European Journal of Social Psychology
Eur. J. Soc. Psychol. **40**, 760–773 (2010)
Published online 6 July 2009 in Wiley InterScience
(www.interscience.wiley.com) **DOI**: 10.1002/ejsp.646

Research article

Reopening the study of extreme social behaviors: Obedience to authority within an immersive video environment

MICHAËL DAMBRUN* AND ELISE VATINÉ
Université Blaise Pascal, LAPSCO UMR CNRS, France

Abstract

In this study, we used a paradigm similar to the one used by Milgram in his classic obedience study, using an immersive video environment. We manipulated the victim's degree of visibility and his ethnicity. When the victim was hidden, the level of obedience we obtained was similar to Milgram's. Replicating previous findings observed in real environments, participants were more obedient when the victim was hidden than when he was visible, and the more obedient participants negated their own responsibility by projecting responsibility on both the victim and the experimenter. State-anger and right-wing authoritarianism (RWA) emerged as two significant predictors of the level of obedience. Illustrating an underlying process of racial-dehumanization, participants reported less anxiety and distress when the victim was a North African than when the victim was of the same racial origin as the participant. These results underscore the usefulness of using immersive environments when studying extreme social behaviors. Copyright © 2009 John Wiley & Sons, Ltd.

It is now more than 40 years since Milgram published his first study on obedience to authority (Milgram, 1963). This amazing and substantially controversial study is one of the more exciting and impressive inquiries conducted in social psychology. As has been noted by Blass (1991), the continuing reference to this work can be attributed, at least partly, to the unexpected enormity of the results themselves. In Milgram's study, a naïve participant was ordered to administer increasingly more severe punishments to a victim after being told that he was participating in an experiment on the effects of punishment on learning. Punishment was an electric shock ranging from 15 to 450 V. The dependent variable was the maximum shock administered to the victim when the naïve participant refused to continue further. An obedient participant was one who complied with experimental commands fully, and proceeded to administer all shocks levels commanded. While psychiatrics experts had predicted that less than 1% of participants would obey fully (Milgram, 1965), results revealed that 65% of the sample of average North American adult men administered the highest level of electric shock (i.e., 450 V; Milgram, 1963). Such results have strong implications for the understanding of radical social behaviors; they are often cited when explaining unconscionable acts such as torture, genocide, suicide bombing, and crimes of obedience (Atran, 2003; Fiske, Harris, & Cuddy, 2004; Kelman & Hamilton, 1989; Staub, 1989; Waller, 2002). While such studies are vital for understanding the complexity of drastic social behaviors, it is difficult to conduct them for ethical reasons. Over the years, Milgram's obedience studies have been a target of criticism, particularly because of the deception involved (e.g., Baumrind, 1964; Miller, 1986). The development of a more ethical paradigm would make this type of research more accessible. Thus, the first goal of the present research was to design and validate a new paradigm in order to study

*Correspondence to: Michaël Dambrun, Université Blaise Pascal, UFR de Psychologie, UMR 6024, CNRS, 34 avenue Carnot, 63000, Clermont-Ferrand, France. E-mail: michael.dambrun@univ-bpclermont.fr

Received 8 February 2008
Accepted 9 April 2009

obedience to authority in a more ethical manner. Using immersive virtual environment technology (IVET), we developed a new paradigm, and tested its *psychometric validity*[1]. The second objective of this experiment was to examine the role of a new variable—the victim's ethnicity—in the context of obedience within an immersive environment.

Recent studies have found immersive virtual environment technology useful for studying human behaviors (e.g., Bailenson & Yee, 2005; Blascovich, Loomis, Beall, Swinth, Hoyt, & Bailenson, 2002; Freeman et al., 2005; Pertaub, Slater, & Barker, 2002; Slater et al., 2006). IVET has numerous important advantages. First, experimental simulation has the potential to achieve isolation without alteration. As Greenwood (1989) noted ''The activity of the experimenter in isolating as aspect of a real-life social situation, may not only influence the outcome of the experiment, but may alter or transform the nature of the phenomenon that is the putative object of analysis.'' (p. 184). Experimental manipulation and the use of deception often create ambiguity. Indeed, several participants in Milgram's experiments said that they found the experience unreal, absurd, and highly ambiguous (Milgram, 1974). The main goal when using deception strategy is to eliminate contaminating artifactual variables. The problem is that the description of the experiment to the participants (i.e., the cover story) affects the experiment. As a consequence, new, different, contaminating variables are introduced. In contrast, ''the participant in an experimental simulation can represent the situation as if all the normal social relations of a social context are satisfied, without representing them in a determinate and thus causally confounding form.'' (Greenwood, 1989; p. 203). Along the same lines when role-playing simulations of Milgram's experiments have been used as alternatives to the use of deception, success has been demonstrated in several studies (Geller, 1978; Mixon, 1972). However, replication, particularly exact replication, remains problematic for both role-playing simulations and traditional experimental social psychology. For example, researchers do not share physically identical laboratories, thereby eliminating perfect replications of scenarios (Blascovich et al., 2002). Moreover, when confederates are used, it is impossible to reproduce their exact characteristics (e.g., voice tone, physical attractiveness, etc.). With IVET, near-perfect replications become possible through access to another investigator's complete experimental computer program (Blascovich et al., 2002). Finally, as Blascovich and his colleagues argue, IVET can help to solve the experimental control-mundane realism trade-off that has characterized current experimental social psychology (see Blascovich et al., 2002; Loomis, Blascovich, & Beall, 1999). Although experimental control is greater when using more sterile scenarios (e.g., simply written vignettes), ecological validity and mundane realism are generally reduced. Similarly, complicated scenarios involving trained actors and elaborate props increase realism, but engender a loss of experimental control. Thus, the higher the mundane realism, the lower the level of experimental control. However, when using high-resolution graphics computers and sophisticated software, participants can be immersed in a realistic environment, where the level of mundane realism is high. Additionally, computer programming allows the investigator near-perfect control over the experimental environment and actions within it. Thus the advantages of using IVET include better mundane realism, more experimental control, and more opportunity for exact replication. For these reasons, IVET is a useful experimental tool for use in social psychology.

Recently, Slater et al. (2006) developed a paradigm similar to the one used by Milgram using an immersive virtual environment. Their main objective was not to study obedience, but rather ''human responses to interaction with a virtual character in the type of extreme social situation'' (p. 1). Interestingly, they demonstrated that in spite of the fact that all participants knew that neither the victim, nor the shocks were real, the participants tended to respond to the situation as if it were real. Replicating Milgram's finding, the researchers observed that participants who saw and heard the virtual victim (i.e., visible condition) were less obedient than those who communicated only through text (i.e., hidden condition). Thus, they reported the first results suggesting that it is possible to study obedience to authority in an ethical manner using a virtual paradigm. Because Slater et al.'s paper had not yet been published when we started our research, we independently developed a similar paradigm but with some important differences. While they used an immersive virtual environment, we developed an immersive video environment, that we called the Immersive Video Milgram Obedience Experiment (IVMOE). Our victim was not a virtual person, but a real person (an actor) filmed, recorded, and displayed on a computer screen. Using a real person has the advantage of maximizing the degree of realism, and thus increases ecological validity. This experiment was immersive in the sense that all parameters were computer-programmed in order to give the impression of real time and a dynamic environment, within which the participant could experience events and interact with the victim. We tried to reproduce Milgram's original procedure. Our main objectives were different from those of Slater

[1]In the present paper, the term ''psychometric validity'' mainly refers to criterion validity and validity of replication.

DOI: 10.1002/ejsp

et al. (2006). First, we wanted to design and validate a new paradigm to study obedience to authority. Using varying approaches, we tested the psychometric properties of our immersive video experiment. We examined the effect of the victim's visibility, but in addition, we developed two news approaches: (a) we tested whether the predictors of obedience in the classic paradigm also predicted obedience within the immersive environment, and (b) we examined whether the participants' rationalizations for their acts within the immersive environment replicated what had been observed in the classic obedience paradigm. Second, based on the assumption that an immersive environment constitutes a useful tool for the study of social behavior (Blascovich et al., 2002; Slater et al., 2006), we examined the role of a new variable in the context of obedience to authority; the race of the victim. While this variable often plays a central role in extreme social behaviors such as crimes of obedience, including torture and genocide, to our knowledge, no research has systematically addressed the role of this factor in the context of obedience. Finally, by assessing anxiety and depression at different times, we determined that any distress experienced by the participants was transitory.

In order to investigate the psychometric properties of the IVMOE, we designed a study to test whether the basic findings Milgram observed could be replicated using an immersive video environment. First, we expected to observe a comparable level of obedience. In one condition, we attempted to replicate Milgram's ''vocal feedback'' situation (1974). We chose this condition because it was the easiest to replicate since in this condition the victim was hidden and we only needed to accurately reproduce the vocal feedback. In this situation, Milgram (1974) had observed a rate of obedience of 62.5%. We predicted that there would be a similar level of obedience for the ''hidden'' condition of the IVMOE. In Milgram's study, it was additionally noted that the procedure created extreme levels of nervous tension in the participants. While the present paradigm was developed in order to avoid the elicitation of unethical and even painful stress levels, transitory elevations of distress would provide further evidence that the IVMOE was psychologically meaningful. Milgram (1974) also found that the level of obedience varied according to certain procedural conditions. For example, if the participant could see the victim in addition to hearing him the percentage of obedience decreased from 62.5 to 40. We expected that a similar tendency would be observed with our IVMOE, giving it additional validity. Therefore, we designed a ''visible condition'' in which the participants could see the victim. We predicted that there would be a higher level of obedience in the ''hidden'' condition of the IVMOE than in the visible one. Authoritarianism and hostility have been identified as two additional significant predictors of levels of obedience. Using varying methodologies, several studies have reported that more authoritarian participants are more obedient (Altemeyer, 1981; Elms, 1972; Elms & Milgram, 1966). With regards to anger, Haas (1966) found those who were most obedient were also those who were the most hostile. Thus, we predicted that there would be positive and significant correlations between authoritarianism, anger, and obedience observed in the IVMOE paradigm. Milgram (1974) clearly demonstrated that obedient subjects denied their own responsibility by projecting blame on their victims. We similarly predicted that obedience in the IVMOE would increase when blame was projected onto the victim and decrease when blame was self-directed.

Our final aim was to investigate the effect of the victim's ethnicity in the IVMOE. Obedience to authority is part of the process of genocide and mass killing (Staub, 1989; Waller, 2002). Waller (2002) has written that the Milgram obedience paradigm ''correctly focuses our attention on the social and situational pressures that can lead ordinary people to commit extraordinary evil.'' (p. 108). But genocides and mass killing involve various social categorizations, particularly racial ones (e.g., Jones, 1997). Therefore, it would seem particularly important to examine the role of the victim's ethnicity using Milgram's paradigm. The literature on overt prejudice and discrimination suggests that participants would be more inclined to obey fully when in the presence of a racial out-group victim than in the presence of an in-group one. However, because currently there are strong norms that inhibit the expression of overt prejudice and discrimination (e.g., Crosby, Bromley, & Saxe, 1980; Dambrun & Guimond, 2004; Jones & Sigall, 1971), it becomes less likely that this kind of overt discrimination will be expressed. Nonetheless exposure to an out-group victim could affect participants' psychological processes in a subtle manner. Milgram's participants showed great anguish and conflict when delivering dangerous shocks to their victims. One would expect that this process might be different when the victim was a member of a different ethnic group. According to embodiment theories, ''perceiving and thinking about emotion involve perceptual, somatovisceral, and motoric re-experiencing (collectively referred to as 'embodiment') of the relevant emotion in one's self.'' (Niedenthal, 2007, p. 1002). Interestingly, studies show that individuals are more likely to be ''sensitive'' to in-group members' emotions and feelings than to the one's of an out-group (e.g., Chambon, Droit-Volet, & Niedenthal, 2008; Elfenbein & Ambady, 2002; Mondillon, Niedenthal, & Droit-Volet, 2007). In other words, in the context of the Milgram obedience experiment, it is likely that the participant re-experienced the emotions (e.g., pain, distress) of in-group member victims more easily than those of an out-group one. If such an effect is observed, then participants would be less anxious and

DOI: 10.1002/ejsp

distressed when in the presence of an out-group victim than in the presence of an in-group one. By manipulating the victim's ethnicity, we tested this hypothesis directly within our IVMOE.

METHOD

Participants

Thirty-one first year undergraduates (29 women; *M* age = 19.2, SD = 1.6) from Blaise Pascal University (France) took part in the study. All of them were of French origin. Our study was subject to full ethical scrutiny with no deception, informed written consent, and full debriefing.

Overview

Prior to their participation in the IVMOE, participants were asked to fill out a questionnaire assessing state anxiety, state- and trait-anger, right-wing authoritarianism (RWA), and depression. Once this questionnaire was completed, participants started the IVMOE on a computer. Two variables were manipulated in the IVMOE: the visibility of the victim (hidden vs. visible) and the victim's ethnicity (French vs. North African). At the end of the IVMOE, participants were asked to fill out a second questionnaire in which anxiety, peri-traumatic distress, attribution of responsibility, and various controlling measures were assessed. Participants were then fully debriefed and thanked for their participation. Participants were contacted 2 months later and asked to complete a follow up questionnaire. This last questionnaire measured the participants' evaluation of the experiment, as well as their anxiety level, and their level of depression.

Procedure and Materials

IVMOE: The IVMOE is very similar in content to the original Milgram obedience experiment, except that, here, the student (i.e., the victim) is seen on a computer screen (i.e., video) and the participant is told that the student is an actor feigning the vocal and behavioral reactions. The IVMOE was controlled by the Psyscope X (B37) software package 1.2.5. version on Apple Macintosh OS X, equipped with 17-in color monitor (color resolution = 1440×900 millions). The distance between the participant and the computer screen was approximately of 50 cm. The experiment was immersive in that everything on the screen was simulated and pre-recorded. All the parameters were computer-programmed to give the impression of real time and dynamic experience. For example, the programming of the video-sequences gave the participant the impression that it was his own clicking of the button that delivered the shocks.

The IVMOE was structured into three sections: the explanation and instruction phase, the learning task, and the experimental task. While the victim's ethnicity was introduced in the learning task, his degree of visibility was manipulated in the experimental task. At the beginning of the learning task, the experimenter called the student (i.e., the victim) by his last name. Because North Africans are a target of prejudice in France (e.g., Dambrun & Guimond, 2004), we chose to use a North African or French categorization. Half of the participants were exposed to a North African last name (i.e., Abdelkadi), while the other half were exposed to a French last name. The ethnicity of the victim was somewhat ambiguous (i.e., suntanned complexion, a week's beard growth; see Figure 1). Concerning the manipulation of visibility, while all participants could see and hear the student in the learning task, only half of the participants could see and hear the student in the experimental task. The remaining half of the participants could only hear the student without seeing him.

During the first phase (i.e., explanations and instructions), we used Milgram's original cover story and instructions. The participants were informed that they were taking part in an experiment on the effects of punishment on learning. For evident reasons and unlike the original experiment, participants were not asked to choose their role (i.e., teacher or student). From the beginning, all took on the role of teacher. Prior to the learning task, participants were exposed to three slides. On the first slide, the participants were informed about two aspects of the study: first, they were informed that the experiment was a simulation, that nothing was real, no shocks were really administered, the student was an actor who was simulating pain and distress and everything he would see had been recorded using a video camera. It was made explicit that

DOI: 10.1002/ejsp

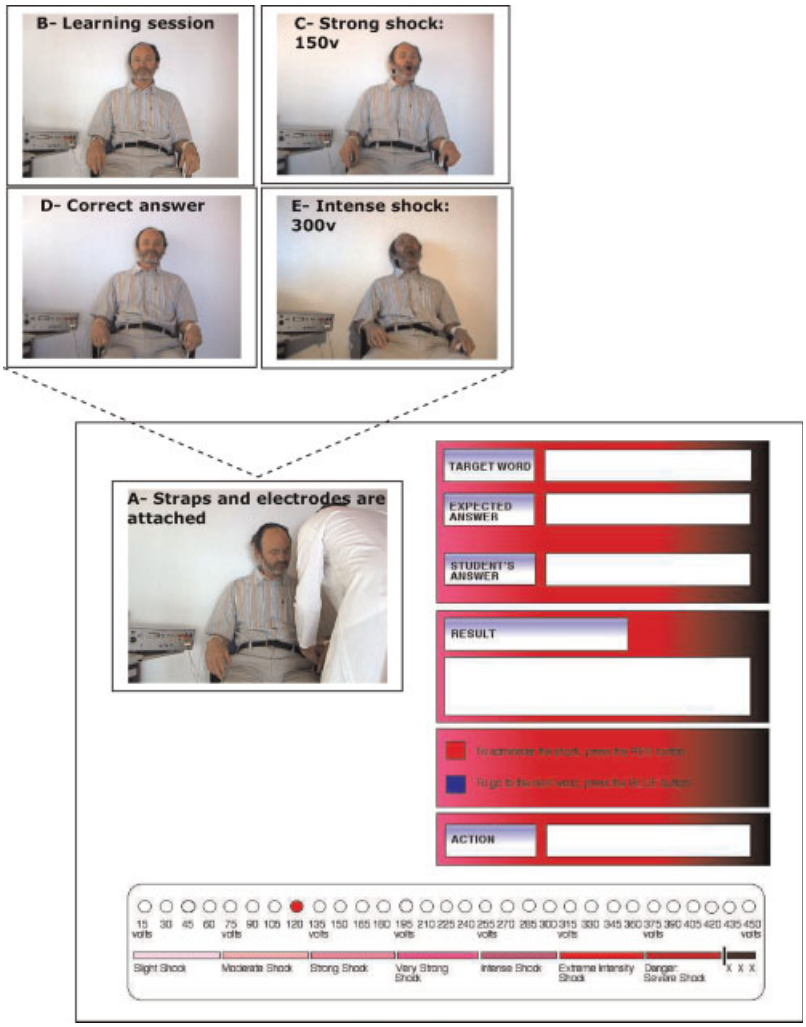

Figure 1. The Immersive Video Milgram Obedience Experiment (IVMOE)

both the shocks and victim's reactions were not real, but simulated. The experimental procedure was presented to the participants on the second slide. They learned that the experiment consisted of a paired-associate learning task (30 pairs) in which the student had to indicate for each pair, which of four words had originally been paired with the first word. After they had been informed again that nothing was real but had been pre-recorded, a second slide was presented. At this stage, the participant was instructed that an electric shock (red button) had to be administered to the student when the student's answer was incorrect. When the answer was correct, the teacher was expected to press the blue button and the participant was informed that it was impossible for a shock to be administered when the student's answer was correct and it was also not possible for the blue button to be activated when the answer was incorrect. The teacher was also told that there was a 15-V increment for each successive incorrect answer and that an absence of an answer was also followed by a shock. On the third slide, the experimental screen configuration depicted in Figure 1 (without the videos) was presented and explained.

The learning task began with the seating of the student on the ''electric'' chair by an assistant of the experimenter (Figure 1, Video A). The student was strapped into the chair and an electrode was attached on each arm. The student was then called by his last name by the assistant of the experimenter (i.e., ethnicity manipulation: Mr Roche or Mr Abdelkadi), and asked whether he was ready to start the learning task. The student replied that he was ready. During the learning task, the teacher watched the student trying to memorize each of the 30 word pairs, which were sequentially pronounced by the assistant (Figure 1, Video B). This sequence took 5 minutes.

DOI: 10.1002/ejsp

The last phase of the IVMOE was the experimental task, which consisted of punishing the student each time he made an incorrect response. During this phase, half of the participants could both see and hear the student, while the other half could only hear him. Using the shock generator (presented in Figure 1; ranges from 15 to 450 V), participants were asked, depending of the learner's quality of answer, to press the red or the blue button. The shock generator was similar to the one used by Milgram. There was a 15-Vt increment from one switch to the next going from left to right. The verbal designations for the group of four switches were also similar.

For each pair of words, the sequence worked in the following manner: the teacher saw the student on the computer screen. The teacher heard the target word pronounced by the assistant of the experimenter (pre-recorded). Five hundred milliseconds later, the target word appeared on the screen (e.g., blue) following by the expected correct answer (e.g., sky). Then the teacher heard the student answer which also appeared on the computer screen 500 milliseconds later. Following the student's answer, the teacher heard the assistant's feedback (i.e., ''correct answer'' vs. ''incorrect answer''). This feedback appeared on the screen on the ''result'' box. Then the teacher was instructed to press the red or the blue key. When the answer was correct, the teacher pressed the blue key, and the next trial began. However, when the answer was incorrect, if the teacher pressed the red button, an electric buzzing was heard (duration = 1000 milliseconds) followed by the sound of an electric discharge. At the same time, the teacher saw the student receiving the shock. Feedback from the victim varied as function of the voltage level. We followed the original procedure advocated by Milgram. In all conditions, the student gave a pre-determined set of responses to the word pair test, based on a schedule of three wrong answers to one correct answer. At the level of 150 V, the student reacted strongly and asked to stop the experiment because the shocks were too painful (Figure 1, Video C). When the student provided a correct answer he showed much satisfaction (Figure 1, Video D). At the level of 300 V, the student's groaning was loud (Figure 1, Video E) and the student refused to provide further answers to the teacher's multiple-choice questions. After 330 V, the student no longer reacted and appeared to be in agony on the computer screen. In the visible condition, all the feedback from the student could be seen on the computer screen; in the hidden condition, the teacher could only hear the feedback; there was no image on the screen.

At various points in the experiment, the actual participant could turn to the experimenter to express his desire to stop the experiment. As Milgram did, we standardized the experimenter's responses to these reactions. Also, similarly to Milgram, the experimenter responded with a sequence of ''prods.'' Prod 1: Please continue. Prod 2: The experiment requires that you continue. The prods were always used in sequence: Only if Prod 1 had been unsuccessful, could Prod 2 be used. If the participant refused to obey the experimenter after Prod 2, the experiment was terminated. Originally, Milgram designed four ''prods'' (i.e., Prod 3: It is absolutely essential that you continue; Prod 4: You have no other choice, you must go on). Because this experiment could potentially be a source of tension for the participant, we chose to use only the two first prods.

As was the case in the original experiment, the primary dependent variable was the maximum shock administered before the participant refused to go any further. The score could vary from 0 (for a participant who refused to administer even the lowest shock) to 30 (i.e., 450 V; for a participant who administered the highest shock).

Questionnaire Measures

Predicting Variables of Obedience to Authority

Using 7-point rating scales, three constructs were assessed in the first questionnaire: state-anger, trait-anger, and RWA. Specifically, eight items from the State-Trait Anger Scale were used (Spielberger, Jacobs, Russel, & Crane, 1983); four items assessed state-anger ($\alpha = .94$) and another four items measured trait-anger ($\alpha = .77$). To measure RWA, we selected 10 items from the French translation of Altemeyer's 20-item (1988) RWA scale. The internal consistency of this scale was satisfactory ($\alpha = .86$).

Psychological Health Measures

Three different scales assessing psychological health were used: the French version of the State Anxiety Inventory developed by Spielberger, Gorsuch, and Luchene (1970), the Peri-traumatic Distress Inventory (Brunet, Weiss, Metzler,

DOI: 10.1002/ejsp

Best, Neylan, & Rogers, 2001), and the short form (13 items) of the Beck Depression Inventory (Beck & Beck, 1972). Using visual analog rating scales, anxiety was assessed three times: before the IVMOE ($\alpha = .90$), after the IVMOE ($\alpha = .93$), and 2 months later ($\alpha = .89$). The Peri-traumatic Distress Scale was only measured after the IVMOE ($\alpha = .86$; 5-point rating scales ranged from 0 to 4). Finally, the Beck Depression Inventory was assessed two times: before the IVMOE ($\alpha = .75$) and 2 months later ($\alpha = .68$; 4-point rating scales ranged from 0 to 3).

Attribution of Responsibility Measures

Using 6-point rating scales (from 0 = not at all responsible to 6 = fully responsible), we assessed participants' perception of responsibility. Specifically, they were asked to rate how each of the following targets were responsible for the shocks administrated to the student: themselves, the experimenter, and the student. These measures were assessed after the IVMOE.

Participants' Evaluation of the Experiment

Two-months after the experiment, we assessed participants' evaluation in the follow-up questionnaire. First, they were asked to report all the positive and later the negative aspects of this experiment. Finally they were asked to evaluate the experiment on four items (i.e., instructive experiment, happy having participated, regret having participated, and useful experiment to understand human behavior). We computed a global evaluation index by averaging these items ($\alpha = .74$).

Controlling Variables

After the IVMOE, participants were asked to identify the exact name of the student (0 = false identification; 1 = correct identification; $M = 0.61$; SD = 0.49). They were also asked to evaluate the credibility of the student on two items ranging from 0 to 5 ($\alpha = .66$; $M = 3.79$; SD = 1.10) and the degree to which they were immersed in the IVMOE on a scale ranged from 0 to 10 ($M = 7.03$; SD = 1.94). Finally, at the beginning of the debriefing, participants' knowledge of the original Milgram work was assessed. This variable was coded from 0 (Don't know the Milgram name, nor the Milgram obedience experiment) to 2 (Know both the Milgram name and the experiment). A score of 1 was attributed to those knowing the name of Milgram but were unable to say more. Of the whole sample, 22.6% said they were very familiar with this experiment, 32.3% said they were familiar with Milgram's name but were unable to say more, and 45.2% did not know his name and his experiment.

RESULTS

Obedience to Authority in an Immersive Video Environment

Prior to the analysis, we examined the extent to which the various controlling variables were related to the level of obedience to authority. Using binary logistic regression analyses with the binary scores of obedience as a dependent variable (0 = not fully obedient; 1 = fully obedient), the degree of immersion in the IVMOE was marginally related to obedience ($B = -.35$, SE = 0.21, $p = .10$). Those who were more immersed were also those who obeyed less. The other controlling variables were not significantly related to the level of obedience (i.e., knowledge of Milgram, $B = .06$, SE = 0.48, $p = .90$; perceived credibility of the student, $B = -.05$, SE = 0.37, $p = .89$; knowledge of the victim's last name, $B = .56$, SE = 0.82, $p = .49$). Using the maximum shock voltage as a dependent variable, the analyses revealed the same basic findings. While the degree of immersion in the IVMOE was marginally related to the maximum shock voltage ($r = -.34$, $p < .06$), the other variables were not significantly related to the DV (i.e., knowledge of Milgram, $\beta = -.24$, $p = .19$; perceived credibility of the student, $\beta = -.03$, $p = .85$; knowledge of the victim's last name, $\beta = -.06$, $p = .75$).

DOI: 10.1002/ejsp

General Distribution of Scores

The distribution of break-off points by condition is presented in Table 1. On the whole, 32% of participants obeyed fully and administrated the maximum shock of 450 V. The mean maximum voltage of shock was 251.61 (SD = 167.92). Two participants refused to administer the lowest shock and stopped the experiment. Eleven participants stopped prior to administering shock level 10 (35%). At this level (150 V), the victim said that the shocks were too painful and asked to stop the experiment. Thirteen participants (42%) continued after the shock level 20 (300 V). At this level, the victim no longer provided answers to the teacher's multiple-choice questions and appeared to be in agony.

Table 1. Distribution of break-off points by condition

		Number of participants for whom this was maximum shock				
Shock level	Verbal designation and voltage level	General distribution	Hidden victim	Visible victim	"French" victim	"North African" victim
	Refuse	2	2		1	1
	Slight shock					
1	15	1	1		1	
2	30					
3	45					
4	60			1	1	
	Moderate shock					
5	75	2	1	1	1	1
6	90	1		1		1
7	105	1		1		1
8	120					
	Strong shock					
9	135	2		2	1	1
10	150	3		3	1	2
11	165	1	1		1	
12	180	2	1	1	1	1
	Very strong shock					
13	195					
14	210					
15	225	1		1	1	
16	240					
	Intense shock					
17	255					
18	270					
19	285					
20	300	1		1		1
	Extreme intensity shock					
21	315					
22	330					
23	345	1		1	1	
24	360	1	1		1	
	Danger: severe shock					
25	375					
26	390					
27	405	1		1	1	
28	420					
	XXX					
29	435					
30	450	10	8	2	4	6
Percentage of obedience		32	53	13	25	40
Mean maximum voltage level		251.61	293.00	212.81	244.69	259.00
Mean maximum shock level		16.77	19.53	14.19	16.31	17.27

DOI: 10.1002/ejsp

Comparison with the Original Milgram Experiment

In order to compare the properties of the immersive video experiment with those of the original Milgram experiment, we compared the distribution of the data in the hidden condition (immersive video experiment) with the data for the vocal feedback condition in Milgram's primary experiment. When binary logistic regression was applied to the data, the percentages of obedience were comparable and not significantly different from each other (53% in the hidden condition and 62.5% in vocal feedback condition; χ^2 (1) = 0.38, $p > .53$, respectively).

Visibility and Ethnicity of the Victim

First, a binary logistic regression analysis with degree of visibility (hidden victim vs. visible victim), ethnicity (French victim vs. North African victim), and the interaction term as independent variables and the binary scores of obedience as a dependent variable (0 = not fully obedient, 1 = fully obedient) was performed. This analysis revealed a significant effect of the degree of visibility ($B = 1.07$, SE = 0.47, $p < .03$). As Table 1 shows, the level of obedience was significantly higher in the hidden condition (53%) than in the visible condition (13%). Concerning the effect of ethnicity, participant were more inclined to fully obey when the victim was North African (40%) than when the victim was of French Origin (25%), however this difference was not statistically significant ($B = .36$, SE = 0.47, $p > .28$). Finally, the interaction term was not significant.

Second, we performed an ANOVA with the same independent variables and the maximum shock voltage as a dependent variable. Both the effect of ethnicity and the interaction term were not significant (Fs (1, 31) < 1). Similarly, the effect of visibility was not statistically significant (F (1, 31) = 1.85, $p = .18$, $\eta^2 = .06$). Because the degree of immersion in the IVMOE was found to predict the maximum shock voltage, we included it as a covariate in the analysis. Once this variable was statistically controlled, the maximum shock voltage was marginally higher in the hidden condition ($M = 293.0$, SD = 194.1) than in the visible condition ($M = 212.8$, SD = 133.8; F (1, 31) = 3.73, $p < .07$, $\eta^2 = .13$).

Because the effect of ethnicity was not significant, we explored the possibility that only those who correctly identified the victim's name were affected by the experimental manipulation of ethnicity. Using both the binary scores of obedience and the maximum shock voltage as dependent variables, we did not find support for this hypothesis. Finally, controlling for knowledge of Milgram's experiment and the perceived credibility of the student, the analyses revealed the same basic findings.

Predicting Obedience to Authority

In order to examine the relationships between the expected predicting variables (state-anger, trait-anger, and RWA) and obedience to authority, we computed the correlations between these three independent variables and the mean of maximum voltage shock administrated to the victim. Interestingly, state-anger and RWA emerged as two significant predictors of the level of maximum shock. The greater the participants' level of state-anger, the more they were inclined to administer a violent shock ($r = .40$, $p < .02$). The level of trait-anger was not significantly related to obedience ($r = .10$, $p > .58$). Finally, RWA was positively and significantly related to extreme intensity shocks ($r = .39$, $p < .03$); those scoring higher on RWA were also those who administrated more violent shocks. In order to test the respective effects of state-anger and RWA and also whether they interacted, we performed a regression analysis which included the two variables and the interaction term. State-anger ($\beta = .30$, $p = .10$) and RWA ($\beta = .34$, $p < .06$) still remained marginally significant predictors of the level of maximum shock, but the interaction term was not significant ($\beta = .10$, $p = .55$).

Attribution of Responsibility

On the whole, participants attributed equal responsibility to themselves ($M = 3.52$) and to the experimenter ($M = 3.48$; $t < 1$), and they attributed lower responsibility to the victim ($M = 0.81$; ps < .001). In order to examine the extent to which those who obeyed the most also tended to deny their own responsibility (by blaming both the victim and the experimenter) we computed the correlations between the voltage of maximum shock administrated to the victim and the different scores

DOI: 10.1002/ejsp

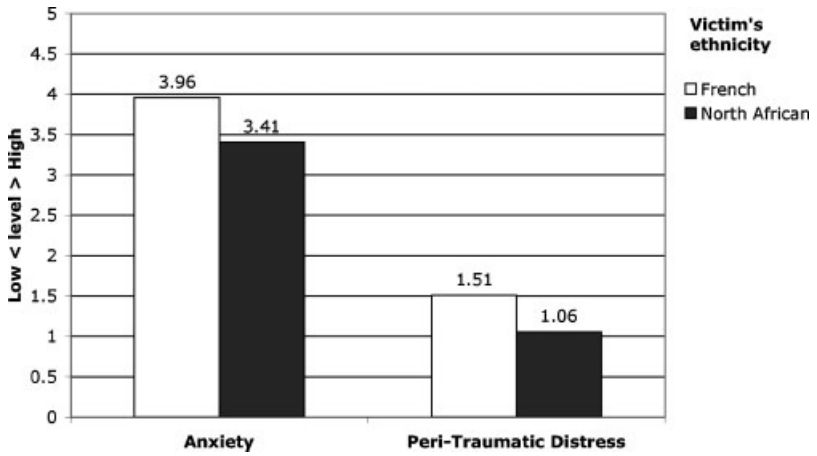

Figure 2. Anxiety and peri-traumatic distress after the experiment as function of the victim's ethnicity

of responsibility. The more the participants administrated an extreme intensity shock, the more they attributed the responsibility to both the experimenter ($r = .40$, $p < .02$) and the victim ($r = .32$, $p < .08$), and the less they attributed the responsibility to themselves ($r = -.39$, $p < .03$).

Anxiety and Peri-traumatic Distress During the Experiment

Two scales were used to assess the global level of psychological discomfort during the experiment: the state anxiety inventory and the peri-traumatic distress inventory. While the peri-traumatic distress inventory was only assessed at time 2, the state anxiety inventory was assessed at both time 1 and time 2. We compared the participants' level of anxiety before and after the experiment. As expected, this analysis showed that participants were more anxious after running the IVMOE ($M = 3.69$) than before ($M = 2.26$; $t\,(30) = 6.37$, $p < .001$). Because anxiety and peri-traumatic distress were strongly and positively inter-correlated ($r = .81$, $p < .001$), we conducted a 2 (degree of visibility: hidden victim vs. visible victim) $\times$ 2 (ethnicity of the victim: North African vs. French) MANCOVA with the two scales as dependent variables. The level of anxiety assessed before the experiment was entered as a covariate. The only significant main effect was ethnicity, $F\,(2, 25) = 3.88$, $p < .04$, $\eta^2 = .24$. As shown in Figure 2, participants who were exposed to a North African victim were significantly less anxious after the experiment ($M = 3.41$) than those who were exposed to a French victim ($M = 3.96$; $F\,(1, 31) = 4.73$, $p = .04$, $\eta^2 = .15$). Similarly, those who were exposed to a North African victim reported a significantly lower level of peri-traumatic distress ($M = 1.06$) than those who were exposed to a French victim ($M = 1.51$; $F\,(1, 31) = 8.31$, $p < .01$, $\eta^2 = .23$). The effect of visibility did not reach the conventional level of significance ($F\,(2, 25) = 2.15$, $p = .13$, $\eta^2 = .15$) and the interaction term was not significant ($F < 1$).

In a further analysis, we tested whether knowledge of the victim's last name and the perceived credibility of the victim affected the effect of ethnicity on psychological discomfort. Controlling for these variables, the results were quite similar and there was no interaction. In effect, controlling for perceived credibility, the results were identical. However, controlling for identification of the last name, while the effect of ethnicity on peri-traumatic distress still remained significant, the effect on anxiety became marginal ($p = .10$), but there was no interaction effect ($F < 1$).

Follow Up

Participants' Long-Term Psychological Health

To examine the impact of the experiment on the long-term psychological health of participants, we conducted two types of analyses. First we compared the scores of both anxiety and depression at time 1 (before the participation to the experiment) with those at time 3 (2 months after the participation). Second, in order to determinate whether some characteristics of this

DOI: 10.1002/ejsp

experiment were problematic for psychological health, we explored the relationships between our measures of psychological health and various relevant variables.

Concerning anxiety, a repeated analysis of variance on the scores of anxiety at time 1 (before the experiment) and at time 3 (2 months later) revealed a significant effect, $F(1, 27) = 10.44$, $p < .01$, $\eta^2 = .28$. Participants were significantly more anxious before the experiment ($M = 2.12$) than 2 months later ($M = 1.42$), suggesting that mere participation in an experiment leads to anxiety.

The depression scores showed a similar pattern of results. Specifically, a repeated analysis of variance on the scores of depression at time 1 (before the experiment) and at time 3 (2 months later) revealed a significant effect, $F(1, 27) = 23.40$, $p < .001$, $\eta^2 = .46$. Participants were significantly less depressed 2 month later ($M = 0.22$) than before the experiment ($M = 0.43$). No participant displayed a significant increase in terms of depressive symptoms. The mean score of difference between time 3 and time 1 was -0.21, with a standard deviation of 0.23, a minimum of -0.92 and a maximum of $+0.08$.

Finally, we explored the relationships between our measures of psychological health and several relevant variables. First, we examined the inter-relationships between our various measures of psychological health. Contrary to the hypothesis that extreme anxiety and peri-traumatic distress during the experiment would lead to depression, neither anxiety at time 2, nor peri-traumatic distress at time 2 were related to an increase in depression ($r = -.25$, $p > .20$; $r = -.20$, $p > .30$, respectively). While both anxiety and depression were inter-correlated at time 1 and time 3, anxiety after the experiment (time 2) was not related to the same measure at times 1 and 3. Interestingly, the level of obedience to authority assessed by the maximum shock administrated to the victim was not related to an increase of anxiety or depression between time 1 and time 3, but it was marginally related to a decrease of depression ($r = -.22$, $p > .26$; $r = -.37$, $p < .06$, respectively). Finally, the level of anxiety and depression prior to the experiment (time 1) was significantly related to the level of maximum shock ($r = .36$, $p < .05$; $r = .38$, $p < .03$, respectively). Thus anxiety and depression seem to be more a cause than a consequence of obedience in the IVMOE.

Participants' Evaluation of the Experiment

Using the global evaluation index, we obtained a mean score of 5.97 (SD = 0.92) on a scale which ranged from 1 (very negative evaluation) to 7 (very positive evaluation). Thus, 2 months after the experiment, participants were favorably disposed toward it. There was a significant relationship between trait-anger and global evaluation of the experiment ($r = -.58$, $p < .001$). Participants who scored higher on trait-anger were also those who reported a less positive evaluation. Concerning their participation, all participants reported positive aspects and eight reported that the experiment was stressful.

DISCUSSION

Our first objective was to examine whether the IVMOE is a valid instrument for studying obedience to authority. Using various approaches, we tested the psychometric properties of this new instrument. Specifically, we tested whether the basic findings discovered using the original Milgram paradigm were replicable within an immersive video environment. The results are relatively clear in showing that we succeeded in demonstrating that obedience to authority within an immersive environment operates in a manner similar to what was observed in the original studies.

First, using a comparable experimental condition (i.e., hidden condition), we observed a level of obedience similar to the one observed by Milgram (1974) and we replicated the basic finding that obedience decreases as function of the level of proximity to the victim (see also Slater et al., 2006). The closer the proximity to the victim (i.e., visible vs. hidden victim), the more the participant refused to give the higher level of shocks. While 53% of the participants obeyed fully in the hidden condition, only 13% of them were fully obedient in the visible condition. This last percentage is particularly low and indicates that the majority of the participants refused to administer the shock of 450 V. In fact, this percentage is lower than the one observed by Milgram in a comparable context (1974; i.e., proximity condition, 40% of obedience). We believe this effect occurred because the student's reactions in our study were probably more physically violent than those in Milgram's study. All our participants heard the same feedback, but in the visible condition, the student's physical reactions were

DOI: 10.1002/ejsp

particularly dramatic. Nonetheless, it is interesting to observe that despite the fact that all participants knew for sure that nothing was real, they tended to respond to the situation as if it was real (see also Slater et al., 2006). The significant increase in terms of anxiety during the experiment confirms that they were immersed in a meaningful psychological experience.

Second, demonstrating that obedience scores obtained using the IVMOE were not spurious, but reliable, we found that both state-anger and RWA assessed prior to the experiment significantly predicted the scores of maximum voltage shock administrated to the victim. In other words, replicating previous findings observed in real environment (see for example Blass, 1991), we found that those who displayed higher levels of both state anger and RWA were those who obeyed the most. Thus, it seems that individuals who obeyed the most to authority within an immersive environment have the same psychological dispositions as those who obeyed fully in Milgram's original paradigm. However, it is not clear whether those who scored higher on state-anger and RWA obeyed authority by simply doing what was asked, and/or because they deliberately wanted to hurt the victim. Nonetheless, these results suggest that the IVMOE has good criterion validity and, consequently, provides reliable scores of obedience.

Finally, we observed that obedient participants in the IVMOE rationalized their acts in a similar manner that which has been demonstrated in a real situation. While they knew that no real shocks were administrated to the victim, they tended to deny their own responsibility and to blame both the victim and the experimenter. Thus, it seems that the IVMOE is so psychologically meaningful that it produces psychological processes similar to those observed in the real world. Blaming the victim for the punishments he receives was demonstrated in classic Milgram obedience experiments, but has also found expression in perpetrators of mass killings who dehumanize their victims (e.g., Waller, 2002).

Interestingly, if anything was real during the IVMOE, it was the participants' cognitions, emotions, and behaviors all of which suggested that they were immersed in a meaningful psychological experience. In our view, this finding is quite consistent with embodiment theories. During the IVMOE, it is likely that participants re-experienced within themselves the relevant emotions as expressed by the victim (i.e., pain, distress). Recent studies have shown that a painful stimulus applied to another person's hand also activates pain-related neurons in the participant's own hand (Hutchison, Davis, Lozano, Tasker, & Dostrovsky, 1999; Singer, Seymour, O'Doherty, Kaube, Dolan, & Frith, 2004). Thus, student's (simulating) reactions could have generated similar psychological states among the participants, leading them to experience real emotions, and provoking great anguish and conflict while delivering dangerous shocks to their victims. The increase in terms of anxiety during the experience, as well as the physiological stress elevation observed by Slater et al. (2006), is quite consistent with such an interpretation. In the Slater et al. virtual reality simulation, there is absolutely no doubt that the victim is not real and that no one is feeling any pain. In the video simulation, the victim being a real person, the degree of realism is higher, but there may always be that element of doubt, no matter how many times the participants are told otherwise. Despite this difference, participants' emotional reactions seem to be very similar, and thus, relatively spontaneous and not dependent on the degree of the victim's realism. Consequently, it would be important in future research to test more directly the effect of the victim's realism, by comparing a virtual person (avatar) with a real person, on both emotional reactions and obedience to authority.

On the whole, these results suggest that deception is not a necessary condition for the exploration of obedient behaviors. In that sense, the present results are quite consistent with those demonstrating that role-playing versions of the obedience experiments provide levels of obedience comparable to the originals (e.g., Geller, 1978; Mixon, 1972; O'Leary, Willis, & Tomich, 1970). Moreover, reinforcing the usefulness of immersive environments for the study of extreme social behaviors, examination of our participants' long-term psychological health shows that any distress during the IVMOE is transitory. However, because the experiment was stressful for some participants, we plan to design and to test a less stressful version of the IVMOE (i.e., half reduction of the numbers of shocks, less intense victim's feedback, presentation of a final video sequence with the victim being in a good mood and showing no damage).

Our final objective was to examine the effect of a new variable in the context of obedience to authority: the victim's ethnicity. First, while North Africans are a prime target of both prejudice and discrimination in France, participants were not significantly more inclined to punish the North African's victim than the French one. This is very consistent with research that demonstrates that current norms against prejudice and discrimination prevent the expression of overt prejudicial behaviors (e.g., Crosby et al., 1980; Jones & Sigall, 1971). However, because it has already been demonstrated that psychology students are particularly reluctant to behave in an overt prejudicial manner (e.g., Dambrun & Guimond, 2004), it would be necessary to replicate this experiment with a more representative population. Nonetheless, our predicted hypothesis concerning the effect of ethnicity on anxiety and distress was supported by the data. As expected,

DOI: 10.1002/ejsp

participants were less anxious and reported a lower level of peri-traumatic distress when the victim was presented as a North African than when he was presented as French. This subtle effect suggests that participants exhibited less anguish and conflict in delivering dangerous shocks to the North African victim than to the French one. This also seems to confirm that individuals are more ''sensitive'' to in-group members' emotions and feelings than to out-group' ones (e.g., Chambon et al., 2008; Mondillon et al., 2007).

This effect has strong implications for the understanding of genocide and mass killing, and for the general understanding of racist atrocities. In our view, it illustrates an early stage of racial dehumanization which facilitates such phenomena. Recent studies have demonstrated, in analyses of the attribution of uniquely human emotions (i.e., secondary emotions), that individuals tended to judge out-group members as being less human than in-group members (e.g., Leyens et al., 2001), and such secondary emotions facilitate out-group members' discrimination (Vaes, Paladino, Castelli, Leyens, & Giovanazzi, 2003). In other words, people tend to infra-humanize out-groups and tend to discriminate them on the basis of this process. In the context of genocide or mass killing, a process of dehumanization often accompanies the torture or the death of the victim; the victim is described and judged as less than human (Waller, 2002). In addition, we suggest that dehumanization can occur at a very early stage. Results of the present study suggest that categorization into racial categories alters our capacity to process the pain and distress of in-group and out-group members equally; out-group members' pain and distress seems to be more tolerable. However, because North Africans are a prime target of prejudice in France, it is possible that negative feelings toward this out-group contribute to this effect. Thus, in order to test the respective contribution of both mere racial categorization and prejudicial attitudes, it would be interesting to replicate the present study with a more neutral ethnic target. Nonetheless, in our view, while the general conditions of the Milgram paradigm are not equivalents to those of mass killing and genocides (Waller, 2002), the present findings have two main implications for the understanding of these phenomena: First, of course, in some context, it explains the facilitation of out-group members' torture and killing. But, in addition, it also facilitates the passivity of bystanders to atrocities by inhibiting their willingness to blame and protest, encouraging them to cooperate in a passive manner. Using an immersive environment, we would be able to examine how bystanders react to simulated atrocities as function of the victim's ethnicity.

In conclusion, while studies of extreme social behaviors are vital for both our understanding of them and our ability to decrease their frequency, they are, for ethical reasons, very difficult to conduct. Immersive technology is a highly promising tool for the study of extreme social behaviors and, more generally, for the study of basic psychological processes. It has the advantage of generating genuine insights into these phenomena without using deception. In addition, it provides ecological validity without compromising experimental control, and, as well, facilitates replication (see Blascovich et al., 2002; Loomis et al., 1999). For these reasons, this technology would provide experimenters in the field of social psychology with many advantages.

ACKNOWLEDGEMENTS

The authors wish to sincerely thank Paula Niedenthal, Michelle Caron, and Michel Chambon for useful comments on a previous version of this paper. We also would like to sincerely thank Serge Dambrun who played the role of the student in the IVMOE for his helpful assistance.

REFERENCES

Altemeyer, B. (1981). *Right-wing authoritarianism*. Winnipeg, Ontario: University of Manitoba Press.

Altemeyer, B. (1988). *Enemies of freedom: Understanding right-wing authoritarianism*. San Francisco: Jossey-Bass.

Atran, S. (2003). Genesis of suicide terrorism. *Science*, *299*, 1534–1539.

Bailenson, J. N., & Yee, N. (2005). Digital chameleons—automatic assimilation of nonverbal gestures in immersive virtual environments. *Psychological Science*, *16*, 814–819.

Baumrind, D. (1964). Some thoughts on ethics of research: After reading Milgram's ''Behavioral Study of Obedience.'' *American Psychologist*, *19*, 421–423.

DOI: 10.1002/ejsp

Beck, A. T., & Beck, R. W. (1972). Screening depressed patients in family practice: A rapid technic. *Postgraduate Medicine*, *52*, 81–85.
Blascovich, J., Loomis, J., Beall, A., Swinth, K., Hoyt, C., & Bailenson, J. N. (2002). Immersive virtual environment technology as a methodological tool for social psychology. *Psychological Inquiry*, *13*, 103–104.
Blass, T. (1991). Understanding behavior in the Milgram obedience experiment: The role of personality, situations, and their interactions. *Journal of Personality and Social Psychology*, *60*, 398–413.
Brunet, A., Weiss, D., Metzler, T. J., Best, S. R., Neylan, T. C., & Rogers, C. (2001). The peritraumatic distress inventory: A proposed measure of PTSD criterion A2. *American Journal of Psychiatry*, *158*, 1480–1485.
Chambon, M., Droit-Volet, S., & Niedenthal, P. M. (2008). The effect of embodying the elderly on time perception. *Journal of Experimental Social Psychology*, *44*, 672–678.
Crosby, F., Bromley, S., & Saxe, L. (1980). Recent unobtrusive studies of Black and White discrimination and prejudice: A literature review. *Psychological Bulletin*, *87*, 546–563.
Dambrun, M., & Guimond, S. (2004). Implicit and explicit measures of prejudice and stereotyping: Do they assess the same underlying knowledge structure? *European Journal of Social Psychology*, *34*, 663–676.
Elfenbein, H. A., & Ambady, N. (2002). Is there an in-group advantage in emotion recognition? *Psychological Bulletin*, *128*, 243–249.
Elms, A. C. (1972). *Social psychology and social relevance*. Boston: Little, Brown.
Elms, A. C., & Milgram, S. (1966). Personality characteristics associated with obedience and defiance toward authoritative command. *Journal of Experimental Research in Personality*, *1*, 282–289.
Fiske, S. T., Harris, L. T., & Cuddy, A. J. C, (2004). Why ordinary people torture enemy prisoners. *Science*, *306*, 1482–1483.
Freeman, D., Garety, P. A., Bebbington, P., Slater, M., Kuipers, E., Fowler, D., et al. (2005). The psychology of persecutory ideation II: A virtual reality experimental study. *Journal of Nervous and Mental Disease*, *195*, 309–315.
Geller, D. M. (1978). Involvement in role-playing simulations: A demonstration with studies on obedience. *Journal of Personality and Social Psychology*, *36*, 219–235.
Greenwood, J. D. (1989). *Explanation and experiment in social psychological science. Realism and the social constitution of action*. New York: Springer-Verlag Inc.
Haas, K. (1966). Obedience: Submission to destructive orders as related to hostility. *Psychological Reports*, *19*, 32–43.
Hutchison, W. D., Davis, K. D., Lozano, A. M., Tasker, R. R., & Dostrovsky, J. O. (1999). Pain-related neurons in the human cingulated cortex. *Nature Neuroscience*, *2*, 403–405.
Jones, J. M. (1997). *Prejudice and racism*. New York: Mc-Graw-Hill.
Jones, E. E., & Sigall, H. (1971). The bogus pipeline: A new paradigm for measuring affect and attitude. *Psychological Bulletin*, *76*, 349–364.
Kelman, H. C., & Hamilton, V. L. (1989). *Crimes of obedience: Toward a social psychology of authority and responsibility.* New Haven and London: Yale University Press.
Leyens, J. Ph., Rodriguez, A. P., Rodriguez, R. T., Gaunt, R., Paladino, P. M., Vaes, J., & Demoulin, S. (2001). Psychological essentialism and the differential attribution of uniquely human emotions to ingroups and outgroups. *European Journal of Social Psychology*, *31*, 395–411.
Loomis, J. M., Blascovich, J. J., & Beall, A. C. (1999). Immersive virtual environment technology as a basic research tool in psychology. *Behavior Research Methods, Instruments, & Computers*, *31*, 557–564.
Milgram, S. (1963). Behavioral study of obedience. *Journal of Abnormal and Social Psychology*, *67*, 371–378.
Milgram, S. (1965). Liberating effects of group pressure. *Journal of Personality and Social Psychology*, *1*, 127–134.
Milgram, S. (1974). *Obedience to authority: An experimental view.* New York: Harper & Row.
Miller, A. G. (1986). *The obedience experiments: A case study of controversy in social science*. New York: Praeger.
Mixon, D. (1972). Instead of deception. *Journal for the Theory of Social Behavior*, *2*, 145–177.
Mondillon, L., Niedenthal, P. M., Gil, S., & Droit-Volet, S. (2007). Imitation of in-group versus out-group members' facial expressions of anger: A test with a time perception task result. *Social Neuroscience*, *2*, 223–237.
Niedenthal, P. M. (2007). Embodying emotion. *Science 316*, 1002–1005.
O'Leary, C., Willis, F. N., & Tomich, E. (1970). Conformity under deceptive and non-deceptive techniques. *Sociological Quarterly*, *11*, 87–93.
Pertaub, D. P., Slater, M., & Barker, C. (2002). An experiment on public speaking anxiety in response to three different types of virtual audience. *Presence-Teleoperators and Virtual Environments*, *11*, 68–78.
Singer, T., Seymour, B., O'Doherty, J., Kaube, H., Dolan, R. J., & Frith, C. D. (2004). Empathy for pain involves the affective but not sensory components of pain. *Science*, *303*, 1157–1162.
Slater, M., Antley, A., Davison, A., Swapp, D., Guger, C., Barker, C., et al. (2006). A virtual reprise of the Stanley Milgram obedience experiments. *PloSONE*, *1*, 1–10.
Spielberger, C. D., Gorsuch, R. L., & Luchene, R. E. (1970). *Manual for state-trait anxiety inventory.* Palo Alto, CA: Consulting Psychologists Press.
Spielberger, C. D., Jacobs, G. A., Russel, S. F., & Crane, R. S. (1983). Assessment of anger: The state-trait anger scale. In Butcher, J. N. & Spielberger C. D. (Eds.), *Advances in personality assessment* (Vol. 2). Hillsdale, NJ: Erlbaum.
Staub, I. (1989). *The roots of evil. The origins of Genocide and other group violence*. UK: Cambridge University Press.
Vaes, J., Paladino, M. P., Castelli, L., Leyens, J.-P., & Giovanazzi, A. (2003). On the behavioral consequences of infrahumanization: The implicit role of uniquely human emotions on intergroup relations. *Journal of Personality and Social Psychology*, *85*, 1016–1034.
Waller, J. (2002). *Becoming evil: How ordinary people commit genocide and mass killing*. New York: Oxford University Press.

DOI: 10.1002/ejsp