

Evaluation of Intercultural Instructional Multimedia Material on Implicit Xenophobic Cognition: Short Time Effects on Implicit Information Processing

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(Submitted July 8, 2015; Revised November 17, 2015; Accepted January 15, 2016)

ABSTRACT

Considering xenophobic attacks against foreigners and ethnic or religious motivated wars, there is a need for educational concepts to extinguish xenophobia. A model describing the cognitive processes involved in Xenophobic cognition was developed. Instructional multimedia material that discussed various forms of alienation was developed and evaluated. The computer program was based on research findings and proven intercultural teaching strategies. To evaluate the training sessions, methods were developed to measure attitudes toward foreigners. Based on a multi-method concept an evaluation-tool was created that validated the effectiveness of long-term intervention programs and short-term effects on an implicit level of awareness. The procedure used the implicit association test. The applied methods were evaluated in a study with 79 High School students (46.8% female; mean age = 14.13, $SD = 1.16$) within a one-factorial control group design. Although there were no significant results in explicit measures of attitude, there was a significant change in implicit measures showing a reduction of implicit xenophobic cognitive processes in the experimental group and an increase in the control group. Results imply that the chosen tutorial methods lead to a change in attitudes on trait and state-level regarding xenophobic self-concept.

Keywords

Social cognition, Implicit association test, Intercultural education, Prejudice

Introduction

Understanding another's cultural backgrounds as well as our own is one of the most important skills in today's society. Every day, we face situations and social interactions that might be perceived as strange because they are different from our own culture. However, intercultural education could support the process of establishing a peaceful coexistence between cultures when one is confronted with new and unfamiliar intercultural exchanges. That is, intercultural education might contribute to support a change of perspective that can reduce prejudices, resentments, and unfounded fears of any type of foreignness one may encounter.

Most of our beliefs and ideas of other countries and cultures are not based on personal contacts with foreign people but rather are outcomes of traditional lore (cf. Budke, 2008). Such tradition might manifest itself in xenophobic jokes, expressions, cartoons, and propaganda of ultraconservative and right-wing parties. Stereotypes might lead to dubious conclusions and predictions about people from foreign countries. Sometimes, even teaching (e.g., geography courses), might contribute to the generation of stereotypes (cf. Markom & Weinhäupl, 2007).

However, emographic change makes immigration necessary, for example, to sustain the Western socio-economic system. As such, intercultural competencies, and thus, intercultural education is necessary in a multicultural society. Globalization leads to the fact that people are confronted with foreignness within their traditional settings. To avoid a "Clash of Civilizations" as predicted by Huntington (1993), and to assure that ethnical diversity will be recognized as an economic and social viability, a specialized education seems to be necessary. This education should serve to mediate cultural differences among people of different origins.

The current investigation was designed to develop and examine a specialized instructional multimedia material that was based on recent psychological and pedagogical research findings. The main objective of the learning program was to foster attitudinal change in students regarding prejudices, stereotypes, and perceptions of foreignness against people from other cultures. A higher level of education is often seen as a predictor of tolerance and positive attitudes towards a multicultural society. Education also enhances tolerance for others (cf. Noack, 2001; Rippl & Seipel, 2002). Pettigrew and Martin (1987) suggest that education might contribute to a change of attitudes and, in turn, help reduce xenophobic attitudes. Therefore, a learning environment was

developed that could help learners' reflect upon their behaviors and attitudes towards foreigners and consequently, reduce the xenophobic attitudes they may have held. Nevertheless, conducting such training does not automatically guarantee its success. It still remains unclear if education can lead to a change in xenophobic attitudes. Hence it is necessary to evaluate the effectiveness of the training. In the present study, the success of the learning program depended on the strength of the negative association to foreignness and the ability of the intervention program to produce a change. Negative associations are sometimes difficult to change because they are products of socialization and educational processes that have developed over many years.

Intertwined with this problem is the finding that assessing prejudices, stereotypes or other dimensions of xenophobia implies the use of a multi-methodological approach, to obtain not only explicit, but also covert, implicit values. Thus, as part of the current empirical investigation, several methods were developed to measure xenophobic attitudes and stereotypes.

Taken together, the current study was designed to answer the following research question: can an instructional multimedia material lead to a significant change in attitudes as well as covert and implicit xenophobic self-concepts?

The following behavioral learning approach utilized in the study was based on a general model to explain xenophobic behavior and attitudinal change.

A General Xenophobic Model

Implicit prejudiced attitudes are introspectively unidentified traces of past experiences (e.g., Greenwald & Banaji, 1995). The General Xenophobic Model (GXM) describes the concrete development of xenophobic cognitions that are based on general explicit and implicit learning models (e.g., the General Aggressive Model; cf. Anderson & Bushman, 2001). The basic assumption of the GXM (see Figure 1) is that there is a connection between observation, socialization, and concrete xenophobic behavior (cf. Schrangl & Zumbach, 2012).

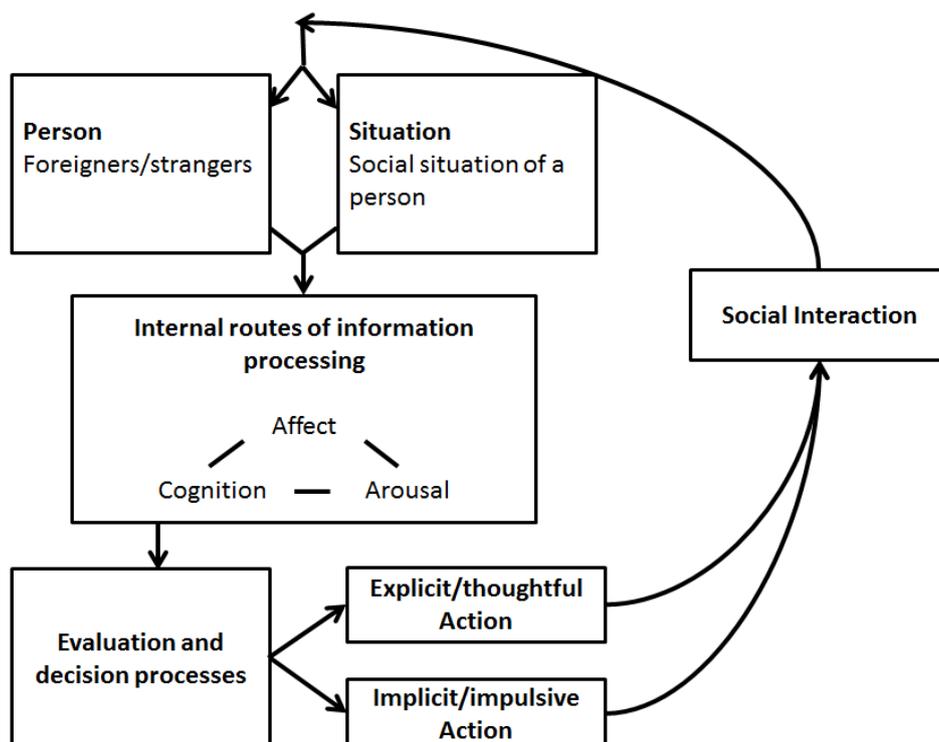


Figure 1. Short-term processes of the General Xenophobic Model

The GXM has been designed to form a framework for understanding the cognitive processes that are based on repeated observations that lead to xenophobic attitudes. The model also considers implicit cognitive processes and integrates the dual process model by Devine (1989). It assumes that there are automatic and controlled components involved in the development of stereotypes.

The model shows the importance of observation regarding the development of xenophobic behavior. The observation can be realized through direct contact (primary experience) or communication (secondary contact; Müller, 2004).

The model describes the processes of how people acquire xenophobic memory representations. Within a specific situation, a person is confronted with one or more persons from a different culture. During the situation, a person experiences a specific state (e.g., frustration) that acts as an input in the subsequent information processing. The processing of the input variables can be done on an affective, cognitive, or arousal level. Let us assume that a person is frustrated because he or she has just lost his or her job. He or she watches a TV advertisement of a right-wing party where unemployment is attributed to the high number of immigrants that take jobs from nationals. The person may process the input cognitively and, thus, might internalize this causal relation. Additionally, the person might also react affectively, for example, becoming increasingly angry towards immigrants. Furthermore, the affective reaction might also influence other accompanying processes that trigger physiological arousal, such as an increased heart rate or blood pressure. The information processing results in an evaluation of the situation that might lead to an explicit and thoughtful reaction (e.g., actively voting for the party) and/or an implicit and rather impulsive behavior (e.g., fostering stereotypic thinking against immigrants) that might impact subsequent social interactions. If the xenophobic behavior does not lead to negative, but rather neutral or positive consequences for the person, the probability of acquiring xenophobic attitudes, behaviors, and knowledge structures increases, and might lead to new, similar information processing and evaluation processes. Thus, starting a new cycle that supports xenophobic attitudes. It is also important to note that the situation does not have to necessarily be experienced in the real world, but can also be mediated by media (cf. Esser, Scheufele & Brosius, 2002).

Repeated consumption of prejudicial media and observation of racist behavior might contribute to the development of xenophobic knowledge structures (see Figure 2). Such structures are usually complex and very difficult to change. The xenophobic knowledge structures also lead to conscious (explicit) and impulsive (implicit) decision making (cf. Devine, 1989) in corresponding social interactions (e.g., Berkowitz, 1993). The first automatic reaction and the following controlled judgement of the person lead to the production of specific behaviors. People with a strong tendency toward xenophobic behavior can easily access xenophobic behavioral scripts due to social priming situations. Support is given here by Greenberg and Pyszczynski (1985) who were able to show that racist statements easily activated stereotypes and, thus, lead to discriminatory acts.

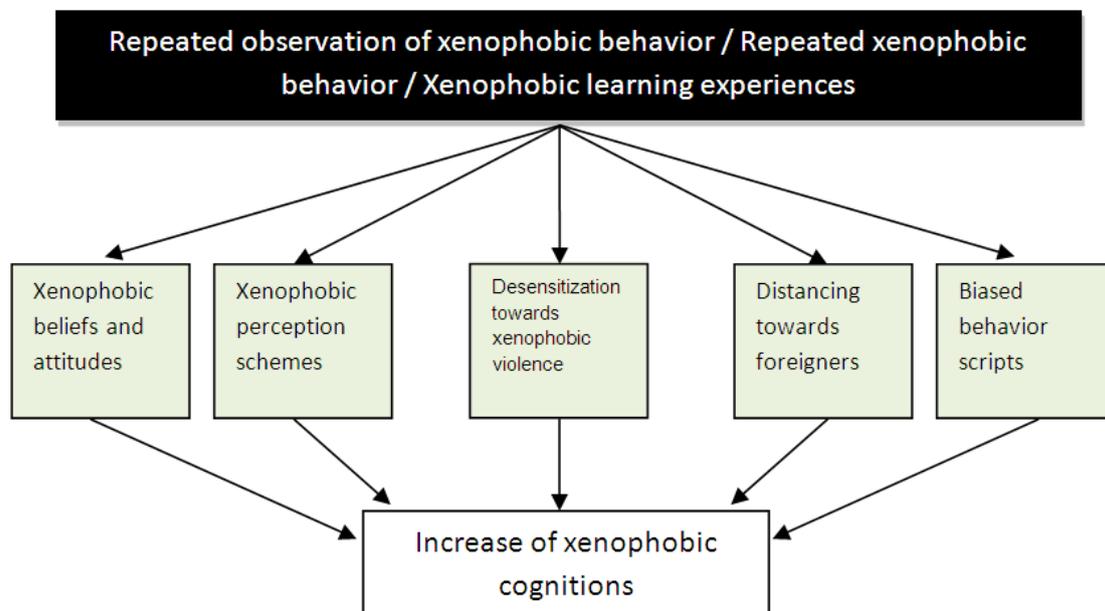


Figure 2. Long-term processes of the General Xenophobic Model

Repeated experience of the short-time model cycle might contribute to permanent long-term effects. These consequences are illustrated in Figure 2. Long-term learning processes are triggered by repeated observations of xenophobic behaviors. Possible consequences include xenophobic beliefs and attitudes (cf. Bacher, 2001), xenophobic patterns of perception (Wahl, 2003), prejudicial behavioral scripts (Greenberg & Pyszczynski, 1985), desensitization towards xenophobic statements, and a growing detachment towards foreigners (Wahl, 1999). All these effects are caused through exposition, socialization, and observational learning.

Xenophobic attitudes can be a result of socialization (Bacher, 2001). While Wahl (2003) assumed that xenophobic attitudes were the product of evolutionary processes, the current investigation suggests that it is a consequence of observational learning experiences that lead to negatively associated stereotypes against foreigners from different cultures. Additionally, people that have already developed xenophobic tendencies often avoid contact with foreigners. However, contact with foreigners might actually reduce xenophobic attitudes. According to the contact-hypothesis theory, intercultural contact has been shown to have a positive impact on attitudes towards foreigners (cf. Allport, 1954). Furthermore, the process of self-reflection provides one a means of changing one's own attitudes (Gudjons, Pieper & Wagener; 1986).

Taken together, the suggested model assumes that each single xenophobic episode can contribute to the construction and activation of xenophobic knowledge structures. Such structures might contain perception failures such as illusory correlations (cf. Shavitt, Sanbonmatsu, Smittipatana & Posavac, 1999) or hostile expectations (cf. Anderson & Bushman, 2001). Repeated experience of the cycle might also lead to desensitization towards hostile behavior against people from other cultures. In short, the above factors are likely to contribute to the adoption of a xenophobic personality—in a similar fashion to how aggressive behaviors are learned (cf. Anderson & Bushman, 2002).

For example, Huesmann (1994) found a strong connection between socialization and personality development. While socialization often takes place within families, the contact that people have outside of their own family can also have an impact on personality development. A person's peergroup and other adults (e.g., teachers or trainers) also play an important role (cf. Huesmann, 1994). If the peergroup has a high acceptance of xenophobia, then one may tend to find the behavior more acceptable. Furthermore, non-xenophobic peers tend to be rejected by members of xenophobic peers, whereas, like-minded people tend to attract each other.

It is therefore assumed that the kind of learning described in the model above (e.g., observational learning) can significantly influence the perception of strangers and foreignness.

Explicit and implicit attitudes

As described above, the model considers implicit cognitive processes as well as automatic and controlled components involved in the development of stereotypes. Explicit cognitions are introspectively accessible, while implicit processes operate outside of awareness. Contrary to explicit beliefs, implicit attitudes are introspectively unidentified traces of past experiences that mediate favorable or unfavorable feelings, thoughts, or actions toward social objects (Greenwald & Banaji, 1995), as well as influence automatic and spontaneous *behavior* (Gawronski, 2006; Gschwendner, Hofmann & Schmitt, 2006). In other words, it is possible to be prejudiced without making a conscious decision.

While explicit measures mostly rely on self-reports, implicit measures are frequently based on reaction time tasks, such as the Implicit Association Test (IAT, Greenwald, McGhee & Schwartz, 1998). Generally it is possible that there is a divergence between explicit and implicit measurement results, particularly regarding socially sensitive topics like prejudice against minorities (Hofmann, Gawronski, Schwendner, Le & Schmitt, 2005). Implicit attitudes can be seen as better predictors of behavior than self-reported attitudes because a participant might lack the ability to introspect correctly (Brunel, Tietje & Greenwald, 2004). Similarly, another problem with explicit measures is that participants might be motivated to avoid external censure by answering questions in a manner that will be viewed as "good behavior" by others. Thus, socially desired answering might be a consequence. By using reaction time measures and excluding responses that take too long, socially desired answering is minimized (Gschwendner et al., 2006). The main difference between explicit and implicit measurement methods is that explicit methods allow an introspective approach of the measured constructs, whereas, implicit methods do not. Thus, by detecting spontaneous processes, the implicit attitude can provide a more comprehensive picture of a person's attitudes.

The first question is whether or not implicit and explicit decisions can be influenced by a short-term instructional intervention that helps one reflect about situational or personal input variables? The second question is how to measure the influence of instructional approaches on implicit knowledge structures? We focussed on an implicit, cognitive level rather than on a genuine affective level because it is assumed that implicit cognitive structures would subsequently have impact on affect. The present study will address both of these questions by evaluating an intercultural training program with established explicit measures (questionnaires) as well as a proprietary Implicit Association Test (IAT) to assess changes in implicit knowledge structures related to the perception foreignness. Since short time interventions rarely lead to significant changes of explicit attitudes, a

combination of explicit and implicit measures was used to better detect the initial implicit changes that subsequently affect explicit changes (e.g., Cochran-Smith, 2003; McDiarmid & Price, 1993; Wasonga, 2005).

Method

The present study describes the development, application, and assessment of an intercultural training software program as well as a methodological toolkit to assess short- and long-term consequences of instructional interventions for reducing xenophobic attitudes. The study employed an experimental-control group, one-factorial design with repeated measurement. The IAT was administered before and after the intercultural teaching sequences. Additionally, explicit measurements for operationalization of emotional and cognitive effects were also used.

Participants

The participants were 79 Austrian high school students (46.8% female) between the ages of 12 and 16 ($M = 14.13$, $SD = 1.16$). Sixty-one participants were assigned to the experimental condition, 18 participants were assigned to the control group. Due to administrative processes the control group was assessed half a year later in a comparable school within the same class levels. Thus, the original planned experimental design had to be modified to a quasi-experimental design. Participation was voluntary with no incentives and was completed during regular school hours. High School students were selected based on the rationale that this group is highly vulnerable for stereotypes and prejudices, but can highly benefit from programs to overcome them. Participants were grouped in a manner consistent with other programs such as the group jigsaw (Aronson & Patnoe, 2011).

Material

The Implicit Association Test

To detect participants' implicit attitudes we used the Implicit Association Test ($\alpha = .79$; Greenwald, McGhee & Schwartz, 1998). The IAT detects the strength of association between a person's different mental concepts. The test is based on scientific research concerning implicit social cognitions (Greenwald & Banaji, 1995).

The IAT measures individual differences in automatic activation of semantic and evaluative associations (Gawronski & Conrey, 2004). It is a reaction-time-based measurement method of automatic association strength between two concepts. In short, the IAT makes it possible to measure implicit cognitions.

Theoretical background of the IAT

The IAT-effect results from different reaction times while assigning stimuli to dichotomous categories. According to the Activation Theory of Semantic Processing, the difference in reaction times represents the concept of spreading activation. (Collins & Loftus, 1975). It assumes that when concepts in memory are activated, those concepts that have been learned or experienced in conjunction with the activated concept will also be activated. Thus, concepts become more or less connected to each other.

In the IAT-task, the subject has to categorize various stimuli into dichotomous concepts. Faster reaction times indicate stronger associations. Congruent tasks can be solved faster than association- incongruent tasks (Greenwald et al., 1998). Since the IAT uses complementary pairs of concepts, it only measures the relative strength of pairs of associations (Greenwald & Farnham, 2000). Thus, this method is not measuring the strength of associative links of memories, but the difference between various associative links (Greenwald & Nosek, 2001).

Evaluation of the visual material of the IAT

Appropriate visual stimuli play a major role during the IAT process (Nosek, Greenwald & Banaji, 2007). Therefore, the visual materials of the IAT had to be created and evaluated before its application. The visual materials used in the study were taken from the International Affective Picture System – IAPS (Lang, Ohman &

Vaitl, 1988) and from daily life scenarios in Austria. To get dichotomous categories for the IAT, the visual materials were evaluated according to the degree of familiarity. Eighty participants (47.2% female) between the ages of 10 and 76 ($M = 19.95$; $SD = 9.75$) evaluated a set of pictures using a semantic differential scale ranging from culturally distant to culturally proximal. The sample consisted of Austrian high school students (61.2%), university students (31.2%), and other adults (7.6%).

The data was subjected to a principal component factor analysis with varimax rotation ($KMO = .500$; Bartlett's $= .005$). The pictures were divided into familiar and non-familiar categories. The most common attribute of the respective groups was skin color .

All pictures showing dark-skinned people were assigned to the non-familiar group (see Figure 3) and all pictures showing light-skinned people were assigned to the familiar group (see Figure 4). The pictures were integrated into the IAT as dichotomous categories—familiar and unfamiliar.



Figure 3. Cultural distant pictures



Figure 4. Cultural proximal pictures

The IAT procedure

The IAT consists of five discrimination tasks where participants are required to respond as quickly as possible. Participants complete an associated attribute discrimination task where the participants are asked to differentiate between pleasant and unpleasant words and pictures (e.g., health, heaven, poison, murder; see also Nosek et al., 2007). In the third task, the two prior tasks are superimposed or mapped onto one another. For example, one response key is used for individual stimuli that are either familiar or pleasant. Another response key is used for stimuli that are unfamiliar or unpleasant. In the fourth step, the response keys are reversed. Finally, in the fifth step, the mapping from the stimuli is reversed from the third step. Individual IAT effects were computed as D-scores (Greenwald, Nosek, & Banaji, 2003). That is, differences between the mean latencies in the critical blocks 3 and 5 were calculated by an individual's pooled standard deviation score. Higher scores indicate higher xenophobic attitudes. Most participants had negative IAT scores. However, given a fixed block order and the absence of an IAT calibration procedure of zero scores, it was important that the absolute magnitude of the IAT effects were not overinterpreted (see also Zumbach, Seitz & Bluemke, 2015).

Explicit measurements

We used several self-report measures to determine participants' attitudes. The first scale was the "Motivation to Unbiased Behavior" questionnaire by Banse and Gawronski (2003). It is divided into three subscales "Behavioral Control" (8 items; e.g., "One should not laugh at jokes about foreigners"; $\alpha = .80$), "Admission of Prejudice" (4 items, e.g., "I pay attention to not let prejudices influence my behavior"; $\alpha = .66$) and

“Unprejudiced Self-perception (4 items, e.g., “I’d feel uncomfortable if someone believes that I have prejudices toward minorities”); $\alpha = .51$).

Second, we used the “Xenophobia” scale (Bucher, Göllner & Auer, 2001; $\alpha = .73$) with seven items, e.g., “There would be much less problems in our country if less foreigners lived here.”

Finally, we used the scale “Attitude Towards Foreigners” by Frindte, Funke und Jacob (1999). It detects participants’ position regarding foreigners by means of nine items (e.g., “Foreigners provoke xenophobia by their own behavior”); $\alpha = .85$).

Participants indicated their answers to all items using a 5-point Likert scale (1 = “I do not agree at all”; 5 = “I do totally agree”).

Educational software “Intercultural Games”

The main goal of the study was to have students in the experimental group engage with instructional multimedia material, designed to reduce xenophobic attitudes and schemata. The “Intercultural Games” consisted of several modules that helped learners become familiar with elements of foreignness, to accept culturally distant stimuli, and to reframe them as a part of everyday life. The program is based on a biographical approach to the topic of foreignness. It uses “biographical self-reflection” as well as an analytical and self-reflective process.

Gudjons, Pieper and Wagener (1986) define a biographical self-reflection as a reappropriation of one's own biography. Past experiences shape identity and behaviour. Through the process of reappropriation we can explain and change our own attitudes. A dialectical entanglement of the reflection and self-reflection must always be part of intercultural education (Zielke, Meier & Bollacher, 2005). Self-reflection is an important aspect of multicultural education whereby discriminations can be made visible (Hejazi, 2009). For this reason, the tasks of the tool addressed participants’ biography and the life of strangers by focusing on the encounter between people of foreign origins.

Analyzing the images and films were an essential part of this approach. Furthermore, the intervention tool was based on different social and educational theories including symbolic interactionism (Mead, 1978) and symbol-didactics (Biehl, 1991). In everyday life, symbols play an important role in communication, identity formation, and also localization in social space (cf. Holzwarth 2001). In short, the training program was designed to not only allow students to come into contact with foreigners, but to also allow them to discuss and become familiar with various types of alienation.



Figure 5. Screenshot from module “music from around the world”

The instructional multimedia material includes seven different modules. The first module, “*music from around the world*,” requested participants to listen to several pieces of music first and relate it to the corresponding parts of the world afterwards (see Figure 5). The diverse styles of music varied from vocals of several ethnos to traditional folk music. During the module “*viewing pictures*,” pictures showing different cultural habits were presented along with additional information, e.g., women wearing scarfs in religious tradition (see Figure 6). Afterwards, learners had to answer topic-related questions. In the “*symbols of foreignness*” module, participants had to arrange cultural and religious symbols according to familiarity, e.g., the Star of David or the Yin and Yang sign. Additionally, learners could retrieve audio-visual information related to the symbols.



Figure 6. Screenshot from module “*viewing pictures*”

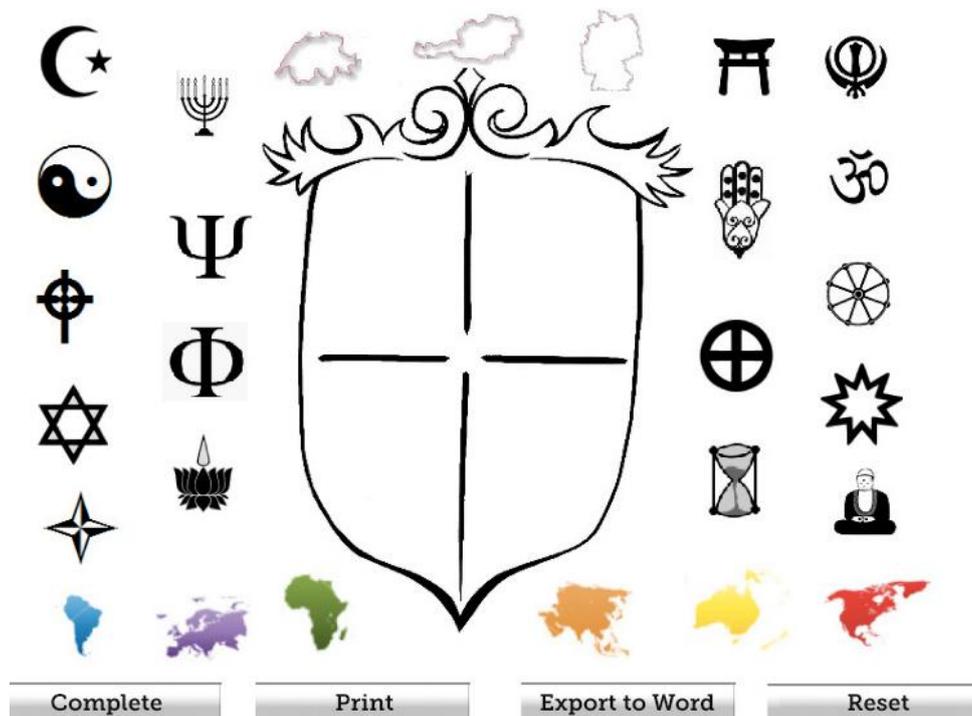


Figure 7. Screenshot from “*create a crest*”

The “*create a crest*” module, was designed to help learners through a process of self-discovery (see Figure 7). In this module, learners had to create a crest that is related to their own identity. Several cultural and religious symbols were presented as well as shapes of different countries and continents. Learners chose symbols and arranged them within a pattern of their choosing. The individual crest was printed and discussed in class afterwards. During “*foreign pictures*” module, participants had to arrange photos. The pictures were taken of persons and things in the immediate vicinity of the learners. Photos could be classified either as foreign or familiar. Subsequently, an explanation was presented to that dealt with the term of “foreignness.” It allowed a better understanding of the feeling that it can be hard to decide whether a picture is familiar or not.

Next, learners watched a movie during the “*short film*” module. The movie “Schwarzfahrer” (in English: fare dodger, Danquart, 1992) deals with xenophobia in everyday life. Afterwards, learners answered questions concerning their comprehension about the plot. The answers could be optionally discussed later in class. Finally, during the “*online research*” module, learners used the Internet to find definitions for several terms like culture or stereotype. For that purpose, an online browser was integrated into the program. The results were also discussed afterwards. Taken together, the learners’ own biography and the biography of foreigners played a major role within all parts of the program. All modules were designed to support understanding, experiencing, and facing foreignness in all facets of one’s own biography.

Design and procedure

A “pre and post” study design was implemented. Upon completion of the questionnaire and the IAT, the 61 students in the experimental group engaged in an instructional multimedia material that consisted of two teaching units that lasted for a total of 100 minutes. Finally, the post test was administered. The 18 students in the control group used the same assessments but did not participate in the multimedia learning.

Results

Due to the restrictions of the quasi-experimental design, we compared the pre-test values between the experimental group and control group. Descriptive values indicate that the sampling led to differences between both groups where the control group showed higher values in “Behavioral Control,” “Admission of Prejudice” and “Unprejudiced Self-perception”. Additionally, the control group showed lower values regarding “Xenophobia” and “Attitude Towards Foreigners” (see Table 1). A MANOVA showed that these difference were statistically significant ($F(5, 73) = 4.97; p < 0.001; \eta^2 = .25$). Due to these systematic pre-test differences we calculated the difference between pre- and post-test measures as subsequent dependant variables to avoid subsequent problems with this sampling bias. A MANOVA on these pre- and post-test differences showed no significant main effect, $F(5, 73) = 1.59; p = 0.17; \eta^2 = .10$. Additionally, there was no significant difference between the mean values of pre- and post-training sessions, $F(6, 55) = 0,351, p = .91, \eta^2 = .04$.

Table 1. Descriptive values of pre- and post-test measures

Scale/Tests	Subscale	Experimental group		Control group	
		Pretest <i>M (SD)</i>	Posttest <i>M (SD)</i>	Pretest <i>M (SD)</i>	Posttest <i>M (SD)</i>
Motivation to unbiased behavior	Behavioral control	2.05 (0.54)	2.05 (0.57)	2.72 (0.91)	3.09 (0.79)
	Admission of prejudice	1.94 (0.60)	1.94 (0.57)	2.63 (0.89)	2.63 (0.73)
	Unprejudiced Self-representation	2.90 (0.69)	2.98 (0.70)	3.46 (0.51)	3.38 (0.63)
Xenophobic Attitude	Xenophobia	3.48 (0.71)	3.43 (0.93)	2.79 (0.63)	2.66 (0.65)
Attitudes towards foreigners		3.45 (0.64)	3.35 (0.75)	2.79 (0.91)	3.09 (0.79)
IAT		-212.89 (578.86)	-481.82 (713.7)	-356,57 (348,9)	-205,43 (385,99)

Regarding the IAT pre-test scores, an ANOVA showed no significant group differences, $F(1, 70) = 1.59; p = .48; \eta^2 = .007$. However, the ANOVA comparing the post-test results showed that the experimental group had significantly lower scores on automated negative self-concept related to foreignness, $F(1, 70) = 3.07; p = .04; \eta^2 = .04$; one-sided. Subsequent t-tests for dependent samples showed a significant difference between pre- and

post-test implicit measures, $t(61) = 4.23, p < .01, d = .41$, for the experimental group. Descriptive values revealed that participants in the experimental group had a lower negative self-concept related to foreignness after the treatment than before. Regarding the control group, the difference between pre- and post-test was also statistically significant, $t(17) = -1.95, p < .01, d = .42$. In contrast to the experimental group, the control group participants had higher values in the post-test than in the pre-test, indicating that they had a higher negative self-concept related to foreignness.

Discussion

The study examined the consequences of intercultural instructional multimedia material on implicit and explicit attitudes towards foreigners. It was assumed that the program entitled, “Intercultural Games” would have a positive impact on the perception of others and would lead to a positive change of attitudes compared to a control group without intervention. Various explicit measurement methods were used such as, the “Motivation to Unbiased Behavior” scale by Banse and Gawronski (2003). An implicit association test was also used to measure the implicit xenophobic self-concept before and after the treatment.

The main question was to determine if attitudes can be changed after short didactical intervention sequences. Following the suggested General Xenophobic Model, we assumed that information processing regarding change in xenophobic attitudes could take an explicit or an implicit route, depending on the route of information preprocessing.

Similar to previous research findings (e.g., Cochran-Smith, 2003; McDiarmid & Price, 1993; Wasonga, 2005), we were not able to find significant changes in explicit attitudes. However, there was a change at an implicit level related to the xenophobic self-concept of participants. While there was a significant decline in hostility toward strangers in the experimental group, there was an unexpected increase in the control group. The finding that there was a difference on an implicit level, but not an explicit level is not surprising because implicit and explicit measurement methods often do not show the same results, even when the same constructs have been measured (cf. Boysen & Vogel, 2008). One possible explanation is the disposition to social desirable answering that can influence the results, especially when considering ethical and moral issues. However, such a divergence was also measured in relation to other topics (cf. Greenwald & Nosek, 2001). Thus, moderator-variables need to be analysed for explaining such divergent outcomes. For example, Hofmann, Gawronski, Gschwendner, and Schmitt (2005) found evidence of a moderator effect between awareness and adjustment, thereby suggesting that adjustment effects may be more pronounced under conditions of high awareness. For Lambert, Payne, Ramsey, and Shaffer (2005), the perception of out-group homogeneity was a moderator for a high correlation between self-reported attitudes and reaction time based data.

Regarding aggressiveness, social desirability can be a moderator for a high coherence between implicit and explicit results. In relation to anxiety, desirability is not a moderator (Egloff & Schmukle, 2004). Thus, moderating variables may explain the divergence between implicit and explicit measures. However, in this study, moderators were not evaluated.

Based on the results of the study, it was shown that the IAT had a highly predictive power, especially regarding spontaneous behavior (cf. Gawronski & Conrey, 2004). Various studies confirm the link between spontaneous behavior and the results of the IAT (e.g., Asendorpf, Banse & Mücke, 2002; Egloff & Schmukle, 2004).

What does this mean in relation to this study? Due to the training with the instructional multimedia material, there was a positive change in spontaneous acts performed toward strangers. Thus, changing assessment procedures lead to a positive change of behavior toward foreigners. The procedures are part of the short-term processes of the GXM. If intercultural education are part of everyday instruction and not restricted to special subjects such as Geography or Philosophy, tolerant behavior and sustainable positive changes in attitudes can be achieved.

The results of this study are the first to support the validation of the GXM. The implicit measurement demonstrated the existence of the implicit way of information processing as a part of short-time processes related to the generation of xenophobic cognitions. Nevertheless, we were not able to confirm changes on the explicit route of information processing. Therefore, long-term interventions may be needed to replicate these findings.

Furthermore, it was shown that the range of impulsive and deliberate actions—based on evaluation and decision-making processes—could easily be influenced, even by didactical short-time interventions. Consequently,

repeated trainings could lead to long-term changes in attitudes. To verify prolonged changes, it will be necessary to conduct additional longitudinal studies. Limitations derive from the sample as used in this study. In this study, all participants were Caucasians. Although dark skin-color persons are a minority in the geographical location where the study was carried out, results of the evaluation of the material reveal these people seem to be judged more unfamiliar in daily life than they might in other geographical regions. Thus, the results are highly likely to differ in regions with a higher degree of different ethnical groups are living together.

Broader implications

The findings of this study might also have implications on current research on educational technology. While there is tradition of focusing on the cognitive and motivational aspects of learning with technology (cf. Astleitner & Hufnagl, 2003), emotional or attitudinal issues are rather rare. Instructional approaches such as the FEASP-approach (Astleitner, 2000), that are designed for emotionally sound instruction, are hardly implemented in educational practice or research. This study contributes to this area by integrating a cognitive and an attitudinal perspective in technology-based learning environments. This makes it necessary to change assessment strategies because traditional paper and pencil tests are not sensitive enough or are susceptible to social desirability. We attempted to overcome these known problems by using explicit and implicit measures, similar to how it has already been done in domains where technology might influence attitudes, such as assessing effects of violent computer games on aggression (Schrangl & Zumbach, 2012). This could also be an approach suitable for other domains, such as moral education or education for democracy, where technology-based learning environments could be implemented.

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