character of matched-guise-inspired set-ups generates a rather artificial scenario predefined response questionnaire designs, for instance, compel respondents to draw conclusions about information that may not accurately reflect what they would consider important in complex real-world circumstances. In doing so, we can give them an incorrectly disproportionate amount of weight by "uncovering" language triggers and stereotype effects that may only have a little impact on decisions made in actual scenarios. As a result, we run the risk of drawing attention to and arousing concerns about stereotypes that are either unfounded or of minimal significance.

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