Europe's Journal of Psychology
ejop.psychopen.eu | 1841-0413

Research Reports

Relationship Between Implicit and Explicit Measures of Attitudes: The Impact of Application Conditions

Agustín Echebarria Echabe*[a]

[a] Department of Social Psychology, Faculty of Psychology, The Basque Country University, San Sebastian, Spain.

Abstract

Three experimental studies analyzed the extent to which correlations between implicit and explicit measures of (anti-Arab) attitudes depend on the conditions in which these measures are applied. The first study revealed that the correlation increased when the explicit measure was applied in conditions of time-pressure and cognitive load. The second study showed that, under these conditions, both implicit and explicit measures predicted stereotypic attributions. The third study confirmed that the correlation between both measures increased when participants were previously familiarized with the logic that underlies the use of implicit measures. The theoretical and methodological implications of these results are discussed.

Keywords: attitudes, implicit and explicit measures

Europe's Journal of Psychology, 2013, Vol. 9(2), 231–245, doi:10.5964/ejop.v9i2.544

Received: 2012-11-08. Accepted: 2012-12-22. Published: 2013-05-31.

*Corresponding author at: Department of Social Psychology, Faculty of Psychology, The Basque Country University, Tolosa Avenue 70, San Sebastian, E- 20009, Spain. E-mail: pspeteta@ss.ehu.es

Fazio and Olson (2003) outlined the explosion of interest in implicit attitudes. By taking recent meta-analyses on this issue (Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010; Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005) or a review of the literature on attitudes in the Annual Review of Psychology (Bohner & Dickel, 2011) as indices of the interest aroused by the topic, this tendency has grown even more sharply during the first decade of the present century. Fazio and Olson (2003) find parallels between the evolution of this new domain of enquiry and the development of the study of attitudes during the last century (Zanna & Fazio, 1982). In a similar fashion to research on attitudes at the beginning of the 20th century, the first decade of interest in implicit attitudes has been marked by a strong empirical orientation. We have witnessed the proliferation of methods to assess this construct. Some of these techniques are the Implicit Association Test (IAT) (Greenwald & Banaji, 1995), the Affective Priming Task (Fazio, Sanbonmatsu, Powell, & Kardes, 1986), the Semantic Priming Task (Wittenbrink, Judd, & Park, 1997), or the Affect Misattribution Procedure (AMP) (the latter provides the procedure used in these studies).

One of the first systematic findings of these studies was the low correlation between implicit and explicit measures of attitudes. This evidence led some authors to consider the reasons for this low correlation. Instead of focusing on the new measures themselves, some authors gave a theoretical answer. They concluded that both measures were tapping into different underlying constructs: implicit and explicit attitudes. Thus, we would expect the existence of two attitudes instead of only one. Dual-attitude models were proposed (Devine, 1989; Wilson, Lindsey, &

Schooler, 2000). People hold multiple attitudes towards a topic at the same time. When attitudes change, the new attitudes are layered on top of the older ones. When people introspect they report the most current attitudes. The older attitudes can be unearthed through implicit techniques (Payne, Burkley, & Stokes, 2008). One of the most influential of these dual-models is the associative-propositional evaluation model (APE) developed by Gawronski and Bodenhausen (2006, 2007), see also Gawronski & Sritharan, 2010; Peters & Gawronski, 2011). The fundamental assumption of the APE model is that of the existence of two independent constructs, namely implicit and explicit attitudes. The former are affective automatic reactions aroused by encounters with an object. Authors assume that implicit attitudes are shaped and changed via associative processes. Evaluative conditioning (EC) has been postulated as one of these associative mechanisms that contribute to the formation and change of implicit attitudes. Evaluative conditioning refers to "a change in the valence of a stimulus (here Arabs) that is due to the pairing of that stimulus with another positive or negative stimulus" (Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010, p. 390; Jones, Fazio, & Olson, 2009). In contrast, explicit attitudes are conscious evaluations of the attitude's object. The fundamental mechanism that participates in their formation and change is the processing of available information about the object (propositional learning, PL). Explicit attitudes are based on "syllogistic inferences about propositional information that is relevant for a judgment" (Bohner & Dickel, 2011, p. 398; Gawronski & Bodenhausen, 2006). The model also proposes a mutual influence between the two types of attitude, such that changes at one level can induce changes at the other level.

Most of these dual models are based on three assumptions, namely that (a) implicit measures reflect introspectively inaccessible representations, (b) implicit measures are less susceptible to social desirability concerns, and (c) implicit measures reflect more stable, older representations rooted in long-term social experiences. However, as Gawronski, LeBel, and Peters (2007) show, data supporting these claims are equivocal. Olson, Fazio, and Hermann (2007) found that, at least in the domain of implicit measures of self-esteem, the assumption that implicit measures assess associations that are not accessible to consciousness is contestable. For instance, Gailliot and Schmeichel (2006) found that people can estimate correctly the scores in implicit measures of self-esteem. Some studies go a step further, questioning the validity of implicit measures. One example is the study conducted by Cunningham, Preacher, and Banaji (2001) on the consistency, stability and convergent validity of implicit measures of attitude. This study has been quoted 480 times according to Google-Scholar. Most of these citations refer to the study as one supporting the validity of implicit measures. However, as the authors recognized, "the inter item consistency of the implicit measures is indeed lower than that of most standard measures of attitudes" (p. 166) (0.78 for IAT, 0.63 for response-window IAT, and 0.64 for response-windows evaluative priming). Their temporal stability (1 week) is low (IAT = 0.46, response-windows priming = 0.68, and response-window IAT = 0.36). As for as the bivariate correlations among the three measures, "it is surprisingly low" (p. 167) (mean r = 0.19). Analyzing the predictive models of implicit and explicit measures, Perugini (2005) points out to the low reliability of implicit measures. The problem of the validity of implicit measures is specially accentuated in the case of Self-Esteem. As Bosson, Swann, and Pennebaker (2000) report, the different implicit measures of self-esteem do not correlate with each other, and they correlate only weakly with explicit measures. Reviewing the evidence about the construct validity of the most commonly used techniques to measure implicit self-esteem (IAT and the letter-name), Buhrmester, Blanton, and Swann (2011) conclude, "the most troubling aspect of our review is the lack of evidence that either test measures self-esteem" (p. 375). In addition to the low correspondence between implicit measures of the same underlying construct, we must to point out to the inconsistency in the size of correlations between implicit and explicit measurements. Focusing the attention on correlations between implicit and explicit measures of stereotypes and prejudice, the evidence shows that the correlation can be weak or strong depending on the

attitude's objects (Lemm & Banaji, 1999; Nosek, Banaji, & Greenwald, 2002; Wittenbrink, Judd, & Park, 1997, 2001). Reinforcing the latter position, a recent meta-analysis conducted by Greenwald and colleagues (2009) shows that correlations between explicit and implicit attitudes range from near .10 to .54 depending on the domains. Moreover, this correlation increases as the importance of the attitude's object increases (Karpinski, Steinman, & Hilton, 2005).The evidence is troublesome for the dual-attitude perspective.

We think that there is an alternative interpretation of the low correspondence between implicit and explicit measures of attitudes. The low correlation can be due to methodological factors. Payne, Burkley, and Stokes (2008) propose that the low correlation between implicit and explicit measures of attitudes can be explained by a question of "structural fit". The demands that both types of measures put on the respondents are entirely different. In fact, the correlation between both measures increases in the extent to which their formats become more similar. In the same line, Hofmann, Gawronski, Gschwendner, Le, and Schmitt (2005) have found that the correlation between the two measures increases to the extent to which the conceptual correspondence between implicit and explicit measures increases.

The studies presented in this paper follow this path. The main assumption is that a factor that explains the low correlation between implicit and explicit measures of attitudes is the different demands that both measures place upon respondents. A theoretical model which serves to support our reasoning is MODE. Fazio´s MODE (acronym for motivation and opportunity as determinants of attitude-behavior relation) (Fazio, 1990; Fazio, Chen, McDonel, & Sherman, 1982; Fazio & Towles-Schwen, 1999) is perhaps one of the best known models that propose the existence of a single-attitude construct (Bohner & Dickel, 2011; Fazio & Olson, 2003). It assumes that there is a single construct – attitude – which can be manifested as behavior via spontaneous or deliberative processes. The author prefers to speak of implicit and explicit measures of attitude rather than implicit and explicit attitudes. The MODE, designed before the emergence of the concept of implicit attitudes, seeks to explain when attitudes translate into overt behaviors – in other words, when there is a correspondence between attitudes and behaviors, and when there is not. The model proposes that attitudes are only one of the various determinants of behaviors. The presence of other factors such as social norms against the expression of certain opinions (a policy of political correctness), the desire to project a specific self-image, the need to be accepted by others, etc., also contribute to the shaping of behaviors. In fact, if anything has been characteristic of social psychology throughout its history, it is the recognition of the strong situational nature of human behavior. The MODE assumes that sometime there are contextual pressures against the overt expression of certain attitudes. This is evident in the domain of prejudice. In these situations, the relation between attitudes and behaviors is weak. In other situations, there are not constraints against the overt expression of attitudes (ambiguity, presence of others with similar attitudes, noncontroversial topics, etc.). In the latter case, the correspondence between attitudes and behaviors is strong. Applying this logic to the issue at hand, we can regard the measurement of attitude as a "context". First, we must remember that attitudes are inner, private constructs, stored in long-term memory and ready to be activated when necessary. Researchers have not direct access to these constructs. They can only assess them through their translation into an external response such as the expression of opinions in the instruments designed to measure attitudes. In other words, attitudes are not recorded themselves, but their translation into an overt response. Taking up the idea of the measurements of attitude as context in which a judgment is requested, implicit measures can be thought of as contexts that differ in significant structural characteristics from those contexts in which explicit measures are applied. The two types of context differ in opportunity and motivational dimensions. We will start with contexts where attitudes are measured via implicit instruments. The first characteristic of these situations is novelty. For participants who face this measurement for the first time, the situation is a new one. They do not

know what is being assessed (usually the objective of these measures is masked, being presented as measuring other constructs in an attempt to avoid social desirability bias). We might imagine what would happen if these same instruments were employed to measure attitudes amongst professionals with previous knowledge of these techniques, thus removing the uncertainty. Moreover, many of these techniques use reaction-time, thus submitting participants to time-pressure. It is well known in many social-psychological domains, especially in that of social perception, that responses emitted below certain time thresholds (500 ms) reflect spontaneous responses because controlled and deliberate processes require more time to start working. In short, responses to implicit measures can be regarded as contexts where the meaning of the behavior is ambiguous, and there is no opportunity for controlled processes to start working. It is the prototypical context in which the MODE predicts a strong correspondence between attitude and behavior (a response recorded by implicit measurements).

As for the use of explicit measurements, the context is structurally different. Here, the meaning of the behavior is clear and obvious, and participants have time to think it over before expressing their opinions. In other words, all the conditions that allow controlled and deliberate processes to start working are present. In these contexts, two things can happen. One is that the attitude's object is not controversial. There are no social norms which constrain the expression of certain opinions. Social desirability concerns do not exist. As recent meta-analyses confirm (Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Nosek, Banaji, & Greenwald, 2002), in this situation correlations between implicit and explicit measurements are strong. In the second type of situation, participants are asked to express opinions on controversial issues. Here, participants risk being categorized as belonging to a group with undesirable positions (bigot, unpatriotic, prejudiced, conservative or radical depending on the context, etc.). Social constraints are so strong that the MODE predicts a low correspondence between attitudes and behaviors. The situational forces are strong enough to inhibit the expression of attitudes. In other words, the overt response (judgment or opinion) is shaped not only by attitudes but also by other situational factors.

Summarizing, we think that there are several structural differences in the application of implicit and explicit measures of attitudes that can explain the low correlation between both techniques. One is the explicitness of the objectives: obvious in the explicit and hidden in the explicit. The other is the condition in with the responses are requested: under time-pressure in most of the implicit measures and without time restriction in the explicit. We hypothesize (H1) that the correlation between implicit and explicit measures will increased when the latter ones are applied in time-pressure and cognitive load conditions. (H2) Correlations are also expected to increase when participants are made familiar with the logic underlying implicit measures.

Three studies were designed to test these hypotheses. In all cases, the attitudinal object under scrutiny was a controversial issue: anti-Arab prejudice. In the first two studies, participants responded to implicit and explicit measures of prejudice, but we manipulated the conditions under which explicit measures were applied. Either they were answered under standard conditions or under cognitive-load and time-pressure conditions. In the third study, the conditions upon which the implicit measurement was applied were manipulated. Participants filled it either under standard or under "familiarizing" conditions. We predicted that the correlation between implicit and explicit measures of anti-Arab prejudice will be higher under cognitive-load and familiarity conditions than under standard application conditions. The studies reported below were approved by the deontology commission of the faculty in which this research was carried out.

Study 1

Sample and Procedure

Forty-two undergraduate students of psychology (29 women and 13 men, average age = 18.93, SD = 3.54) participated in the study in exchange for course credit. All of them were submitted to the implicit measurement procedure developed by Payne, Cheng, Govorun, and Stewart (2005). The reason for choosing this technique instead off others was that we have previously used it in a number of studies on the same topic and it has provided good results. The procedure was based on the Affect Misattribution Procedure (AMP). The AMP measures implicit attitudes through the evaluation of ambiguous items (Chinese ideograms). When an ambiguous object is preceded by a pleasant or unpleasant picture, the latter alters the impression of the former. People tend to misattribute their affective reactions from the prime picture to the target ideogram. This effect is even stronger when subjects are warned to avoid any influence for the prime photos (Payne, Burkley, & Stokes, 2008). Participants were informed that the task was about aesthetic preferences and that they would be asked to judge how much they liked (format 1 = not at all and 10 = a lot) 26 Chinese ideograms projected on slides. They were warned that a picture of a male adult would serve to refresh each ideogram and announce the presentations of the following one. They were instructed to avoid the influence that the picture of the male might have on their judgments and to concentrate on how much they liked each ideogram. Half of the ideograms were randomly preceded by pictures of European adult male faces whereas the other half was preceded by pictures of Arab adult male faces. Primes were presented for 100 ms followed by blank screens for 100 ms and Chinese ideograms for 100 ms. Implicit anti-Arab prejudice was computed as the mean of evaluation of the 13 ideograms preceded by the European faces minus the mean evaluation of the 13 ideograms preceded by Arab faces.

Having completed this measure, half of the participants were randomly assigned to the "cognitive-load and time-pressure" condition. They answered McConahay's (1986) modern racism scale (α = 0.87), adapted to assess anti-Arab prejudice (Echebarria Echabe & Fernández Guede, 2006a, 2006b, 2007), under specific conditions: they were asked to retain in memory a cipher made up of numbers and letters (128XG756GHZ) while responding to the questionnaire. They were informed that a memory test would be presented during the session. In addition to this, they were advised to answer each item with the first answer that came to their minds (a "guts reaction"), without reflecting upon each question because items would only be presented for 30 seconds. These instructions were expected to impair the functioning of controlled and deliberate processes (Chun & Kruglanski, 2006; Dhar, Nowlis, & Sherman, 2000; Dijker & Koomen, 1996; Drolet & Luce, 2004; Gilbert & Hixon, 1991; Gilbert, Pelham, & Krull, 1988; Kruglanski & Freund, 1983; Shiv & Fedorikhin, 1999). The other participants filled in the same scale under standard conditions (without time-pressure and memory task).

Results

A Mixed Model ANOVA was conducted with implicit and explicit measures as a within-subjects factor and the experimental conditions as between-subjects factor. The measure by condition interaction effects was significant, $F(1,40) = 13.31$, $p = .001$. As expected, the two groups did not differ in their level of implicit prejudice (standard condition: $M = 2.09$, $SD = 1.94$; cognitive-load condition: $M = 2.33$, $SD = 1.68$), $F(1,40) = 0.18$, $p = 0.67$. However, the difference in explicit prejudice was significant, $F(1,40) = 12.72$, $p < .01$. Participants placed in the cognitive-load and time pressure condition revealed higher levels of anti-Arab prejudice ($M = 13.90$, $SD = 1.81$) than those of the standard condition ($M = 11.85$, $SD = 1.90$).

Two correlation indices between explicit and implicit measures were computed to obtain a more direct test of the hypothesis: one for participants under the standard condition and another for participants under the cognitive-load and time-pressure condition. While the correlation was significant in the cognitive-load condition *(r* = 0.62, $p < .01$), it was not significant in the standard one (*r* = 0.19, *n.s.*).

Conclusions

The correlation between implicit and explicit measures of anti-Arab prejudice depended on the conditions upon which they were applied. Under standard conditions - neither time limitation nor cognitive load - the correlation between explicit and implicit measurements was low. This result changed under conditions that impaired the functioning of controlled-cognitive processes. In the latter, we found that the correlation between the two measures increased significantly.

Study 2

The second study was designed to analyze the relative predictive power of implicit and explicit measures of prejudice. The literature claiming the existence of two independent constructs presents as evidence for this assumption data that reveal that the two types of construct predict different types of behavior (Bohner & Dickel, 2011; Fazio & Olson, 2003; Lambert, Payne, Ramsey, & Shaffer, 2005; Perugini, 2005). Explicit measures are better predictors of deliberate behaviors. In contrast, implicit attitudes are stronger predictors of spontaneous, no deliberate behaviors. One's behavior can be defined as non-deliberate, out of conscious control mechanisms not only because it is difficult to be controlled, but because the subject is unconscious of the relation between the provoking stimulus and its influence on subsequent behavior. Uncontrolled behavior has been the target of many studies in a large variety of domains such as the terror management theory, influence of stereotypes on judgments and behaviors, stereotype threat, social perception and correspondence inference, etc. The lack of consciousness of the causal effects of the manipulated variable on subsequent dependent variables prevents conscious, deliberate, corrective cognitive mechanisms to start working. This is one of the prototypical situations that purportedly allows researchers access to stereotypes or attitudes "uncontaminated" by factors such as social desirability or self-presentation motives.

We used the domain of social perception as a testing-ground for this hypothesis. The main models developed in the last decades have proven that the targets' categorization plays a significant role in social perception. The categorization of a target distorts the perception of his/her behavior. Moreover, many factors are believed to shape impressions of a target, such as stereotypes that work automatically, uncontrollably and outside the conscious control of observers (Gilbert, 1989, 1998; Gilbert & Hixon, 1991; Gilbert, McNulty, Giuliano, & Benson, 1992; Trope, 1986; Trope & Alfieri, 1997). For these reasons, this is a suitable domain to analyze the differential predictive power of implicit and explicit measures. We followed a modified version of the procedure used by Lambert, Payne, Ramsey, and Shaffer (2005) to test the predictive validity of implicit measures of attitudes (racial attitudes). This is a domain in which one might expect that implicit measurements will be better predictors than explicit ones. We argue that this would be the case under standard conditions. However, if explicit measures were applied in conditions impairing the working of deliberate and controlled processes, we expect that implicit and explicit measurements would have a similar predictive power.

Procedure and Measurements

Fifty-four undergraduate students (40 women and 14 men, average age = 19.21 years, SD = 3.75) enrolled in introductory courses on psychology participated in the study in exchange for course credit. They were completely different to those used in study 1.

The study was carried out in two sessions a week apart. In the first session, participants answered a large number of instruments used in social-psychological studies. The alleged objective was to familiarize them with instruments used in the discipline and to collected data that would be used in the practical sessions of the course. Amongst numerous other instruments, they filled in the two which we were interested in, implicit and explicit measures of anti-Arab prejudice. The instruments used for this purpose were exactly the same as those described in the first study (the modern racism scale). The experimental manipulation was introduced in this first session. Half of the participants answered the explicit measure under standard conditions while the rest were randomly assigned to the time-pressure plus cognitive load condition. This latter group filled in the explicit measure of prejudice under exactly the same conditions as those described in study 1.

The second session took place a week later. It was presented as a continuation of the familiarization session. Participants responded to a new battery of measures covering a number of constructs not measured in the first session. Amongst other tasks, participants read a short description of the curriculum vitae of a candidate for a job in a multinational company in the domain of distribution of milk products across southern European countries. The information included in the CV was: the place of birth of the candidate (Madrid); his current educational status (a diploma in sales); citizen status (Spanish citizen); hobbies (mountain walking); marital status (married with two children); and holiday preferences (seaside resorts). The information used to activate the Arab stereotype was the name of the candidate (OMAR ADHULAGID). Participants were informed that the surname of the candidate was deleted to guarantee his anonymity. Participants were told that studies in social psychology have shown that lay people are as efficient as psychologists at forming impressions of other people and that their impressions are close to those obtained from standardized instruments employed by professionals. They were then asked to describe the impressions they had formed of OMAR ADHULAGID. For this purpose, we presented a list of adjectives that mapped three trait domains: religiosity, sexism, and non-stereotypic traits. Studies of Arab stereotypes (Dambrun & Guimond, 2001; Echebarria Echabe & Fernández Guede, 2006a, 2006b, 2007; Gordijn, Koomen, & Stapel, 2001; Stangor, Sullivan, & Ford, 1991) reveal that sexism and religiosity are stereotypical dimensions attached to the image of Arabs. Participants were asked to express the extent to which they thought that the target was (format 1 = not at all and 6 = a lot): a believer (0.75); religious (0.69); pious (0.70); a devotee (0.76) (religiosity dimension, α = 0.86); sexist (0.65); misogynous (0.78); feminist (-0.67); gender-traditionalist (0.81); gender-egalitarian (-0.77) (sexist dimension, α = 0.77); loyal (0.62); understanding (0.59); trustworthy (0.65); friendly (0.59); and kind (0.69) (nonstereotypical dimension, α = 0.75). According to Fiske, Cuddy, Glick, and Xu's Stereotype Content Model (Fiske, Cuddy, Glick, & Xu, 2002), it could be argued that some of the traits included in the non-stereotypic dimension are in reality part of one of the two dimensions (warmth and competence) which describe the stereotype of any group. However, in this context, 'non-stereotypical' features are considered to be those not highlighted by previous research regarding common stereotypes of Arabs in Europe.

A factor analysis grouped the traits in three dimensions (the factor loads of items in the corresponding factor are printed within brackets). The third factor included attributes that are not part of the stereotype attached to Arabs according to the studies previously quoted that surveyed the specific issue of Arab's stereotype. Three scales were created adding items grouped in the same dimension (after reversing the scores of items with negative

loads) and dividing totals by the number of items that made up each scale. Thus, the range of the scales remains from 1 to 6.

Results

An initial mixed model ANOVA with implicit and explicit measures as within-subjects factors and the experimental manipulation as a between-subjects factor was conducted in order to test the hypothesis about the influence of the application conditions. The measure by condition interaction was significant, $F(1,52) = 3.81$, $p = .05$. The experimental manipulation did not affect the implicit measure, $F(1,53) = 0.75$, $p = .0.39$, but it influenced the explicit one, $F(1,53) = 5.81$, $p = .02$. Participants placed in the cognitive-load and time-pressure condition exhibited more explicit prejudice than those in the standard condition ($M = 4.27$, $SD = 0.70$ vs. $M = 3.82$, $SD = 0.64$). The correlation between implicit and explicit measurements of prejudice was significant in the cognitive-load condition *(*$r = 0.58$, $p = .001$) but not in the standard condition ($r = 0.26$, $p = 0.18$).

Three additional ANOVAs were conducted in order to measure the influence of the manipulation on the three attributional dimensions. The manipulation did not affect the attribution of religiosity, $F(1,53) = 1.99$, $p = .16$, sexism, $F(1,53) = 0.45$, $p = .65$, nor non-stereotypic traits, $F(1,53) = 0.16$, $p = .69$. The implicit and explicit measurement of prejudice had significant correlations with the attribution of religiosity *(*$r = 0.60$, and $r = 0.43$, $p < .01$), and sexism ($r = 0.32$, and $r = 0.31$, $p < .05$), but not with non-stereotypic traits ($r = 0.05$, and $r = 0.00$).

A second order factor analysis was conducted to explore whether one unique index of stereotypic attribution instead of two could be used in further analyses. The two stereotypic attributional dimensions where entered into the analysis. The analysis yielded a single factor (eigenvalue = 1.63) with both scales showing equally high cognitive loads in the factor (religiosity = 0.90 and sexism = 0.90). Thus, both variables were combined into a single index of stereotypic attribution.

Two regression analyses were conducted with implicit and explicit measures as predictors and the stereotypic attribution as dependent variable. The first was performed including only participants placed in the “standard” condition. Although the effect of the predictors was significant ($r^2 = 0.25$, $F(2,24) = 3.92$, $p = .03$), only the impact of the implicit measure ($\beta = 0.51$, $p = .01$) was significant (β explicit $= 0.13$, $p = .46$). The situation changed in the time-pressure and cognitive-load condition. Here, both implicit ($\beta = 0.42$, $p = .01$) and explicit ($\beta = 0.56$, $p \leq .01$) measures had significant effects on stereotypic attribution. Two mediational analyses were conducted to see whether there was any indirect effect of implicit measures on attribution through explicit measures and of explicit measures through implicit ones. Bootstraps confidence intervals (CCI) were used to conduct the analyses. Bootstraps revealed an indirect effect of the implicit measure on stereotypic attribution through the explicit measure (CCI: 0.1237, 0.6424) but not of the explicit measure on attribution through the implicit measure (CCI: -0.1272, 0.0792).

Conclusions

The results of this second study reinforced those of the first study. The correlation between implicit and explicit measures was significantly affected by the conditions in which they were applied. In standard conditions, the correlation was not significant, but it was significant in the cognitive-load and time-pressure conditions. Furthermore, while under standard conditions only implicit measures predicted the application of stereotypic traits to the target, both implicit and explicit measures affected stereotypic attribution under cognitive-load and time-pressure conditions.

Study 3

This study approached the topic from a different perspective. We have said above that if we regard the measurement of attitudes as contexts in which an overt response is required, there are fundamental structural differences between contexts in which explicit or implicit measures are employed. Whereas questionnaires and scales in general are familiar instruments for most participants, and they can easily guess which attitudes are under scrutiny, this is not the case when implicit measures are applied. In the first place, participants are unfamiliar with these techniques. In other words, uncertainty is the feature that can best define the situation. What would happen if participants were familiar with these techniques as they are familiar with questionnaires? This study was designed to answer this question.

Sample and Procedure

Fifty undergraduate students (31 women and 19 men, average age = 19.1 years, SD = 3.54) took part in this study. They were completely different from those who participated in the previous two studies. They were randomly assigned to one of the two following conditions. In the standard condition, they filled in the two instruments used in the previous two studies under standard instructions. As in the two previous studies, we assessed attitudes towards Arabs. The "familiarization" condition was different. The 25 students placed in this condition received a two-hour lesson about implicit attitudes. In the first hour, they were informed about current dominant theories of implicit and explicit attitudes, their formation and change, and their influence upon our thoughts, feeling and behaviors. The second hour lesson aimed at familiarizing participants with two techniques of measurement of implicit attitudes, the IAT and the technique based on the misattribution effect (Chinese ideograms). The logic underlying both methods was explained, and the instruments presented. After the explanation, they responded to two versions of the AMP, one designed to measure implicit attitude towards old people (here ideograms were preceded either by pictures depicting an adult male or an old male), and towards gender (ideograms were preceded by pictures of white adult males or females). The evaluation session took place a week later without previous warning that this would happen.

Results

A mixed model ANOVA, with implicit and explicit measures as within-subjects factor and the experimental manipulation as a between-subjects factor was conducted. The measure by condition interaction effect was significant, $F(1,48) = 4.10$, $p \leq .05$. The groups differed in the implicit measurement, $F(1,49) = 8.16$, $p < .01$, but not in the explicit one, $F(1,49) = 0.02$, $p = .79$. Participants placed in the "familiarization" condition had lower scores in the implicit measure ($M = 0.42$, $SD = 1.44$ vs. $M = 1.48$, $SD = 1.15$).

Separate correlations between implicit and explicit measures for each condition were computed. The correlation was significant in the familiarization condition ($r = 0.56$, $p = .009$) but not in the standard condition ($r = 0.24$, $p = .21$).

Conclusions

This third study supported and reinforced the findings of the two previous studies. We found that implicit and explicit measures did not correlate under standard conditions. However, this changed when the conditions of application were modified. The correlation between implicit and explicit measures becomes significant after familiarizing participants with implicit measures and the theoretical logic underlying their design.

Discussion

One of the topics of socio-psychological enquiry that has generated the most interest during the last decade is that of the implicit measures of attitudes (Bohner & Dickel, 2011; Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Hofmann, De Houwer, Perugini, Baeyens, & Crombez, 2010; Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005). Spurred on by the development of techniques to assess unconscious structures, social psychology has witnessed the proliferation of these types of measures. Amongst these, we can single out the Implicit Association Test (IAT) (Greenwald & Banaji, 1995), the Affective Priming Task (Fazio, Sanbonmatsu, Powell, & Kardes, 1986), the Semantic Priming Task (Wittenbrink, Judd, & Park, 1997), or the Affect Misattribution Procedure (AMP). These studies found low correlations between implicit and explicit measures of attitudes. Based on these findings, some authors concluded that measures tapped two independent constructs: implicit and explicit attitudes. Dual-attitude models were proposed (Devine, 1989; Gawronski & Bodenhausen, 2006, 2007; Gawronski & Sritharan, 2010; Peters & Gawronski, 2011; Wilson, Lindsey, & Schooler, 2000). Although appealing, these models are not exempt of contradictory evidence. This is especially true in the domain of implicit self-esteem (Buhrmester, Blanton, & Swann, 2011). There is significant evidence that the relations between both measures are strongly affected by methodological factors (Payne, Burkley, & Stokes, 2008).

Based on the concept of structural-fit proposed by Payne, Burkley, and Stokes (2008) we hypothesized that the low correlation between implicit and explicit measures can be explained by structural differences in the way in which both are applied. Explicit and implicit measurements of prejudice represent contexts that differ significantly in certain structural features, namely, clarity and time for responding. From the participants' point of view, implicit measures are ambiguous: participants do not know what is being measured (the construct under scrutiny is masked) and respond under time-pressure. They have to answer faster than the threshold necessary for controlled and deliberate cognitive processes to start working. In these conditions, the potential effects of situational factors on the overt response are reduced almost to zero. The main determinants of behavior that are allowed to function are attitudes. Explicit measures tend to be unambiguous and not time-limited. What is being measured is usually quite obvious and participants have time to think their responses over before translating them into an overt opinion. The condition is optimal for allowing situational factors - such as social norms against the expression of certain opinions or self-presentation motives - to affect responses in addition to attitudes. Summarizing this thesis, what differentiates explicit and implicit methods of measuring attitudes is how they define the measurement context. Going one step further, we surmise that if we redefine the structural characteristics in which explicit and implicit measurements are applied, constraining the intervention of controlled and deliberate cognitive processes through cognitive load and time pressure, or familiarizing participants with implicit techniques, then the results obtained by the two methods of measurement will be similar.

The results of our studies supported our hypotheses. The first study showed that when measured under conditions that impair the functioning of controlled and deliberate processes, the correlation between implicit and explicit measures of anti-Arab prejudice was significant, but the correlation was not significant when assessed under standard conditions that allow controlled processes to start working. The second study revealed that when measured under standard conditions, the implicit measure of prejudice, but not the explicit one, predicted the attribution of stereotypical traits. However, this changed when the explicit measure was applied under conditions designed to impair the functioning of controlled processes (time-pressure and cognitive load). Here, the explicit measurement's predictive power was equal to that of the implicit measure.

Results from the third study were consistent with the results from the first two studies. When the unfamiliarity inherent to implicit measures are abolished by informing participants about the theories that support implicit techniques and the scoring procedures, scores collected from implicit and explicit measures strongly correlate with each other.

Notwithstanding the popularity of dual-processes models in social psychology in general, and in the domain of attitudes in particular, evidence is accumulating that call these models into question (Bosson, Swann, & Pennebaker, 2000; Buhrmester, Blanton, & Swann, 2011; Cunningham, Preacher, & Banaji; 2001; Gawronski, LeBel, & Peters, 2007; Olson, Fazio, & Hermann, 2007; Payne, Burkley, & Stokes, 2008; Perugini, 2005).

Our results leave a question unanswered: Are dual-attitude models theoretical ad-hoc constructions designed to explain empirical artifacts? The fact that familiarizing participants with theories about implicit attitudes and their corresponding measurement techniques strongly increases the correlation of the scores collected through both techniques support this interpretation. A characteristic of modern times is that scientific findings, sooner or later, are shared and become part of folk knowledge. The classic study of Moscovici (1961) about the spread and use of psychoanalysis amongst lay French people illustrates this process of popularization. The third study can be regarded as a micro-representation of this process of popularization and its effect on the theoretical ground. It seems that an important condition for the support of dual-attitude models is participants' ignorance of the constructs under scrutiny and the techniques used to measure them. However, what are now new theories about implicit processes, reserved only for specialists, will sooner or later become common knowledge.

One of the advantages of single construct models is that they are more parsimonious. Moreover, the model of attitudes that has been built up over a century or research can explain the divergences between different methods of measurement when the contexts of measurement differ without the need to introduce new constructs. In addition to this theoretical advantage, there is another practical consideration. Most implicit methods have a restricted range of applicability. By their nature, they are difficult to export outside the laboratory.

One limitation that can undermine our conclusions is the employment of a single measure to tap implicit attitudes in the three studies presented above. It is well known that there are several different measures to assess implicit attitudes such as the Implicit Association Test (IAT) (Greenwald & Banaji, 1995), the Affective Priming Task (Fazio, Sanbonmatsu, Powell, & Kardes, 1986), the Semantic Priming Task (Wittenbrink, Judd, & Park, 1997), or the Affect Misattribution Procedure (AMP) (procedure used in our research). It has also been found that the structural characteristics of these techniques are so different that correlations between them are low, which is odd given that they are supposed to tap into the same underlying construct (Bosson, Swann, & Pennebaker, 2000; Fazio & Olson, 2003). It is for this reason that replications of the studies presented in this paper are necessary which utilize other techniques to measure implicit attitudes in order to confirm the validity of these results. Another potential limitation is that the order of presentation of implicit and explicit measures was not counter-balanced. The reason for this decision was that, while the objective of the implicit measures was hidden, except for the third study, this was not the case of explicit measures. Thus, answering first the explicit measures could have provided participants with clues regarding the objective of the next implicit ones. Given the small size of the sample, we took the decision of presenting first the explicit measures. However, counter-balancing the presentation will add additional strength to future replications of these studies. Finally, another limitation of our studies is represented by the very small sample size that is biased in favor of women.

References

Bohner, G., & Dickel, N. (2011). Attitudes and attitude change. *Annual Review of Psychology, 62*, 391-417. doi:10.1146/annurev.psych.121208.131609

Bosson, J. K., Swann, W., & Pennebaker, J. W. (2000). Stalking the perfect measure of implicit self-esteem: The blind men and the elephant revisited? *Journal of Personality and Social Psychology, 79*, 631-643. doi:10.1037/0022-3514.79.4.631

Buhrmester, M. D., Blanton, H., & Swann, W. B. (2011). Implicit self-esteem: Nature, measurement, and a new way forward. *Journal of Personality and Social Psychology, 100*, 365-385. doi:10.1037/a0021341

Chun, W. Y., & Kruglanski, A. W. (2006). The role of task demands and processing resources in the use of base-rate and individuating information. *Journal of Personality and Social Psychology, 91*, 205-217. doi:10.1037/0022-3514.91.2.205

Cunningham, W. A., Preacher, K. J., & Banaji, M. R. (2001). Implicit attitudes measures. Consistency, stability, and convergent validity. *Psychological Science, 12*, 163-170. doi:10.1111/1467-9280.00328

Dambrun, M., & Guimond, S. (2001). La théorie de la privation relative et l'hostilité envers les Nord-Africains. *Revue Internationale de Psychologie Sociale, 14*, 57-89.

Devine, P. G. (1989). Stereotypes and prejudice: Their automatic and controlled components. *Journal of Personality and Social Psychology, 56*, 5-18. doi:10.1037/0022-3514.56.1.5

Dhar, R., Nowlis, S. M., & Sherman, S. M. (2000). Trying hard or hardly trying: An analysis of context effects in choice. *Journal of Consumer Psychology, 9*, 189-200. doi:10.1207/S15327663JCP0904_1

Dijker, A. J., & Koomen, W. (1996). Stereotyping and attitudinal effects under time pressure. *European Journal of Social Psychology, 26*, 61-74. doi:10.1002/(SICI)1099-0992(199601)26:1<61::AID-EJSP737>3.0.CO;2-#

Drolet, A., & Luce, M. F. (2004). The rationalizing effects of cognitive load on emotion-based trade-off avoidance. *The Journal of Consumer Research, 31*, 63-77. doi:10.1086/383424

Echebarria Echabe, A., & Fernández Guede, E. (2007). A new measure of anti-Arab prejudice: Reliability and validity evidence. *Journal of Applied Social Psychology, 37*, 1077-1091. doi:10.1111/j.1559-1816.2007.00200.x

Echebarria Echabe, A., & Fernández Guede, E. (2006a). Effects of terrorism on attitudes and ideological orientation. *European Journal of Social Psychology, 36*(2), 259-265. doi:10.1002/ejsp.294

Echebarria Echabe, A., & Fernández Guede, E. (2006b). Crossed-categorization and stereotypes: Class and ethnicity. *Revue Internationale de Psychologie Sociale, 19*, 81-102.

Fazio, R. H. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 75–109). San Diego, CA: Academic Press.

Fazio, R. H., & Olson, M. A. (2003). Implicit measures in social cognition research: Their meaning and uses. *Annual Review of Psychology, 54*, 297-327. doi:10.1146/annurev.psych.54.101601.145225

Fazio, R. H., Chen, J.-m., McDonel, E. C., & Sherman, S. J. (1982). Attitude accessibility, attitude–behaviour consistency, and the strength of the object–evaluation association. *Journal of Experimental Social Psychology, 18*, 339-357. doi:10.1016/0022-1031(82)90058-0

Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of Personality and Social Psychology, 50*, 229-238. doi:10.1037/0022-3514.50.2.229

Fazio, R. H., & Towles-Schwen, T. (1999). The MODE model of attitude – Behavior processes. In S. Chaiken & Y. Trope (Eds.), *Dual process theories in social psychology* (pp. 97–116). New York: Guilford.

Fiske, S. T., Cuddy, A. J. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology, 82*(6), 878-902. doi:10.1037/0022-3514.82.6.878

Gailliot, M. T., & Schmeichel, B. J. (2006). Is implicit self-esteem really unconscious? Implicit self-esteem eludes conscious reflection. *Journal of Articles in Support of the Null Hypothesis, 3*, 73-83.

Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin, 132*, 692-731. doi:10.1037/0033-2909.132.5.692

Gawronski, B., & Bodenhausen, G. V. (2007). Unraveling the processes underlying evaluation: Attitudes from the perspective of the APE model. *Social Cognition, 25*, 687-717. doi:10.1521/soco.2007.25.5.687

Gawronski, B., & Sritharan, R. (2010). Formation, change, and contextualization of mental associations: Determinants and principles of variations in implicit measures. In B. Gawronski & B. K. Payne (Eds.), *Handbook of implicit social cognition: Measurement, theory, and applications* (pp. 216-240). New York: Guilford Press.

Gawronski, B., LeBel, E. P., & Peters, K. R. (2007). What do implicit measures tell us? Scrutinizing the validity of three common assumptions. *Perspectives on Psychological Science, 2*, 181-193. doi:10.1111/j.1745-6916.2007.00036.x

Gilbert, D. T., Pelham, B. W., & Krull, D. S. (1988). On cognitive busyness: When person perceivers meet persons perceived. *Journal of Personality and Social Psychology, 54*, 733-740. doi:10.1037/0022-3514.54.5.733

Gilbert, D. T., & Hixon, J. G. (1991). The trouble of thinking: Activation and application of stereotypic beliefs. *Journal of Personality and Social Psychology, 60*, 509-517. doi:10.1037/0022-3514.60.4.509

Gilbert, D. T. (1989). Thinking lightly about others: Automatic components of the social inference process. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 189-211). New York: Guilford Press.

Gilbert, D. T. (1998). Ordinary personology. In S. T. Fiske & G. Lindsay (Eds.), *The handbook of social psychology* (Vol. 2, pp. 89-150). New York: McGraw-Hill.

Gilbert, D. T., McNulty, S. E., Giuliano, T. A., & Benson, J. E. (1992). Blurry words and fuzzy deeds: The attribution of obscure behavior. *Journal of Personality and Social Psychology, 62*, 18-25. doi:10.1037/0022-3514.62.1.18

Gordijn, E. H., Koomen, W., & Stapel, D. A. (2001). Level of prejudice in relation to knowledge of cultural stereotypes. *Journal of Experimental Social Psychology, 37*, 150-157. doi:10.1006/jesp.2000.1443

Greenwald, A. G., & Banaji, M. R. (1995). Implicit social cognition: Attitudes, self-esteem, and stereotypes. *Psychological Review, 102*, 4-27. doi:10.1037/0033-295X.102.1.4

Greenwald, A. G., Poehlman, T. A., Uhlmann, E. L., & Banaji, M. R. (2009). Understanding and using Implicit Association Test: III: Meta-analysis of predictive validity. *Journal of Personality and Social Psychology, 97*, 17-41. doi:10.1037/a0015575

Hofmann, W., De Houwer, J., Perugini, M., Baeyens, F., & Crombez, G. (2010). Evaluative conditioning in humans: A meta-analysis. *Psychological Bulletin, 136*, 390-421. doi:10.1037/a0018916

Hofmann, W., Gawronski, B., Gschwendner, T., Le, H., & Schmitt, M. (2005). A meta-analysis on the correlation between the Implicit Association Test and explicit self-report measures. *Personality and Social Psychology Bulletin, 31*, 1369-1385. doi:10.1177/0146167205275613

Jones, C. R., Fazio, R. H., & Olson, M. A. (2009). Implicit misattribution as a mechanism underlying evaluative conditioning. *Journal of Personality and Social Psychology, 96*, 933-948. doi:10.1037/a0014747

Karpinski, A., Steinman, R. B., & Hilton, J. L. (2005). Attitude importance as a moderator of the relationship between implicit and explicit attitude measures. *Personality and Social Psychology Bulletin, 31*, 949-962. doi:10.1177/0146167204273007

Kruglanski, A. W., & Freund, T. (1983). The freezing and unfreezing of lay-inferences: Effects on impressional primacy, ethnic stereotyping, and numerical anchoring. *Journal of Experimental Social Psychology, 19*, 448-468. doi:10.1016/0022-1031(83)90022-7

Lambert, A. J., Payne, B. K., Ramsey, S., & Shaffer, L. M. (2005). On the predictive validity of implicit attitude measures: The moderating effect of perceived group variability. *Journal of Experimental Social Psychology, 41*, 114-128. doi:10.1016/j.jesp.2004.06.006

Lemm, K., & Banaji, M. (1999). Unconscious attitudes and beliefs about women and men. In U. Paseo & F. Braun (Eds.), *Wahrnehmung und Herstellung von Geschlecht* [Perceiving and performing gender] (pp. 215-223). Opladen: Westdeutscher Verlag.

McConahay, J. (1986). Modern racism, ambivalence, and the modern racism scale. In J. F. Dovidio & S. L. Gaertner (Eds.), *Prejudice, discrimination, and racism* (pp. 91-125). San Diego: Academic Press.

Moscovici, S. (1961). *La psychanalyse, son image et son public*. Paris: Presses Universitaires de France.

Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2002). Math = male, me = female, therefore math is not equal to me. *Journal of Personality and Social Psychology, 83*, 44-59. doi:10.1037/0022-3514.83.1.44

Olson, M. A., Fazio, R. H., & Hermann, A. (2007). Reporting tendencies underlie discrepancies between implicit and explicit measures of self-esteem. *Psychological Science, 18*, 287-291. doi:10.1111/j.1467-9280.2007.01890.x

Payne, B. K., Burkley, M. A., & Stokes, M. B. (2008). Why do implicit and explicit attitude test diverge? The role of structural fit. *Journal of Personality and Social Psychology, 94*, 16-31. doi:10.1037/0022-3514.94.1.16

Payne, B. K., Cheng, C. M., Govorun, O., & Stewart, B. D. (2005). An inkblot for attitudes: Affect misattribution as implicit measurement. *Journal of Personality and Social Psychology, 89*, 277-293. doi:10.1037/0022-3514.89.3.277

Peters, K. R., & Gawronski, B. (2011). Are we puppets on a string? Comparing the impact of contingency and validity on implicit and explicit evaluations. *Personality and Social Psychology Bulletin, 37*, 557-569. doi:10.1177/0146167211400423

Perugini, M. (2005). Predictive models of implicit and explicit attitudes. *The British Journal of Social Psychology, 44*, 29-45. doi:10.1348/014466604X23491

Shiv, B., & Fedorikhin, A. (1999). Heart and mind in conflict: The interplay of affect and cognition in consumer decision making. *The Journal of Consumer Research, 26*, 278-292. doi:10.1086/209563

Stangor, C., Sullivan, L. A., & Ford, T. E. (1991). Affective and cognitive determinants of prejudice. *Social Cognition, 9*, 359-380. doi:10.1521/soco.1991.9.4.359

Trope, Y., & Alfieri, T. (1997). Effortfulness and flexibility of dispositional judgment processes. *Journal of Personality and Social Psychology, 73*, 662-674. doi:10.1037/0022-3514.73.4.662

Trope, Y. (1986). Identification and inferential processes in dispositional attribution. *Psychological Review, 93*, 239-257. doi:10.1037/0033-295X.93.3.239

Wilson, T. D., Lindsey, S., & Schooler, T. (2000). A model of dual attitudes. *Psychological Review, 107*, 101-126. doi:10.1037/0033-295X.107.1.101

Wittenbrink, B., Judd, C. M., & Park, B. (2001). Evaluative versus conceptual judgments in automatic stereotyping and prejudice. *Journal of Experimental Social Psychology, 37*, 244-252. doi:10.1006/jesp.2000.1456

Wittenbrink, B., Judd, C. M., & Park, B. (1997). Evidence for racial prejudice at the implicit level and its relationship with questionnaire measures. *Journal of Personality and Social Psychology, 72*, 262-274. doi:10.1037/0022-3514.72.2.262

Zanna, M. P., & Fazio, R. H. (1982). The attitude–behavior relation: Moving toward a third generation of research. In M. P. Zanna, E. T. Higgins, & C. P. Herman (Eds.), *Consistency in social behavior: The Ontario Symposium* (Vol. 2, pp. 283–301). Hillsdale, NJ: Lawrence Erlbaum.

About the Author

Agustin Echebarria Echabe is professor of Social Psychology at the University of the Basque Country. Teacher of social psychology since 1985, he is specialized on studies about stereotypes, prejudice, social representations, and gender identity.