

# ‘Walking through the hospital’, priming tolerance to enhance the approaching behavior between healthy individuals and patients suffering from psychoses

## ORIGINAL PAPER

Research has shown that priming works, but most evidence comes from laboratory situations and may not be applicable to situations in daily life. The present study used priming for the enhancement of the quality of approaching behavior between patients suffering from psychoses and healthy young individuals. Twenty-one healthy undergraduate students (age: 18-25) were recruited. Interpersonal distance was used as an indicator for approaching behavior. Using a virtual reality setting, it was tested whether the participants keep less distance towards psychotic patients after being primed with a sentence scrambling task involving words associated with tolerance. It was hypothesized that priming of tolerance can elicit more empathy towards mentally ill. The data reveal that this method of priming has no measurable influence on approaching behavior in situations in which people encounter mentally diseased suffering from psychoses. Nevertheless, this needs further investigation. Priming for social purposes could be a convenient and supportive way to improve people’s attitude towards mental illnesses. **Keywords:** social distance; stigma; psychosis; tolerance priming; virtual reality.

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## INTRODUCTION

The movie “Black Swan” is a popular movie dealing with mental illnesses. In the movie, Natalie Portman (alias Nina Sayers) experiences the consequences of a psychosis. As the watcher of the movie, you will see how two worlds can exist in one person. This movie made a contribution to the development of making mental diseases more familiar to a broad range of people by showing them the daily life of someone having a psychosis.

According to a general investigation of Vaughan and Hansen (2004) about mental illnesses, the society got used to the occurrence of mental diseases over the last decade. A lot of people learned that those disorders should be taken as seriously as physical ones. The discussion about mental illnesses and its classification is more and more expanding from psychologists to the general population, resulting in more attention to the tabooing of mental illness and the end of this taboo (Vaughan & Hansen, 2004).

In spite of those positive findings, people tend to stigmatize mentally ill persons. Sickened persons are treated differently and lose support by their caregivers (Stout, Villegas & Jennings, 2004). It has been shown, for example, that people tend to keep more distance, both emotionally and spatially, towards persons with abnormal behavior than to persons with normal behavior (Lauber, Nordt, Falcató & Rössler, 2004). The distance a person keeps towards the partner he or she is interacting with, has been shown to be a good indicator whether a person feels comfortable during the interaction (Bailenson, Blascovic, Beall & Loomis, 2001).

A lot of different attempts have been made to reduce the skepticism against mentally disordered (e.g. Vaughan & Hansen, 2004). For instance, research is conducted to investigate the shortcomings of media usage in stereotype reduction. Mainly, media are challenged on how to permeate to the consciousness and attitudes of its recipient (Stout, Villegas & Jennings, 2004).

A more subtle and experimentally measurable way than media campaigns to reduce discrimination and to change behavior against mentally ill persons may be priming. Priming is a technique to implicitly influence the thinking and behavior of persons. Through unconscious cues, certain aspects or schemes within the mind are made more salient (Bargh, Chen & Burrows, 1996). When those aspects are more accessible, they can guide the person’s behavior in a certain direction. In that way it may be possible to influence a person to act in a specific manner. The active self account by Wheeler provides a theoretical basis explaining the mechanism of priming (Wheeler, DeMarree & Petty, 2007). According to this theoretical framework, the prime activates a certain facet of the self, which then leads to a particular kind of behavior. In a study of Hansen & Wänke (2009) the facet “professor” through priming of the professor stereotype was activated. This increased the accessibility of aspects from the self related to that facet. When the “professor-facet” was triggered, the parts of the self connected to intelligence and performance were activated. This led to better performance during a knowledge test (Hansen & Wänke 2009).

Priming was and is frequently used to influence behavior in several ways. Other experimental studies used it to influence motor behavior of people (i.e. walking more slowly after priming the elderly stereotype; e.g. Bargh, Chen & Burrows, 1996)

or the judgment of neutral faces through odors (Li, Moallem, Paller & Gottfried, 2007), and even donation behavior (Lamy, Fischer-Lokou & Guéguen, 2012).

The present study aimed to apply the framework of Wheeler et al. (2007) and the findings from previous studies in the clinical sector. In this study, we wanted to investigate whether priming is a valuable way to reduce stigmatization of mentally sickened persons. Using priming, it might be possible to provide social guidance on how to react in situations with mentally diseased persons. A psychosis was chosen as mental illness. Although all mental diseases tend to utter themselves very differently, we thought that a psychosis could be the most striking example of a mental illness causing the relatives to be insecure about how to interact with such persons. A psychosis is characterized by negative and positive symptoms. Negative symptoms involve the reduction of emotionality, stereotyped thinking and less perspective taking (Piskulic & Addington, 2011). In contrast to that, positive symptoms are experiences which are added to the normal human functioning. Positive symptoms include hallucinations and delusions. For instance, the patient always feels persecuted (DSM IV-TR, 2000).

Based on the active self account of Wheeler, DeMarree & Petty (2007), we attempted to activate the tolerant facet of the self to influence the approaching behavior to mentally disordered persons. Because of the fact that there is a link between the distance a person keeps and the comfortableness during an interaction (Lauber, Nordt, Falcato & Rössler, 2004), we inferred that less distance is a sign of reduced stigmatization.

A virtual reality (VR) experience was used to investigate whether the approaching behavior to a mentally diseased person was improved after a tolerance prime. A VR setting was used, because it has some advantages in comparison with other methods. First, it is possible to measure interpersonal distance in a scientific and precise manner. The participant was not aware of the fact that her/his distance to the virtual person was measured. In addition to that, the tracking system of the virtual reality laboratory is able to measure very precisely using the 16 cameras it is equipped with. A second advantage is that the situation is standardized across participants because all participants encountered the same persons with exactly the same behavior. If we asked a simulation patient to be our patient, it could have happened that he/she would have interacted differently across participants.

Wheeler & Berger (2007) found that equal primes can have different effects depending on the personality structure. Because of that, the personal tolerance level of the participant was taken into consideration. The question was whether the personal tolerance level increases or decreases the effect of the tolerance prime.

It was hypothesized that priming of tolerance will activate a facet of the self concept, which improves the approaching behavior to mentally ill persons. This could be expressed by a decrement of distance. Moreover, it was hypothesized that the personal tolerance level would lead to a different effect of the prime. If the tolerance level already is high, then the facet related to tolerance already is active. Because of that, it could be that the prime does not add any new information to the active facets. Subsequently, it could be that the prime has no effect or that highly tolerant persons show a different priming effect than low tolerant participants.

## METHODS

### **Participants**

After approval of the study by the ethical committee of Maastricht University's Faculty of Psychology and Neuroscience, a total of 21 participants aged between 18 and 25 years (9 men, 12 women) were recruited. Seventeen participants were psychology students of Maastricht University and 4 were students of other faculties of the same university. Participants were admitted to this study if they did not experience seasickness to prevent motion sickness provoked by the virtual reality experience (Howarth & Costello, 1997). Two participants were excluded from the experiment; one due to lost VR data and one because of poor perception (i.e. the participant did not notice it when the mental or physical condition of the patient switched). Psychology students amongst the admitted participants were rewarded with 1,5 participation point while the remaining participants participated on a voluntary basis.

### **Materials**

#### *Tolerance level questionnaire*

We used a paper version of the questionnaire of Devine and Plant (1998) to measure tolerance level. Considerable changes were made in the questions, because the questionnaire of Devine and Plant only tested prejudice against black and white people and we wanted to focus also on other prejudiced groups (e.g. homosexuals, mentally ill people and skinheads). It therefore was decided to replace for example 'black people' by 'mentally ill people'. Participants were tricked into thinking that social ability was measured instead of tolerance level. Items were added and the questionnaire was labeled a 'questionnaire to measure social ability'. The reason for this distraction was to decrease the opportunity the participants got to know the actual goal of the study, which could influence the results in a negative way. The items added included questions about culture and relationships (see table 1). These distractors were not included in our analysis. Participants used a 9 point scale to rate each statement (ranging from 1: strongly disagree to 9: strongly agree).

**Table 1:** The modified tolerance level questionnaire (Plant & Devine, 1998).

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- 1 Because of today's politically correct standards, I try to appear non prejudiced toward black people.
  - 2 I try to hide any negative thoughts about mentally ill people in order to avoid negative reactions from others.
  - 3 I attempt to act in nonprejudiced ways toward impaired people, because it is personally important to me.
  - 4 Because of my personal values, I believe that using stereotypes about homosexuals is wrong.
  - 5 I am personally motivated by my beliefs to be nonprejudiced toward people who are different.
  - 6 According to my personal values, using stereotypes about mentally ill persons is OK.
  - 7 I attempt to appear nonprejudiced toward mentally diseased persons in order to avoid disapproval from others.
  - 8 Being nonprejudiced toward impaired people is important to my self concept.
  - 9 I try to act nonprejudiced toward impaired people because of pressure of others.
  - 10 If I acted prejudiced toward homosexuals, I would be concerned that others would be angry with me.
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### *Sentence scrambling task*

Colleague students (n=17) were asked to write down twenty words they associated with tolerance. On this basis we sampled the most frequently chosen words for the priming condition. In total fifteen words out of 56 words were selected for the priming condition. One of the five words of each sentence scrambling task was 'highly tolerant', whereas the other words were neutral. One example of the words used in the priming condition is: 'respect, people, to think, public, women'. In this case we indicated respect as a highly tolerant word. The nonpriming condition consisted of neutral words like: 'blue, summer, sky, vacation, Italy'. The participant was asked to make a sentence out of these words. For example: This summer, I was on vacation in Italy and the sky was blue. The participant was asked to do this 15 times with different words. The participant received a paper (with the indicated words on it) and a pen and he or she had to make sentences out of the indicated words. The experimenter mentioned that it was important to make the sentences grammatically correct, to make the coverstory work well.

**Table 2:** The items of the word scrambling tasks (the bold words are indicated as ‘highly tolerant’).

	<b>Priming condition</b>	<b>Non priming condition</b>
1	respect, people, to think, public, women	blue , sky, summer, vacation, Italy
2	differences, to accept, men, dinner, cook	university, exam, book, library, quiet
3	election, to vote, liberal, democracy, room	car, color, price, kilometer, speed
4	students, unprejudiced, most, black, people	hair, black, red, blonde, short
5	open minded, journey, New Zealand, money, experience	party, drinking, friends, boyfriend, bed
6	mental ill, people, empathy, psychosis, help	airplane, train, car, bike, speed
7	children, roles, to play, tolerant, behavior	steak, fries, sugar, cola, broccoli
8	friends, to be, equal, sports, clothes	music, rhythm, voice, microphone, stage
9	to wait, train, clock/watch, patience, rain	Weather, sun, storm, rain, umbrella
10	art, colors, exposition, artist, interest	trousers, t-shirt, socks, shoes, blue
11	welcoming, host family, country, gift, special	book, story, film, scene, actor
12	Life, possibilities, opportunities, to choose, pleasure	life, optimism, pessimism, person, character
13	Facebook, media, contact, social, like	baby, diaper, milk, sweet, little
14	Christmas, together, tree, wine, fire	Christmas, tree, ginger bread, wine, fire
15	To follow, moral, important, to have, values	experiment, researcher, test, variable, statistics

*The virtual environment*

The experiment was conducted at the immersive virtual environment research laboratory at the Faculty of Psychology and Neuroscience of Maastricht University, in a 5.7 by 7.8 meters sized room. The Immersive Virtual Environment Technique (IVET) setup contained sixteen cameras and an equal number of speakers. The cameras placed across the room accurately tracked the so called light emitting diodes (LEDs) located on the stereoscopic head-mounted display (HMD). Thus, using the

tracking of the LEDs, the participant's position and orientation were measured during the experiment. The HMD contains build-in screens that are placed in front of the eyes, displaying the graphics of the IVET rendered by a computer for each eye separately. A laptop was carried on the back gathering the participant's position and head-movement information which was rendered to the HMD, thereby creating the experience of being immersed within a 3D virtual environment.

### *Modeling of the immersive virtual environment*

The same type of immersive virtual hospital room environment was used as in the PhD project of Toppenberg (Toppenberg, Bos, Wigboldus, & Pryor, 2009-2014; papers in preparation). The facial editor software from FaceGen (2009) was used for creating the 30-year-old virtual male faces. Two types of patients were distinguished (both were lying in a bed): a patient with a mental disease (psychosis) and a patient with a somatic injury (broken leg). The patient with the psychosis was fixated to the bed with two blue bands. This patient looked very pale. The patient with the broken leg was lying in bed with his leg upwards (with his knee in a knee cast, so that the plaster was visible). Furthermore, this patient looked healthy. Both patients had nametags on their wrists and both were following the participants with their eyes. The hospital room was relatively empty; in the middle of the room a bed was standing and some apparatus were present. The room was light and spatial, because one window (with bus station view) was present.

### *Interpersonal distance*

The wrist was chosen as reference point to measure interpersonal distance ( $X, Z$  coordinates in VR; 0,75; 0,67). This reference point was consistent across all trials. Furthermore, it was chosen to measure from the foot of the bed ( $Z=0,5$ ), this was to make sure we only measured the distances that were relevant in our experiment.

### **Procedure**

After giving informed consent, participants were asked to complete the tolerance level questionnaire and the sentence scrambling task. Subsequently, the experimenter guided the participant to the VR room. There, the experimenter explained the task: the participant would have to walk through a virtual hospital room with a patient in bed. Patients had one of the two diagnoses, i.e. psychosis vs. broken leg. Participants had to say the patient's name, which was stated at the wrist of the patient, and the diagnose. It was mentioned that the name of the patient would switch in each trial. To start the next trial, the participant had to walk to a red dot in the the middle of the room.

After explanation, the experimenter helped to put on the equipment. The participant was told to first explore the empty room and then go to the red dot to start with the experiment. The experimenter observed the participant and what he or she was seeing during the experiment (i.e. on a computer screen). The experiment started with a practice trial. Here, the patient was healthy. After the practice trial, the experimenter made clear he wanted to be informed about the physical or mental condition of the patient in the beginning of each block. When the participant was

wrong with the diagnose, the experimenter explained what the diagnose of the patient was. After the experiment, the experimenter asked the participant to recall as many names as possible, this was to make sure the coverstory worked well. This surprise recall was included because otherwise, the participants could doubt the memory task they had to perform, because it was too easy (they just had to keep one name in mind for a couple of seconds). Now, they really had to recall, which made the task believable. The experiment consisted of 21 trials (i.e. one practice trial and 20 experimental trials).

### *Manipulation check and debriefing*

At the end of the experiment, the participant was asked to guess the goal of the experiment. After this, the participant was debriefed and the experimenter thanked the participant for participation in the experiment.

### **Design and statistical analysis**

In the sentence scrambling task participants were randomly assigned to one of the two conditions: the priming condition or the non-priming (control) condition. In the VR, there were two patients: one with a broken leg and one with a psychosis. The experiment consisted of 20 trials: first ten consecutive trials with the one and the same patient in all ten of these, followed by ten trials with the other patient. The participants were either in the order condition starting with the psychosis (psycho-leg), or in the order condition starting with the broken leg (leg-psycho). Participants were evenly distributed across conditions. We counterbalanced the conditions by usage of a balanced latin square. The design is a 3x3 factorial design. We used a repeated measures mixed model ANOVA. Within and between factors were distinguished. The between factors were order (psycho-leg or leg-psycho) and condition (priming or non priming). In addition to that, the diagnose (broken leg vs. psychosis) was the within subject factor. Mean minimal distance (MMD) towards the wrist in both diagnoses (i.e. broken leg vs. psychosis) in the VR environment was used as the dependent variable in the experiment.

## RESULTS

### **Internal validity of the questionnaire items**

At first a factor analysis was done to investigate whether the questionnaire measuring tolerance was valid. Upon inspection of the eigenvalues, the screeplot and the factorloadings in the factor matrix (i.e. table 3), and after exploration of the content of the items, we finally distinguished two factors: internally motivated tolerance items (1, 3, 4, 5, 6 and 8), and externally motivated tolerance items (2, 7, 9 and 10). Internally motivated means the motivation for the behavior described in a specific item is to follow ones own values; externally motivated means its motivation is to satisfy (the values of) others/society or to be liked by others. The factor analysis



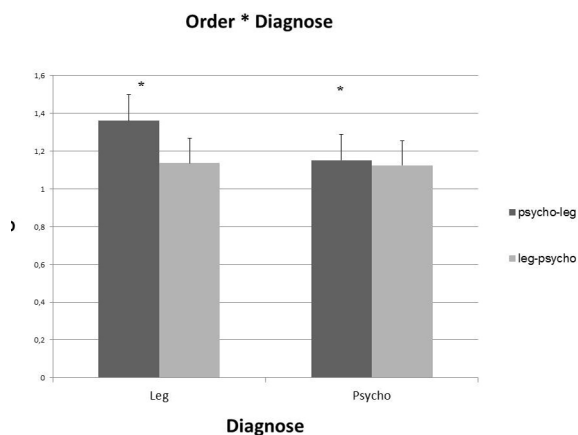
showed that item 2 was an internally motivated tolerance item, whereas the content of this item showed that this item was an externally motivated item. We decided to bring this item under the externally motivated tolerance items, because the loadings of this item did not differ extremely. The items were reliable, Cronbach's ( $\alpha = 0,809$ ) was found in the internally motivated tolerance items ( $n=6$ ) and Cronbach's ( $\alpha = 0,704$ ) was found in the externally motivated tolerance items ( $n=4$ ), see table 3. The centered internally and externally tolerance items were included as covariate in the analysis.

**Table 3:** Oblimin rotated factor matrix of the items measuring tolerance. Note: the boldface denotes the strongest factor loading for each item.

Items	IM	EM
Tolerance 1	0.777	0.134
Tolerance 2	0.526	0.352
Tolerance 3	0.754	-0.229
Tolerance 4	0.625	-0.178
Tolerance 5	0.351	-0.370
Tolerance 6	0.765	0.035
Tolerance 7	0.247	0.738
Tolerance 8	0.622	-0.119
Tolerance 9	0.027	0.935
Tolerance 10	-0.074	0.485

### Mixed Model ANOVA

More participants were in the priming condition ( $n=12$ ) than in the non-priming condition ( $n=9$ ). This was because we excluded the two participants after the data reduction and both excluded participants were in the non-priming condition. Initially, ten participants were in the psycho-leg order, whereas eleven participants were in the leg-psycho order. Three tests were relevant to test our main hypothesis. At first, the interaction of the  $3 \times 3$  mixed model repeated measures ANOVA within subjects effects was not significant ( $F(1, 15) = 0.015, p = 0.904$ ). Second, the interaction of condition and diagnose was also not significant ( $F(1, 15) = 0.602, p = 0.450$ ). Moreover, the test of between subjects effect of condition was not significant ( $F(1, 15) = 0.018, p = 0.896$ ), which states that priming did not work. However, the interaction of order and diagnose was significant ( $F(1, 15) = 5.071, p = 0.040$ ), see figure 1.



**Figure 1:** Interaction effect of diagnose and order, with mean minimal distance towards the wrist on the vertical axis and condition on the horizontal axis (\* significant  $p < 0.05$ ).

The interaction between order and diagnose was further explored. We decided to split the file based on order. In the psycho-leg order we found a significant effect for diagnose ( $F(1, 6) = 12.929, p = 0.011$ ). MMD was larger in the leg-psycho order. In the psycho-leg order a trend for interaction between internally motivated tolerance items and diagnose ( $F(1, 6) = 2.068, p = 0.200$ ) was found. However, in the leg-psycho order no significant effect for diagnose was found ( $F(1, 7) = 0.193, p = 0.647$ ), neither a trend of interaction between diagnose and internal tolerance  $F(1, 7) = 0.005, p = 0.946$  was found.

### Manipulation check

None of the participants guessed the goal of the current study. We therefore can conclude that the manipulation worked well.

## DISCUSSION

The goal of the present study was to test whether tolerance priming can have an influence on the approaching behavior to psychotic persons. Furthermore we wanted to investigate whether the effect of priming tolerance is dependent on the personal tolerance level.

Our data show that priming has no measurable influence on behavior in social situations. In spite of insignificance, our data still made a contribution to specify whether priming is suitable to improve approaching behavior. The data reveal important information about human approaching tendencies and provide a basis to improve further research.

The absence of a measurable influence of priming could be due to the fact that we used the wrong priming technique. Different techniques using subliminal messages or a word scramble task could have been more effective. Furthermore, it could have happened that the prime did not activate additional information in the mind's facet. We tested psychology students, who may be more tolerant towards individuals suffering from a mental disorder than other students. According to Wheeler and Berger (2007) a prime can have little influence if the trait primed already is active (Wheeler & Berger 2007). Thus, if the tolerant facet of the self already is active because psychology students naturally may be more tolerant, the prime cannot elicit more tolerance than is already active. In conclusion, the data could have been different with another sample.

All in all, participants kept more distance to the person with the broken leg. This was contrary to our expectations because we thought that the participants would keep more distance to the psychotic patient. This pattern could be the result of a diversity of reasons. First, it could have been that the participants were more cautious with regard to the person with the broken leg, because of the knee crutch. This knee crutch was standing outside of the bed and in the direction to the participants, so it could have been that they were keeping more distance trying not to bump into it.

Second, may be possible, that the participants were feeling more secure when confronted with the psychotic patient. This patient was fixed on the bed and the participants could have been sure that he could not stand up or approach them. This could result in less distance due to less fear of physical confrontation (Corrigan et al., 2001).

In addition to that, we discovered an order effect of diagnose, but only in one direction. The participants kept more distance to the patient when they first saw the psychotic patient and then the one with the broken leg. Several reasons for that pattern of results exist. First, it could be that the participants thought that the patient with the broken leg would behave differently than the fixated patient in that he might stand up. Secondly, they may have been influenced by the previous diagnose. Our participants maybe were thinking that the second patient could have been sickened with broken leg and a mental disease like the first patient.

Nevertheless, all those explanations are post hoc explanations. We have no theoretical basis for those speculations and it requires further research to test whether one of those explanations is suitable.

Several limitations are present in the current design. One limitation concerns the type of measurement we used. Only approaching behavior was measured instead of a complex interaction. The results could be different when a more complex interaction (e.g. a conversation) would be used. Unfortunately, such a complex situation is not possible within VR. In addition to that, VR has technical limitations. Sometimes the view of the participant was disturbed by lags. This might led the participant repeatedly realize that this situation was virtually. Furthermore, the participants had to wear the backpack equipped with the laptop and wires which also could have had an influence on the natural movement. Moreover, our VR did not integrate any sounds which maybe reduced the realistic experience of the situation. In addition to that, the room was not equipped as one would expect a hospital room to be. It was very empty and contained not as much equipment as a hospital room normally has.

Another limitation concerns the difference between individuals in distance. The distance our participants kept may have been influenced for two different reasons. First different approaching tendencies could be caused by gender differences. The patient lying in bed always was a man. Maybe, our results could have been different when a woman would have been lying there. According to Bailenson, Blascovich, Beall & Loomis (2001) the distance kept differs between men and women. Women tend to keep less distance to a woman, whereas men tend to keep the greatest distance to a man. Moreover, a different tendency between men and women performing the task could exist. It was experienced that women nearly always kept the same distance, whereas men kept more and more distance as the experiment progressed. This could be due to greater habituation within men. The habituation could, in fact, influence the internal validity of our distance measurement. Second, variation in distance could result from different eyesight the participants had. This could be a threat to our external validity, because every participant might have kept his/her unique distance due to different vision.

Some methodological limitations occurred during testing. First, it was not mentioned that there is a difference between the two patients lying in bed. After experiencing that our first participant did not see a difference between the two patients, we asked the following participants what they think the person was sickened with. The answers revealed that the psychotic person was not obvious enough to be directly seen as psychotic. Maybe a more extreme appearance would have been useful. Second, we did not randomize the different patients, all participants got blocks out of 10 trials with the same diagnose. It would have been better to switch the diagnoses during the task. The sequence, in which patients first occurred, was counterbalanced. Nevertheless, a randomization would have increased our internal validity. Third, no manipulation check of the priming procedure was used. This check would have been useful to test whether priming elicited more tolerance. Fourth, our power was threatened by the sample size ( $n = 21$ ), so it would be useful to test more participants to underline the results in future research.

All in all, these data revealed that priming of tolerance utilizing a sentence scramble task did not have an influence on the approaching behavior to mentally diseased patients in a VR environment. Maybe further research could reveal an effect of priming, if there is taken care of the limitations we found in our design. A different priming technique, another social situation or measurement could elicit a priming effect. In conclusion, all of our limitations should be taken into consideration in VR research as well as in priming and approaching behavior research.

Nevertheless, priming has much potential to be used as a supportive technique for improvement of behavior. It is important for human functioning to have social guidance on how to react and priming could provide some guideline (Kawakami et al., 2003). For instance, priming could encourage more social behavior in youth programs, for example anti bullying campaigns or sex education. In addition to that, priming could be used for health promotion purposes like AIDS campaigns or anti addiction programs. It requires much more research about how to apply priming and what technique is the best, but we should not underestimate its potential.

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## REFERENCES

- American Psychiatric Association. (2000). Diagnostic and statistical manual of mental disorders (4th ed., text rev.). Washington, DC: Author.
- Bailenson, J. N., Blascovic, J., Beall, A. C. & Loomis, J. M. (2001). Equilibrium theory revisited: Mutual gaze and personal space in virtual environments. *Presence*, 10 (6), 583- 598.
- Bargh, J. A., Chen, M. & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of Personality and Social Psychology*, 71 (2), 230-244.
- Corrigan, P.W., Green, A., Lundin, R., Kubiak, M.A. & Penn, D.L. (2001). Familiarity With and Social Distance From People Who Have Serious Mental Illness, *Psychiatric Services*, 52, 7, 953-958.
- Hansen, J. & Wäncke, M. (2009). Think of capable others and you can make it! Self-efficacy mediates the effect of stereotype activation on behavior. *Social Cognition*, 27(1), 76-88.
- Howarth, P.A., & Costello, P.J. (1997). The occurrence of virtual simulation sickness symptoms when an HMD was used as a personal viewing system. *Displays*, 18, 107-116.
- Kawakami, K., Dovidio, J. F., Dijksterhuis, A. (2003). Effect of social category priming on personal attitudes. *Psychological Science*, 14 (4), 319.
- Lamy, L., Fischer-Lokou, J. & Guéguen, N. (2012). Priming emotion concepts and helping behavior: How unliked emotions can influence action. *Social Behavior and Personality*, 40(1), 55-62.
- Lauber, C., Nordt, C., Falcato, L. & Rössler, W. (2004). Factors Influencing Social Distance Toward People with Mental Illness. *Community Mental Health Journal*, 40 (3), 265-274.
- Li, W., Moallem, I., Paller, K. A. & Gottfried, J. A. (2007). Subliminal Smells Can Guide Social Preferences. *Psychological Science*, 18 (12), 1044-1049.
- Plant, E.A., & Devine, P., (1998). Internal and External Motivation to Respond Without Prejudice. *Journal of Personality and Social Psychology*, 75 (3), 811-832.
- Piskulic, D. & Addington, J. (2011). Social cognition and negative symptoms in psychosis. *Psychiatry research*. 188, 283-285.
- Stout, P. A., Villegas, J. & Jennings, N. A. (2004). Images of Mental Illness in the Media: Identifying gaps in the Research. *Schizophrenia Bulletin*, 30(3), 543-561.
- Vaughan, G. & Hansen, C. (2004). 'Like Minds, Like Mine': a New Zealand project to counter the stigma and discrimination associated with mental illness. *Australasian Psychiatry*, 12 (2), 113-117.
- Wheeler, S. C. & Berger, J. (2007). When the Same Prime Leads to Different Effects. *Journal of Consumer Research*, 34, 357-368.
- Wheeler, S. C., DeMarree, K. G., Petty, R. E. (2007). Understanding the Role of the Self in Prime-to-Behaviour Effects: The Active-Self Account. *Personality and Social Psychology*, 11(3), 234-261.