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When you already made up your mind,
But you don't know it yet.

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To my parents

Ai miei genitori

Contents

Summary of the work 1

Italian summary of the work 3

GENERAL INTRODUCTION

1. How implicit measures developed 9
2. The Implicit Association Test and the Single Category Implicit Association Test: two measures of Implicit Social Cognition 12
3. What do implicit measures actually detect? 17
4. How to use implicit and explicit measures 21
5. Summary of the work 22

CHAPTER 1: THE PREDICTIVE VALIDITY OF THE IAT

1.1. Introduction 27

1.2. Study 1: The 2005 Italian Local Elections 30

1.2.1. Overview and main hypotheses 30

1.2.2. Method 31

1.2.3. Results 33

1.2.4. Discussion 35

CHAPTER 2: A DEEPER LOOK AT THE ROLE OF IMPLICIT AND EXPLICIT ATTITUDES OF DECIDED AND UNDECIDED INDIVIDUALS

2.1. Introduction 39

2.2. Study 2: The bill on *the facto* relationships 42

2.2.1. Overview and main hypotheses 42

2.2.2. Method 43
2.2.3. Results 45
2.2.4. Discussion 50
2.3. Study 3: The enlargement of the U.S. military base in Vicenza 51
2.3.1. Overview and main hypotheses 51
2.3.2. Method 52
2.3.3. Results 54
2.3.4. Discussion 61
2.4. General discussion 62

CHAPTER 3: THE STRATEGIES AT THE BASIS OF FUTURE DECISIONS OF DECIDED AND UNDECIDED INDIVIDUALS

3.1. Introduction 65
3.2. Study 4: The 2008 Italian General Election 68
3.2.1 Overview and main hypotheses 68
3.2.2 Method 70
3.2.3 Results 71
3.2.4 Discussion 76
3.3. Study 5: The bridge over the Straits of Messina 77
3.3.1. Overview and main hypotheses 77
3.3.2. Method 79
3.3.3. Results 80
3.3.4. Discussion 94
3.4. General discussion 95

GENERAL CONCLUSIONS

1. On the basis of what undecided people make their decisions 99
2. What are the possible strategies by which automatic associations and conscious beliefs influence future decisions? 101
3. Unresolved issues and future researches 103

4. Some conclusive reflections 105

REFERENCES 107

APPENDIXES

Appendix 1 117
Appendix 2 119
Appendix 3 121
Appendix 4 123
Appendix 5 125

Summary of the work

In five studies, we are going to investigate the differential impact of automatic mental associations and consciously held beliefs on future choices by individuals who claim to be decided versus undecided.

In the first study, we are going to demonstrate that it is possible to detect the implicit preference of individuals who define themselves as undecided prior to a political vote, by means of the Implicit Association Test (Greenwald, McGhee, Schwartz, 1998). This technique, even if considered a reliable measure of the automatic mental associations, so far has not been applied to undecided individuals.

In the second study, we are going to investigate in a deeper way the explicit judgements of individuals who claim to be undecided, providing evidence that they show at level of consciously held beliefs a pattern of propositions that don't allow participants to reach a definite choice. At the same time, they manifest at level of implicit preference a set of defined and well structured mental associations that are perfectly related to future decisions.

The results of the third study are going to demonstrate that automatic associations of individuals who self-reported being undecided about a controversial political issue predict future choices and changes in consciously reported beliefs over a period of one week. Conversely, in the case of resolute decision makers, consciously reported beliefs predict future choices and changes in automatic associations over the same period.

In the fourth and the fifth study we are going to try to have a first look at a possible strategy by which conscious beliefs of decided individuals consolidate themselves and influence automatic associations in the course of time. The achieved results suggest that conscious beliefs have a strong influence on selective choice of information, and we are going to demonstrate that selective exposure plays a partial mediation role in consolidating of conscious beliefs of decided people. Moreover, we are going to obtain indirect evidence that also the

relationship between conscious beliefs and automatic associations should be in part mediated by selective choice of information. On the other hand, this strategy does not occur in the case of undecided people.

The overall findings will be discussed in the general conclusions, stressing their important implications for social sciences which aim at predicting future choice decisions of public interest.

Italian summary of the work

In cinque studi indagheremo il differente ruolo che le associazioni mentali automatiche e le credenze consapevoli giocano nel determinare le future scelte di coloro che riguardo ad una controversa questione di carattere politico sociale o prima di una tornata elettorale si definiscono certi della scelta che realizzeranno, oppure dichiarano di non aver ancora maturato una decisione definitiva.

Da un punto di vista concettuale, le associazioni mentali automatiche sono non intenzionali, non sono controllabili e possono essere attivate al di fuori della consapevolezza dell'individuo (Bargh, 1994; Gawronski, Bodenhausen, 2006). Tali associazioni automatiche vengono generalmente contrapposte alle credenze consapevoli, che possono essere descritte come quei contenuti mentali che un individuo esprime intenzionalmente e in in seguito ad una attenta e accurata valutazione (Strack, Deutsch, 2004; Gawronski, Bodenhausen, 2006). La misurazione delle associazioni automatiche si è resa possibile grazie allo sviluppo delle così dette misure implicite che consentono di inferire opinioni, credenze, atteggiamenti e intenzioni delle persone a partire dalla rilevazione dei tempi di risposta dei partecipanti in compiti di categorizzazione o di decisione lessicale che vengono svolti grazie all'ausilio del computer. Le credenze consapevoli vengono invece misurate utilizzando strumenti espliciti di self-report come i questionari di atteggiamento o i sondaggi d'opinione.

Nel primo capitolo saranno presentati i risultati dello Studio 1 in cui abbiamo indagato la validità predittiva dell'Implicit Association Test (Greenwald, McGhee, Swartz, 1998), dimostrando che, nel caso di partecipanti che prima di una tornata elettorale dichiarano di non aver ancora maturato una scelta definitiva, consente di anticipare il comportamento che realizzeranno il giorno delle elezioni.

Nel secondo capitolo discuteremo i risultati dello Studio 2 e dello Studio 3. Con lo Studio 2, analizzando in maniera più approfondita i giudizi espliciti delle persone che si dichiarano indecise, saremo in grado di mettere in luce che le

credenze consapevoli sono effettivamente costituite da un insieme di proposizioni contrastanti. Tali strutture d'atteggiamento esplicito, da un lato sono la ragione per cui il partecipante non è in grado di esprimere una scelta chiara e dall'altro non consentono di predire la decisione che successivamente verrà realizzata. Allo stesso tempo, i partecipanti indecisi hanno fatto emergere a livello implicito un insieme di associazioni automatiche già strutturate, che si sono rivelate stabili nel tempo e coerenti con la decisione realizzata a distanza di una settimana.

Grazie ai risultati dello Studio 3 dimostreremo che le associazioni automatiche di coloro che si dichiarano indecisi rispetto ad una controversa questione di carattere politico sociale predicono in maniera univoca le scelte future e i cambiamenti nell'atteggiamento esplicito dopo un periodo di una settimana. Al contrario, nel caso di coloro che si dichiarano decisi, sono le credenze consapevoli che predicono in maniera univoca le scelte future e i cambiamenti nelle associazioni automatiche dopo uno stesso periodo di tempo.

Con il terzo capitolo, proveremo a dare un primo sguardo ad una possibile strategia attraverso cui le credenze consapevoli delle persone decise si consolidano e influenzano le associazioni automatiche nel tempo. I risultati dello Studio 4 e dello Studio 5 consentiranno di dimostrare che il processo di esposizione selettiva è una strategia primariamente proposizionale e gioca un ruolo di mediazione parziale nel consolidamento delle credenze consapevoli delle persone decise. All'opposto, questa strategia sembra non realizzarsi nel caso delle persone indecise.

Tutti questi risultati saranno discussi nelle conclusioni generali, dove si cercherà di sottolinearne le importanti implicazioni per le scienze sociali che mirano a predire le future decisioni delle presone riguardo a questioni di pubblico interesse.

General introduction

Political surveys have to deal systematically with the recurrent problem of undecided voters. Indeed, at each political survey a significant proportion of respondents report that they have not developed yet any clear voting preference. Even few months before the election rates of 20% or more of undecided voters are not uncommon (Mannheimer, 2003; Perry, 1979). For instance, in the Italian context, fifteen days before the 2006 General Election, around 10% of respondents were unable to report for whom they would have voted if the election had to be held the following day. In addition, data indicate that most of these undecided respondents came to a decision only a few days before the vote, if not the very same day of the election while they were in the polling booth (Barisone, & Mannheimer, 1999).

Despite the numerical relevance of this part of the electorate, there is not a full understanding of the psychological processes yet that characterize their route from uncertainty to the expression of a vote. Empirical research in social cognition has not directly tackled this issue yet. At each election, we know the socio-demographic characteristics of undecided voters. We read results of surveys conducted in order to investigate which influence exerts on voting preferences the individuals' identification with a particular social group, or which behavioral rules may derive from this relationship. We know the results of studies conducted in order to detect the meaning that people attribute to their voting behavior. For example, Quattrone and Tversky (1984) proposed the idea that people vote because they think that their own decision to vote is more diagnostic of the decisions of like-minded others (for example, supporters of the same party or candidates) than of the decisions of others (supporters of competing parties or candidates). On the other hand, not much is known about decision processes that ultimately lead undecided individuals to vote for one candidate or the other.

The present work is going to investigate the differential impact of automatic mental associations and consciously held beliefs on future decisions by individuals who claim to be decided versus undecided. Conceptually, automatic mental associations are those ones that come to mind unintentionally, that are difficult to control once they have been activated, and that may not necessarily be

endorsed at a conscious level (Bargh, 1994; Gawronski & Bodenhausen, 2006). Such automatic associations are often contrasted by consciously held beliefs which can be described as mental contents that an individual explicitly endorses as accurate (Strack & Deutsch, 2004; Gawronski & Bodenhausen, 2006). A better understanding of implicit and explicit components of attitudes among undecided people could be helpful if seen under different points of view.

The first one could provide a new perspective into the study of decision-making processes. For a long time the goal of the research on decision-making was mainly addressed to develop normative models in which decision was considered as a very rational process aimed at maximizing the expected utility (Edwards, 1961), or based on a given individual weighting of the information acquired during the phase of deliberation about the available options (Ajzen, 1991; Gollwitzer, 1999; Strack & Deutsch, 2004). Anyway, already during the Seventies, some researchers showed that the rational and normative models of decision-making were inadequate not only to describe but also to predict individuals' future behavior. For example, Kahneman and Tversky (2000) investigated the psychological principles that are at the basis of the development, perception and evaluation of available options, showing that people do not always make the same choices under the same conditions. In fact, preferences vary considerably according to the way the issue is presented (framing): Consequently there are not uncommon instances in which different representations of the same problem give rise to completely opposite decisions. In addition, because of the limitations of cognitive capacity (Simon, 1956), the estimates of subjective probability easily differ from the normative values and decisions often follow rules that have little to do with utility maximization (Coombs, 1975; Kahneman & Tversky, 1979).

A widespread assumption that characterizes the most recent studies on social cognition is that many aspects of human behavior and a lot of judgements that individuals express on their relationships may occur spontaneously as outcomes of the automatic processes. These automatic processes are difficult to control, and they may not necessarily be endorsed at a conscious level (Johnson & Hasher, 1987). Starting from this assumption and using participants automatic

mental associations as a pipeline to detect implicit preference toward two political candidates or a controversial political issue, we are going to demonstrate that, despite a verbal report of uncertainty, undecided individuals nevertheless show automatic associations that are almost perfectly related to future decisions.

Second, individuals who describe themselves as undecided between two choice options show at level of consciously held beliefs a pattern of propositions that, being inconsistent and equally distant from the two options, prevents them from expressing a clear judgement, and from choosing one option over the other. So, by definition, undecided individuals don't have an 'attitude' about a specific object. The investigation of the differential impact of automatic mental associations and consciously held beliefs on future choices by individuals who claim to be decided versus undecided could be a different and original way to understand and detect the underlying evaluative processes that are accountable for the development of attitudes. In this way, we are going to have the opportunity to provide new and interesting insights able to improve the available results into this intriguing and tricky matter of social psychology.

This issue, in addition to its theoretical relevance, has also several practical implications for social sciences that aim at predicting future choice decisions of public interest, whose one of the most intriguing examples is the prediction of voting decision. In fact, uncertain voters confound the predictions derived from surveys, and introduce a significant error component. According to the pre-electoral surveys, in many cases an indication of how these undecided voters will find a personal political decision, may substantially improve the electoral forecast. Therefore, it would become crucial to employ measurement tools aimed at detecting the likely future voting behaviors of those who report to be undecided.

1. How implicit measures developed

The studies on attitudes represent one of the most intriguing, and, at the same time, tricky matter of social psychology. For a long time, social psychologists inferred the direction and the strength of attitudes from the way

people expressed their beliefs and subsequently behaved: Up to now attitudinal judgements are assessed by means of measures which are based on standard self-report on survey methodology. Apart from the satisfaction for several results achieved, during the past forty years a significant amount of studies into the relationship between attitudes and behaviors have shown that data taken from more consolidated tools for detection of attitudes, such as the traditional techniques proposed by Thurstone (1928) or Likert (1932), often produced biased estimates, and did not always guarantee a satisfactory predictive validity. In other words, what people reported about their attitudes did not always anticipate consistently the way they would have really behaved. For example, most of the work on prejudice (Dovidio & Gaertner, 1998) demonstrated that there were two kinds of result: On the one hand, during the years there has been a decline in self-reported prejudice against minority groups; on the other hand, discriminations against these stigmatized social groups have unfortunately persisted. Pettigrew showed that white American participants who self-reported being egalitarian with respect to members of minority groups on the contrary displayed to be embarrassed when they had to shake hands with black people. Other studies showed that participants who expressed full acceptance towards members of stigmatized social groups displayed non-verbal behaviors that could clearly be interpreted as hostile when they had to interact with members of black minority.

How can we explain these results? Researchers had to admit that the expression of individuals' opinions and attitudes is often affected by social desirability of the proposed matter. According to this view, a first possible explanation is that people may control their self-reported responses in order to show a positive image of themselves and in order to adapt to normative context: Individuals intentionally adjust their self-reports such that their beliefs appear more socially acceptable. In this way, the monitored attitudes turn out inconsistent compared with the real future behaviors.

A second fine and intriguing explanation is based on the hypothesis that people sometimes may not be conscious of their thoughts and evaluations, and then they may not be able to describe the reliable contents of their attitudes. In

other words, people do not often act in accordance with what they believe to think, but they act in accordance with those outcomes of processes or mental associations that are often automatic and inaccessible to conscious introspection.

One fruitful line of research focused on both automatic processes and affective responses that arise when the perceiver encounters or thinks about a specific object. It is now clear that affective responses may arise in an automatic way without any need of consciously thinking or ruminating about the properties of the stimulus, and they may deeply impact on future behaviors and decisions (Zajonc, 1980).

The investigation of these spontaneous affective responses has become particularly relevant because attitudes are conceived as simple object-evaluation associations (Fazio, 2001). Moreover, the efficiency of the automatic retrieval of the evaluation depends on the strength of the associative links (accessibility). The higher is the accessibility of the evaluative responses (for example, a fast and efficient retrieval from memory), the stronger is their influence on subsequent cognitive processes and behaviors.

This hypothesis has been nicely demonstrated by Fazio and Williams (1986) in the course of the 1984 presidential elections in the United States. The authors asked participants to evaluate a number of political topics and to report how much, according to their opinion, Reagan and Mondale could be judged as good candidates for the presidential office. Significantly, the latencies between the end of a question and the response were collected as an index of accessibility, and they were indeed predictive of the coherence between the expressed judgement and the vote: The faster was the response, the higher was the coherence between the expressed judgement and the subsequent voting behavior.

Starting from this fruitful line of research about the role of spontaneous and automatic responses, researchers designed a new class of measures, defined “implicit” or “indirect” measures, in order to provide a less biased estimate of attitudes and cognitions, and to improve the results obtained by traditional questionnaire measures.

These measurement techniques are able to detect the automatic responses of participants. They are based on the analysis of the spontaneous evaluations

which occur when exemplars of different social categories are associated to positive or negative concepts, and allow inferences about respondents' true opinions, beliefs and attitudes. Moreover, implicit measures are able to disclose participants' mental representations even if no direct question is asked to them about their attitudes. In this way, they are less affected by deception and social desirability.

2. The Implicit Association Test and the Single Category Implicit Association Test: Two measures of Implicit Social Cognition

Several implicit measures of attitudes are now available in the literature. Examples of these measures are: The affective priming task (Fazio, Sanbonmatsu, Powell, & Kardes, 1986), the semantic priming tasks (Wittembrink, Judd, & Park, 1997), the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998), the Go/No-Go Association Task (Nosek & Banaji, 2001), and the Extrinsic Affective Simon Task (De Houwer, 2003). Among these instruments, we will briefly consider the two measures that we used on the studies that we are going to present in the course of the next chapters.

The Implicit Association Test (IAT, Greenwald et al., 1998) has emerged in the last few years as the most popular, frequently used, and most carefully tested technique. This instrument is a computer-based, speeded categorization task, in which no direct question is asked to participants about their attitudes.

Participants are asked to discriminate stimuli belonging to four different categories. For instance, in a study assessing spontaneous political preferences, to the participants may be presented pictures of left- and right-wing candidates together with positive and negative words. In the initial two blocks of trials of the IAT, participants are required to categorize either evaluative words on the basis of their valence (block 1) or political candidates on the basis of their political membership (block 2). Stimuli appear in the middle of the screen one after the other until participants will give their answer. Participants have to categorize them using two response keys as quickly as possible. These two initial blocks of trials basically are necessary to learn the meaning of each response key. The

third block is a combination of the previous two phases and participants have to perform a double categorization task. While the evaluative words and the pictures of political candidates are presented on the screen one after the other randomly, participants are required to categorize words as 'good' or 'bad' and political candidates as 'left-wing' or 'right-wing' politicians. The same response key has to be used, for example, either for positive words or for left-wing politicians, whereas another response key has to be pressed to categorize either negative words or right-wing politicians. If the respondents' attitude toward left-wing politicians is positive, the task will be relatively easy since evaluatively congruent concepts have to be mapped together on the same response key. On the other hand, participants with right-wing political beliefs will find the task more difficult to perform, and this will result in an increased number of errors as well as in longer response latencies. Generally, when the task requires to press the same response key for two concepts that are already associated in the mental representation of the participants the performance will be facilitated. In addition, such facilitation tends to increase as soon as the mental association becomes stronger. In the fourth block of trials of the IAT, participants have to categorize again pictures of political candidates but the response key assignment is reversed in comparison to the second block. So, the fourth block is a learning phase in order to allow participants to familiarize with the new response keys. In the fifth and last block, participants have to perform again a double categorization task. This time, however, the association between evaluative words and political leaders is reversed with respect to the third block. If in the third block left-wing politicians shared the same response key with positive words, they now share the same response key with negative words, whereas the opposite holds true for right-wing politicians.

A score of preference for left-wing politicians or right-wing politicians is calculated by means of the D-algorithm (Greenwald, Nosek, & Banaji, 2003). The D-algorithm compares the extent to which performance on incompatible trials, established on the basis of an arbitrary rule determined by the experimenter (for example, the fifth block in which the pictures of left-wing politicians and the negative words share the same response key), is impaired with relationship to the

performance on compatible trials (for example, the third block in which pictures of the left-wing politicians and positive words share the same response key), taking into account participant's individual response latencies, standard deviations of latencies, and error rates in each of the two critical blocks.

The rationale underlying the IAT measure is quite straightforward. As already said, if two concepts, such as 'left-wing' and 'positive', are associated in the respondent's cognitive representation, and these two concepts share the same response key, then the categorization task will be easier, as compared to the task in which the two concepts are mapped through different response keys.

Several researchers have argued that implicit measures provide an index of a certain attitude even though participants are not aware of the fact that the attitude can be measured. Actually, there are studies showing that a substantial number of participants are aware of the purpose of the IAT (for example, Monteith, Voils, & Ashburn-Nardo, 2001). On the other hand, it is also true that these same studies strongly suggest that an IAT effect can be found also in those participants who are unaware of what the IAT really measures. Other researchers (Fazio & Olson, 2003) have argued that participants have no control over the measurement outcome. Actually, existing research shows that participants can fake IAT effects under certain conditions (see also Asendorpf, Banse, & Mücke, 2002; Banse, Seise, & Zerbes, 2001; Egloff & Schmukle, 2002; Kim, 2003; Lowery, Hardin, & Sinclair, 2001). Nevertheless, in a study conducted by Steffens (2004) participants completed the same IAT at two measurement occasions, and were given faking instructions before completing the second IAT. The author found that there was a significant correlation between the scores of participants on the first IAT (when participants were not asked to fake) and the scores on the second IAT. This result strongly suggests that participants are unable to control completely their true attitudes when asked to hide them. In any case, there is no doubt that the IAT effects are less susceptible to faking than the traditional questionnaire measures.

Furthermore, because of the indirect nature of the IAT, the respondent does not need to be aware of the mental representations under investigation, because

IAT performance does not rely on conscious introspection, so that it is generally dissociated from controlled and verbally reported attitudes.

Thus far, the IAT has been applied to the study of attitudes toward several different social groups and issues (for example, Amodio & Devine, 2006; Dasgupta & Rivera, 2006; Knowles & Peng, 2005), toward the self (for example, Bosson, Swann, & Pennebaker, 2000), or toward physical objects like consumer goods (for example, Brunel, Tietje, & Greenwald, 2004). Most importantly for our purposes, it has also proved to be useful in the investigation of political attitudes. For instance, Nosek and his colleagues (Nosek, Banaji, & Greenwald, 2002) applied the IAT to a study on the polls of 2000 American Presidential election demonstrating that this instrument is highly sensitive to the respondents' preference for one of two presidential candidates (see also Knutson, Wood, Spampinato, & Grafman, 2006).

The positive features of the IAT concern several aspects. Beside the ease of implementation, the IAT has very good psychometric properties and it usually displays higher levels of reliability if compared to other implicit measurement techniques (Cunningham, Preacher, & Banaji, 2001). In addition, it is sensitive to individual differences (for example, Greenwald et al., 1998) so that IAT-measured attitudes may be used to predict individual behaviors (see Asendorpf et al., 2002; Hofmann, Gschwendner, Castelli, & Schmitt, 2008; McConnell & Leibold, 2001).

One of the limits of the IAT is that it examines the extent to which complementary pairs of concepts are associated with complementary pairs of attributes. So, it is able to provide an index of the relative strengths of pairs of associations. In other words, the IAT informs us only about the strength of the associations between, for example, the target concept 'flowers' and the attribute concepts 'positive' and 'negative' compared with the strength of the associations between the target concept 'insects' and the attribute concepts. The IAT score only indicates if one evaluates flowers more positively than insects, or viceversa. It cannot reveal the evaluative associations with a single target concept. Unfortunately, there are some circumstances in which the individuation of a complementary target concept is quite difficult or absolutely impossible. For example, we could be interested in having a measure of participants' evaluative

associations regarding the enlargement of a military base in their city. Using an IAT, we may propose the target concept 'military base', but we do not have a contrast concept able to ensure a right measure of the relative strengths of the evaluative associations. How can we do? Several implicit measures have been developed to detect evaluative associations with a single attitude object (De Houver, 2003; Nosek & Banaji, 2001; Wittembrink, Judd & Park, 1997). Unfortunately, these measures have shown a low reliability (Bosson, et al., 2000; De Houwer, 2003; Nosek & Banaji, 2001; Olson & Fazio, 2003).

In 2006, Karpinski and Steinman proposed a modified variant of the IAT that eliminated the need for the second contrast category.

The Single Category IAT is a computer-based, speeded categorization task, in which participants have to perform only two blocks of trials instead of the five ones required by the IAT. Participants are presented with stimuli (words or pictures) related to the target concept as well as positive and negative words. Target stimuli and attribute words are presented in random order in the middle of the screen. In both blocks of trials, participants have to categorize evaluative words on the basis of their valence and words or pictures representing the target concept using two response keys as quickly as possible. In the first block, the same response key has to be used, for example, for both positive words and pictures representing a brand of wine, whereas another response key has to be pressed to categorize only negative words. In the second block, the association between evaluative words and pictures representing the target concept is reversed with respect to the first block. So, negative words and pictures representing a brand of wine now share the same response key and positive words have to be classified pressing the other response key.

The advantage of the Single Category IAT is that the task participants have to perform, the stimuli used and the way the effect is calculated are similar to the much more used IAT. This technique proves to be sensitive to individual differences and displays good levels of validity (Bluemke & Friese, 2008; Karpinski & Steinman, 2006; Wigboldus, Holland & van Knippenberg, 2005). The reliability of the Single Category IAT is similar to the reliability typically observed for the corresponding standard IAT (Greenwald et al., 2003; Karpinski & Steinman,

2006; Nosek, Greenwalk, & Banaji, 2005) and higher than the reliability of the other implicit measures (Bosson et al., 2000; Olson & Fazio, 2003). This instrument also shows satisfactory internal consistencies and higher correlations with explicit measures than corresponding IAT (Karpinski & Steinman, 2006; Penke, Eichstaedt, & Asendorpf, 2006). For instance using 'positive' versus 'negative' as attribute categories and 'me' as target category Karpinski and Steinman (2006) showed that a self-esteem Single Category IAT was significantly correlated with an explicit self-esteem measure, whereas a self-esteem IAT (using identical attribute categories and 'me' versus 'others' as target categories) showed non-significant implicit-explicit correlations. Moreover, the correlation between the Single Category IAT and the explicit measure was larger than correlations typically observed between implicit and explicit measures of self-esteem (Bosson et al., 2000; Greenwald & Farnham, 2000). Finally, Karpinski and Steinman (2006) demonstrated that participants can fake a Single Category IAT, but they are likely to make many errors, and then they can be easily excluded from the analyses.

3. What do implicit measures actually detect?

The use of implicit measures has certainly introduced a revolutionary change of perspective in the scientific literature of social psychology. Beyond the methodological enrichment, this field has also experienced the emergence of significant theoretical debates.

As we said above, researchers have argued that, contrary to traditional explicit measures, implicit measures provide an index of a certain attitude even though participants are not aware of the fact that the attitude can be measured (see also Brunel et al., 2004), and they have no control over the measurement outcome (e.g. Fazio & Olson, 2003). More importantly, because implicit measures provide the access to those automatic mental associations that are often difficult to assess with traditional explicit measures, they have been sometimes conceived as a measure of implicit attitudes described as "introspectively unidentified traces

of past experiences that mediate favourable or unfavourable feeling, thought, or action toward social objects" (Greenwald & Banaji, 1995). Is it true that implicit measures are able to seize those attitudes that we cannot explore through the introspection and a careful recording of our reactions to the attitude object? What are the existing evidences about the unconscious aspects of indirect assessed attitudes?

Social psychologists have known for long that people are not always aware of the causal origin of their attitudes. Kunst-Wilson and Zajonc (1980), for example, showed that individuals who were subliminally presented with polygons, had a more positive attitude toward those polygons than toward other polygons not (subliminally) seen before. At the same time, participants were not able to spot the causes at the root of their preference. Despite these and other interesting results (for example, Dijksterhuis, 2004; Wilson, Dunn, Kraft, & Lisle, 1989; Wilson, Lisle, Schooler, et al., 1993), it is nevertheless true that lack of awareness about the origin of a particular attitude is not a discriminating feature between indirectly assessed attitudes and self-reported attitudes. In fact, both implicit and explicit measures may be characterized by a lack of source awareness (see also Gawronski, Hoffmann, & Wilbur, 2006; Olson & Fazio, 2003;). For example, using self-report measures, Liberman and colleagues (2001) demonstrated that choosing between two equally attractive objects can influence post decisional attitudes toward these objects even when participants have no explicit memory of their choice. On the other hand, awareness of the origin of a given attitude is not limited to self-reported attitudes, but can also characterize indirectly assessed attitudes (for example, Gawronski, Walther, & Blank, 2005).

Another problem is the greater or lesser awareness of the attitude itself: I cannot know why I prefer an octagon compared to another, or I can give explanations of my preference that are not consistent with the real underlying causes (Wilson et al., 1989), but this does not clearly mean that I'm unaware of what is the octagon I like more. And this, even though the studies conducted by Wilson and Schooler (1991) suggest that careful considerations about the causes that lie behind an attitude do not always lead to good judgements and evaluations.

The most convincing empirical evidence of the existence of attitudes of which people are not consciously aware is often represented by low correlations between attitudes detected by indirect measures, and the same attitudes monitored by means of traditional explicit measures (see also Cunningham, Nezlek, & Banaji, 2004; Jost, Pelham & Carvallo, 2002; Phelps, O'Connor, Cunningham et al., 2000; Rudman, Greenwald, Mellot, & Schwartz, 1999). However, these results cannot be considered a satisfactory evidence that indirectly assessed attitudes are really unconscious and that individuals are unaware of them. In fact, a significant number of factors are answerable for the low correlations sometimes found between implicit and explicit measures. Specifically, empirical research suggests that indirectly assessed attitudes may not correspond with self-reported attitudes when cognitive, motivational, or methodological factors undermine their impact on explicit self-reports (see Gawronski, Hoffmann, & Wilbur, 2006). In fact, there are cases in which low correlations between implicit and explicit measures are due to the inadequate reliability that characterizes many indirect measures. If the measurement of error component is too high, then we cannot expect stable correlations with other measures. In other cases, low correlations between implicit and explicit measures are due to the variables measured. Indirect measures detect the affective component of the attitude: For example, an IAT designed to assess implicit self-evaluations detects the strength of the automatic associations between the self-concept and positive and negative words. Instead, self-report on survey methodologies are primarily based on respondents' conscious beliefs regarding the attitude object (in our example, the self). In line with this view, for example, Hoffman, Gawronski and colleagues (2005) have shown that the IAT measure generally displays higher correlations with affective as compared to cognitive self-report measures.

It is also important to underline that most of the work on prejudice has shown that the expression of individuals' attitudes is often affected by social desirability of the proposed matter: Individuals intentionally adjust their questionnaire responses in order to show a positive image of themselves and in order to adapt to normative context. In line with this view, in their meta-analysis

Hoffmann, Gawronski and colleagues (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005) pointed out that the higher is the respondents' spontaneity on their self-reports the higher is the correlation between self-reported and indirectly assessed attitudes. Another motivational factor is cognitive deliberation. For example, Florack and colleagues (2001) demonstrated an influence of *need for cognition* on the relationship between an IAT reflecting favourability toward Turks compared with Germans, and subsequent judgements of a Turkish juvenile delinquent. Conversely, participants less incline to engage in effortful cognitive processing showed higher correlations between self-reported and indirectly assessed evaluations.

To sum up the results depicted above, when can we find stable correlations between implicit and explicit measures? When individuals are motivated to disclose their attitudes; when individuals have not to deeply deliberate about the sources of their attitudes; when individuals do not try to adjust their self-reports; when the measures used display good levels of reliability and validity; and, finally, when the variables measured by explicit measures are identical to the variables detected by indirect measures. Given all of these conditions (Gawronsky, Hoffmann, & Wilbur, 2006), individuals are able to have introspective access to their attitudes, as assessed by indirect measures.

A different and intriguing instance is represented by the unawareness of the influence a given attitude has on spontaneous behavior, or on other psychological processes. Some researchers (for example, Gawronski, Geschke, & Banse, 2003; Nisbett & Wilson, 1977; Wegner & Petty, 1997; Wilson & Brekke, 1994) demonstrated that people may be often unaware of the way in which their indirectly assessed attitudes are able to influence the interpretation of ambiguous information or the correction of a particular social judgement even when individuals are motivated and able to control this influence.

Several other researchers (for example, Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997; McConnel, & Leibold, 2001) have demonstrated that the more negative is the attitude regarding members of black minority, and the more is frequent the number of non-verbal behaviors clearly interpreted as hostile in a subsequent interaction with black people. Beyond these results, the available

literature clearly shows that spontaneous behaviors are better predicted by indirectly assessed attitudes than by self-reported attitudes, whereas deliberate behaviors are better predicted by self-reported attitudes than by indirectly assessed attitudes.

To summarize the empirical evidence about the three possible unconscious aspects of attitudes, and to answer the initial question of this paragraph, we can conclude that the unique aspect that characterizes indirectly assessed attitudes with regard to self-reported attitudes is that the first ones are able to influence spontaneous behaviors and other psychological processes outside of conscious awareness; more importantly, in some processes such influences are unique to indirectly assessed attitudes.

4. How to use implicit and explicit measures

According to Gawronski and Bodenhausen's APE model (2006), we believe that indirectly assessed attitudes differ from self-reported attitudes with regard to their underlying evaluative processes. The authors claim that implicit attitudes are those automatic affective reactions which result from the particular associations that are automatically activated when an individual encounters a relevant object. On the contrary, explicit attitudes are evaluative judgments based on syllogistic inferences; these syllogistic inferences derive from any kind of propositional information considered relevant for a given judgement. Moreover, if a given affective reaction is explicitly endorsed depends on its subjective validity. In fact, the reflective system is assumed to transform inputs from the associative store into a propositional implication. The consistency of this proposition with other propositions that are temporarily considered to be relevant for the judgement determines its perceived validity. If the propositional implication is consistent with the other relevant propositions, it will be considered valid and will be used as the basis for the evaluative judgement. However, if the propositional implication of an automatic affective reaction is inconsistent with one or more relevant propositions, the resulting inconsistency among these propositions may bring about: (i) a rejection of the affective reaction as a valid basis for the evaluative judgement; or (ii) a preservation of the affective reaction as a valid

basis for the evaluative judgement after that one or more propositions are rejected or considered invalid in order to resolve such inconsistency. This conceptualization implies that the evaluative reactions reflected in implicit measures are accessible to conscious introspection, but these evaluations may not be reflected in explicit self-reports when they are deliberately rejected as a valid basis for an evaluative judgement.

In line with this claim, from a methodological point of view, in our studies we are going to use implicit and explicit measures jointly in order to reach two potentially different and temporally confused aspects (automatic associations on the one hand, and conscious beliefs on the other hand) of the attitude about a specific object. Beside that, we believe that only using implicit and explicit measures jointly it is possible to achieve more clear and comprehensive results, capable to provide useful insights about aspects that neither indirectly assessed attitudes, nor self-reported attitudes alone would be able to catch.

5. Summary of the work

In five studies, we are going to investigate the differential impact of automatic mental associations and consciously held beliefs on future choices by individuals who claim to be decided versus undecided.

In the first chapter, we are going to present the results of Study 1. They demonstrate that it is possible to detect the implicit preference of individuals who define themselves as undecided prior to a political vote, by means of the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998). This technique, even if considered a reliable measure of the automatic mental associations, so far has not been applied to undecided individuals.

In the second chapter, we are going to have a deeper look at the role played by implicit and explicit attitudes in future decisions of decided and undecided individuals. Specifically, the aim of Study 2 was to investigate the explicit judgements of individuals who claim to be undecided. The obtained results provide evidence that undecided decision makers show at level of consciously held beliefs a pattern of propositions that don’t allow participants to reach a

definite choice. At the same time, they manifest at level of implicit preference a set of defined and well structured mental associations that are perfectly related to future decisions. The results of the third study are going to demonstrate that automatic associations of individuals who self-reported being undecided about a controversial political issue predict future choices and changes in consciously reported beliefs over a period of one week. Conversely, in the case of resolute decision makers, consciously reported beliefs predict future choices and changes in automatic associations over the same period.

In the third chapter we are going to try to have a first look at a possible strategy by which conscious beliefs of decided individuals consolidate themselves and influence automatic associations in the course of time. The achieved results of Study 4 and Study 5 suggest that conscious beliefs have a strong influence on selective choice of information, and we are going to demonstrate that selective exposure plays a partial mediation role in consolidating of conscious beliefs of decided people. Moreover, we are going to obtain indirect evidence that also the relationship between conscious beliefs and automatic associations should be in part mediated by selective choice of information. On the other hand, this strategy does not occur in the case of undecided people.

The overall findings will be discussed in the general conclusions, stressing their important implications for social sciences which aim at predicting future choice decisions of public interest.

Chapter 1:

The predictive validity of the IAT

1.1. Introduction

Strack and Deutsch (2004) have recently developed a theoretical model in which implicit and explicit attitudes interact influencing behavior. The two authors argue that behaviors are controlled by two systems, which follow different functioning rules and principles; at the same time, they are closely interrelated. The reflexive system is characterized by mental representations based on propositions and analytical principles that are rational, intentional and conscious; the impulsive system is an associative network that follows automatic, intuitive, and unconscious principles. The reflexive system brings about behavioral decisions based on a close deliberation about expected cost-benefits of each behavioral option; conversely, the impulsive system leads to spontaneous behaviors that are defined by motivational guidance and the strength of automatic associations activated. According to this model, implicit measures predict spontaneous behaviors and automatic gestures better than explicit measures do, while explicit self-reports better provide a measure of controlled behaviors.

Even though starting from a different perspective, Fazio and Olson (2003) also argued that implicit measures are helpful in predicting spontaneous and uncontrolled behavior. Implicit measures are better able to predict behavior performed in situations where individuals are not motivated or do not have the opportunity to control the impact of automatically activated attitudes than explicit self-reports.

Given that the IAT is able to detect the automatic responses which occur when exemplars of social categories are associated to positive or negative concepts, it should better allow the prediction of more spontaneous and less controllable behavior than explicit measures. On the other hand, we should find that controlled behaviors are better predicted by self-reports than by IAT.

In line with this view, Asendorpf, Banse & Mücke, (2002) have found a significant correlation between spontaneous behaviors indicating shyness and the strength of the associations between the self and shyness measured by an IAT.

More interestingly, the IAT proved to be moderately correlated with self-reports, while these explicit measures were not able to predict participants' spontaneous behavior.

Egloff and Schumkle (2002) have compared the predictive validity of an explicit anxiousness measure (STAI) and an anxiousness IAT with regard to the level of participants' anxiety during a stressful speech. Participants were asked to perform an IAT designed to assess their automatic evaluative associations between the self and anxiety, and then they completed an explicit anxiousness measure. Immediately afterwards, participants were instructed to make a good impression in a job application scenario. After the stressful speech, participants were finally asked to rate their state anxiety during the speech. The results showed that the anxiousness IAT correlated with several behavioral indicators of anxiety during the stressful speech, whereas the explicit anxiousness measure only accounted for participants' self reported state of anxiety during the speech. Moreover, there was a significant correlation between IAT scores and the experimenter judgement regarding participants' level of anxiety during the job application scenario.

Other researchers have presented evidence that the IAT measure outperforms explicit measures in the domain of stereotyping and prejudice. For example, McConnel and Leibold, (2001) have found significant correlation between a race IAT measuring attitudes toward Black and White and participants' spontaneous non-verbal behaviors indicating prejudice against Blacks. In this study, participants interacted with a white experimenter, and then were asked to complete a set of explicit measures of prejudice and a race IAT. Immediately afterwards, participants interacted with a black experimenter. Both experimenters rated the interaction, as the judges, who examined videotapes of the interactions, did. The results showed the IAT measure well correlated with the experimenters and the judges' assessments of the quality of participants' interactions with the black versus the white experimenter. In addition, a variety of different non-verbal behaviors indicating prejudice during the interaction with the black experimenter (including speaking time, less smiling, less eye contacts, hesitations in speech) were associated with the IAT scores. Finally, the IAT

measure showed a low correlation with the standard self-reports measures of prejudice used.

Beyond these evidences, in recent investigations the IAT have been found to correlate with many measures of interest, and IAT-measured attitudes have been used to predict several individual behaviors such as alcohol consumption in the course of a month (Wiers, van Woerden, Smulders, & de Jong, 2002), or phobic reactions to spiders in spider-phobic sufferers (Teachman & Woody, 2003).
Other studies showed correlations between the relative favorability of sodas versus juices and self-reported frequency of drinking the two classes of beverages in the past, between IAT scores concerning high versus low-calorie foods and self-reports of past eating behavior (Maison, Greenwald, & Bruin, 2001), or between an IAT designed to assess implicit preference toward two political candidates and future voting behavior (Arcuri, Castelli, Galdi et al., 2008).

In a recent meta-analysis, Poehlman (Poehlman, Uhlmann, Greenwald , & Banaji, 2007) found compelling evidence for the predictive validity of the IAT across various other behavioral domains. This review demonstrates that, only for socially sensitive topics, such as racial and other intergroup behavior, predictive validity of IAT measures significantly exceeded predictive validity of self-report measures. Moreover, IAT measures have displayed higher levels of reliability as compared to other implicit measurement techniques (for example, Cunningham, Preacher, & Banaji, 2001) On the other hand, Hoffman, Gawronski and colleagues (2005) have shown that the IAT measure generally displays higher correlations with affective as compared to cognitive self-report measures.

Together, these findings reveal that the IAT shows evidence for good levels of predictive validity, specifically in domains that are hardly guided by conscious control or that are susceptible to social desirability concerns. They also suggest to use IAT and self-report measures jointly as predictors of behavior. Even though the relative predictive validity of the two classes of measures varies considerably across domains, each measure generally provides a gain in relative predictive validity with respect to the use of the other alone.

1.2. Study 1: The 2005 Italian Local Elections

1.2.1. Overview and main hypotheses. Results from a recent study of Lodge & Taber (2005) and from a review on the use of the implicit measures in the field of political attitudes (Burdein, Lodge & Taber, 2006) confirmed the automaticity of responses toward political leaders, parties, and political issues. More specifically, they demonstrated that the activation of consistent responses and the inhibition of inconsistent responses were stronger in the case of participants with more polarized attitudes and with more sophisticated political ideas. Taken together, these studies strongly suggest that there may be important differences across individuals in the automatic mental associations activated by political matters, and that these differences may be predictive of individuals' behavior (Fazio & Williams, 1986).

This last aspect was the starting point of a study conducted by Arcuri and colleagues (2008) during the Italian National Political Elections of May 2001, in which they investigated the validity of the IAT as an instrument for the prediction of voting behavior of those who have a clear preference at the moment of the administration of the test. The results indicated that automatic mental associations of decided participants were almost perfectly related to subsequent voting behavior. Even more interestingly, a clear relationship emerged among automatic mental associations of voters that did not express any explicit preference for one of the two opposing candidates at the moment of the pre-electoral interview, and their subsequent voting behavior.

The latest result is particularly interesting: It provides support for the hypothesis of the presence of well structured mental associations in the cognitive maps of those voters who at an explicit level deny any preference for one of the two candidates. It was shown that these embryonic attitudes may be detected through an implicit measurement technique, the IAT, and that what was measured was not just random noise. Indeed, these automatic associations were highly related to actual voting behavior, performed approximately four weeks later.

A limit of that analysis consists in the small number of undecided respondents who took part in the study. Therefore, the aim of the present study was to provide a more specific investigation of automatic mental associations of those voters who describe themselves as still undecided in a pre-electoral interview, and in addition to investigate the validity of the IAT as an instrument able to predict the electoral choice of those voters. Hence, only voters who described themselves as 'undecided' were eligible for this study in which, one month before the election, the relative implicit preference for one of the two leading candidates was detected, and after the election day the true voting behavior recorded.

Giancarlo Galan (the right–wing candidate) and Massimo Carraro (the left–wing candidate) were the competitors in the Political Local Election held in Veneto (Italy) in April 2005. A sample of voters was contacted for a pre-electoral interview, approximately 4 weeks before the election. Participants were administered an IAT in order to assess their relative preference for the two political leaders, and they were asked to send to researchers after the election day the indication of their real vote. This allowed us to test the relationship between implicit preference, assessed through the IAT, and subsequent voting behavior.

The hypothesis was that undecided individuals, despite a verbal report of uncertainty, should nevertheless express different automatic associations toward the two candidates. More specifically, these spontaneous associations should be predictive of the future voting behavior.

1.2.2. Method

Participants

Several hundred people were contacted and asked if they had already made their voting decision, that is if they could identify a preferred candidate in the case the election had to be held the following day. When participants were approached, they were informed that we didn't want to know for whom they intended to vote, but only if they had already made up their decision, and that only those who described themselves as 'undecided' were eligible for the study. In

this way, we could be confident that the sample included at that point only real uncertain voters. In fact, those who usually describe themselves as 'undecided' in order to conceal their political position could easily hide it by simply answering 'yes' to the initial sentence, and hence becoming not eligible for the study.

Fifty-eight undecided voters were recruited approximately one month before the Local Election. All participants lived in the urban districts of Padova (Italy). In order to guarantee complete anonymity no socio-demographic data were collected. Anonymity was further guaranteed by using numerical codes rather than names for the classification of experimental records. Participants were tested individually, and no gifts or money were given to them.

Procedure

At the beginning of the session (Time 1), to participants who self-reported being undecided for the coming election was assigned a different numerical code, and then they were submitted to an IAT to assess their implicit preference either for Galan (the right-wing candidate) or for Carraro (the left-wing candidate). For the target categories, the IAT used the labels *Massimo Carraro* and *Giancarlo Galan*; for the attribute categories, the labels were *positive* and *negative*. Pictures of the two candidates were used as target stimuli, together with 6 positive and 6 negative words (Appendix 1). On each trial of the task, an attribute word or a picture appeared in the middle of the screen until participants gave their response. The inter-trial interval was 150 ms long. Incorrect responses were highlighted by a red cross which remained in the middle of the screen for 200 ms. Participants were instructed to respond as fast and accurately as possible.

The structure of the IAT was based on five blocks of trials. Two of these, the critical blocks, were presented to participants for the assessment of the relative preference for the left-wing candidate or the right-wing candidate. In one of these blocks participants were randomly presented with 40 trials (20 trials for the evaluative words, and 20 trials for the target pictures), and they were asked to classify the pictures of the left-wing candidate Carraro and the positive words using the same response key (D), and the pictures of the right-wing candidate Galan and the negative words using the other response key (K). In the other

critical block, participants were again randomly presented with 40 trials, but the association between leaders and valence was reversed, so the pictures of Carraro and the negative words had to be classified with one key (K), and the pictures of Galan and the positive words with the other (D). The order of the two critical blocks was counterbalanced among participants to avoid order effects (see Greenwald et al., 1998).

Three simple categorization blocks completed the procedure and were administered to allow participants to learn the response modes, according to the indications of Greenwald et al. (1998). In each of these simple blocks, participants were randomly presented with 20 training trials and they were asked to discriminate either between positive and negative words, or between stimuli related to Carraro and those related to Galan.

Then to participants was given a short questionnaire on their voting behavior and a stamped addressed envelope asking them to complete and send it back to the researchers after the election day indicating their true vote (Time 2).

The numerical code assigned to participants at the beginning of the session was used to identify their performance in the IAT and it was written on the questionnaire they sent back by post. This enabled the researchers to match participants' IAT performances to their questionnaire responses.

1.2.3 Results

Fifty-one participants sent back the questionnaire reporting their voting behavior after the election day. Thirteen of them voted for Galan, the right-wing candidate, and 24 voted for Carraro, the left-wing candidate. The remaining 14 participants either did not go to the polls (8 participants) or expressed a choice for some other candidate (6 participants). These two categories of participants were excluded from the analyses.

The final sample consisted of 37 participants. For each respondent, a Diat index of preference for 'Giancarlo Galan' or 'Massimo Carraro' was computed according to Greenwald, Nosek and Banaji (2003). Specifically, the Diat index was based on the difference between mean latency of reaction times in the task

associating Giancarlo Galan with the positive valence, and the task associating Massimo Carraro with the positive valence, computed after having excluded values outside the 300-3000 ms window and substituted these values with the mean latency of the block penalized by 600 ms. This difference was divided by the pooled standard deviation of all latencies in the two critical blocks. The Diat index was computed so that higher values indicated an implicit preference for Massimo Carraro, and lower values indicated an implicit preference for Giancarlo Galan.

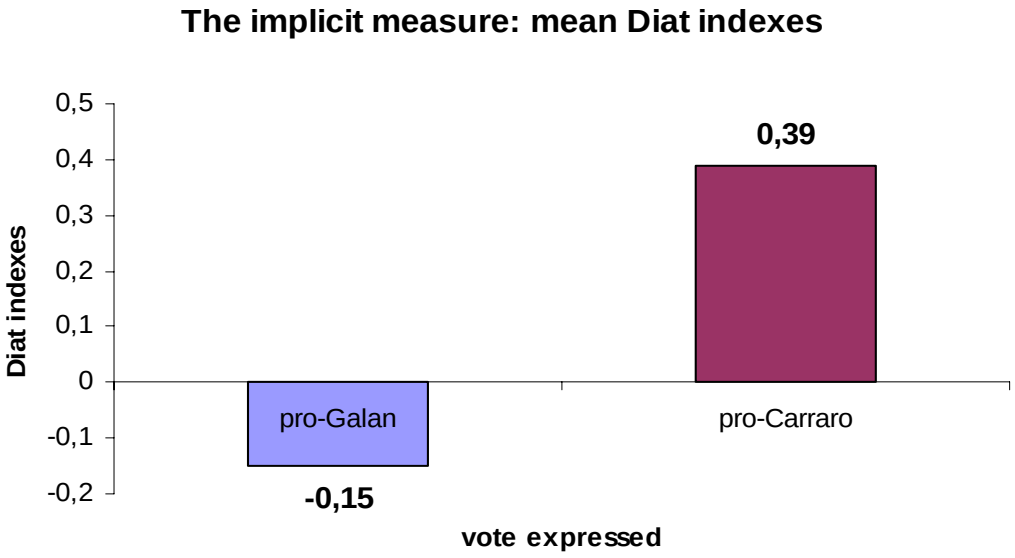
Since preliminary analyses showed that the order of administration of the two critical tasks did not significantly influence the Diat index, this factor was not considered in the subsequent analyses.

As expected, even though participants stated that they had not decided yet how they would have voted, the Diat index of those voting for the right-wing candidate was on the lowest average, while the Diat index of those voting for the left-wing candidate was on the highest. The mean Diat index for each group is presented in Figure 1.

An analysis of variance was conducted on the Diat index, considering voting behavior (either they voted for Carraro, or Galan) as between participants factor. The results indicated that the mean Diat indexes of these two categories were significantly different, [$F(1,35) = 6.652$, $p = .01$, $\eta^2 = .160$].

To investigate further the relations of automatic associations to future voting behavior, participants' true vote at Time 2 was regressed onto automatic associations at Time 1. Results showed that the voting behavior was significantly predicted by automatic associations at Time 1 [$t_{(35)} = 2.58$, $p = .01$]. The adeguacy of the model and its predictive power support the predictive validity of automatic associations, assessed through the IAT, on future voting behavior even among undecided voters.

Figure 1: Mean Diat index for participants who voted for Galan and for participants who voted for Carraro.



1.2.4. Discussion

The main goal of this study was to verify if it is possible to detect the implicit preferences of people who define themselves as undecided before a political vote, by means of the IAT. This technique, even if considered a reliable measure of the automatic mental associations, so far has not been applied to undecided individuals.

The results of this study showed the existence of implicit political preferences in the attitudinal system of undecided voters. These automatic associations were congruent with the political choices that were subsequently expressed, approximately one month later, during the vote. The adeguacy of the model, and its predictive power, were tested by examining the relationships between automatic mental associations, recorded at least four weeks before the election day, and the true vote realized on election day. The obtained results clearly confirm the hypothesis, according to which the implicit preference for one of the

two competing political candidates is a significant predictor of the electoral choice of undecided individuals. The predictive power of the index achieved through the implicit measurement technique was beyond all expectations, and the IAT demonstrated to have a reasonable level of sensitivity to record differences in implicit preferences. More importantly, these differences are related to future voting behavior.

This study expands the previous findings in an important way, showing that automatic responses may indeed arise even for those respondents who are not able to report any preference for one of the candidates. What also emerges here is that those automatic associations that seem to be not accessible to consciousness can play a very important role in decision-making.

These results further underline the importance of automatic associations. Critically, in the case of undecided voters, implicit preferences move unrecognized by their holders, nevertheless it is proved they are highly related to subsequent voting behavior.

Chapter 2:

A deeper look at the role of implicit and explicit attitudes of decided and undecided individuals

2.1. Introduction

Over the past few years, a variety of different models of attitudes have been proposed (see also, Fazio & Olson, 2003; Greenwald & Banaji, 1995; Strack & Deutsch, 2004; Wilson, Lindsey, & Schooler, 2000) in order to account for the differential impact of implicit and explicit attitudes on human behavior. Among these model, we considered the recent Gawronski and Bodehausen' s Associative-Propositional Evaluation model (2006) particularly useful for the aim of our studies. Starting from the widespread definition of attitude as a psychological tendency to evaluate a given object with some degree of favor or disfavor (see also Eagly & Chaiken, 1993; Zanna & Rempel, 1988), the two authors argue that this psychological tendency has its roots in two kinds of mental processes, that are qualitatively different but closely interrelated among them: The associative and propositional processes.

The *associative processes* give rise to affective reactions that result from particular mental associations which are automatically activated when an individual encounters a specific object. These affective reactions arise irrespective of the fact that the individual considers them as appropriate or not.

The *propositional processes*, instead, are involved in the validation of evaluations and beliefs. Specifically, they transform the inputs from the associative system into propositional implications, and lead to evaluative judgments based on a rational processing of validation of affective reactions. In fact, the perceived validity of the propositional implication of a given affective reaction depends on its consistency with any kind of propositional information that is temporarily considered to be relevant for the judgement. If a given automatic affective reaction is transformed into a propositional implication that is consistent with the other propositions temporarily considered, it will be accepted as valid and, then, it will be used as a basis for the evaluative judgement.

If however this propositional implication is inconsistent with one or more propositions considered relevant for the judgement, such inconsistency will be overcome (i) by rejecting the affective reaction as a valid basis for the evaluative

judgement; or (ii) preserving the affective reaction as a valid basis for the evaluative judgement after one or more propositions are rejected; or (iii) preserving the affective reaction as a valid basis for the evaluative judgement after one or more relevant propositions are considered invalid.

Therefore, implicit attitudes reflect those automatic affective reactions which result from the particular associations that are automatically activated when an individual encounters a specific object; on the contrary, explicit attitudes are those evaluative judgments resulting from a rational and conscious processing of validation of automatic affective reactions and beliefs.

Given these assumptions, it follows that implicit an explicit attitudes regarding the same attitudinal object may also differ. This instance occurs every time that the propositional implication of a given affective reaction is rejected as a valid basis for an evaluative judgement.

Another interesting consequence of these assumptions is that the concept of attitude change has a different meaning for the associative and the propositional system. The evaluative judgments resulting from propositional processes are not determined a priori. The truth value of a given propositional implication depends on its consistency with those propositions that are considered relevant at the moment in which the evaluative judgement has to be expressed. What and how many judgement-relevant propositions an individual considers can vary depending on various factors (for example, the degree of cognitive processing). It follows that explicit attitudes are constructed on the spot. On the other hand, despite these sources of variability, explicit attitudes may also show a good degree of stability; it occurs when the set of propositions the individual considers relevant to express a specific evaluative judgement is consistent across the contexts.

On the contrary, in the case of associative processes, it is the specific association which is automatically activated when the individual meets a given object that determines the affective reaction. According to the authors, the same attitude object is associated with different concepts in the memory. Which ones of these mental associations are activated depend on the particular context in which the specific object is encountered. It follows that the same attitude object may

activate different associative patterns and, consequently, different affective reactions depend on the particular context in which the object is encountered. Once again, however, associative evaluations may also be stable in the course of time and across the contexts; it occurs when the activation patterns elicited by a specific attitude object are stronger than others.

We've briefly outlined the general assumptions of this model, because we consider this conceptualization of implicit and explicit attitudes a useful, suitable conceptual and methodological tool with regard to the aim of our studies.

From a methodological point of view, the APE model implies that the evaluative reactions reflected in implicit measures are accessible to conscious introspection, but these evaluations may not be reflected in explicit self-reports. In line with this claim, the joint use of implicit and explicit measures may provide more clear and comprehensive results and it may reveal aspects that neither indirectly assessed attitudes, nor self-reported attitudes alone would be able to catch.

From a theoretical point of view, the APE model provides us a useful starting point to define the uncertainty state. Automatic associations on the one hand, conscious beliefs on the other hand, may be conceived as two potentially different and temporally confused aspects of the attitude about a specific object. In line with this view, we suggest that a situation of uncertainty should be characterized by a set of defined and well structured automatic associations toward the attitudinal object that is not reflected in explicit self reports. The propositional system, in fact, is composed of a set of propositional information, relevant for the judgment, that are not able to validate affective reactions. In other words, the considered propositions that among them could be relevant for the judgement are inconsistent in the sense that they are all equally valid and invalid, they are all equally distant from the choice options, preventing propositional processes from a rational and conscious processing of validation of automatic affective reactions and conscious beliefs. Under these conditions, a clear evaluative judgement cannot be expressed.

At the same time, future decisions of undecided individuals can be predicted by measuring their current automatic associations. Specifically,

starting from earlier research on biased information processing that shows that automatic mental associations can influence the processing of new information in an assimilative manner and outside of conscious awareness (Gawronski, Geschke, & Banse, 2003; Gawronski, Hofmann, & Wilbur, 2006; Hugenberg & Bodenhausen, 2003), our idea is that automatic associations of undecided individuals could distort the processing of new information (for example, by means of selective processing or biased interpretation) in the course of time, so future decisions, that are based on such distorted information, will be in line with previously existing automatic associations. This case contrastes with future choices made by decided individuals, which are expected to be guided by consciously held beliefs about choice options rather than by automatic mental associations.

2.2. Study 2: The bill on the facto relationships

2.2.1. Overview and main hypotheses. The assessment of uncertainty is essentially based on self-reports: Respondents indicate an internal state of indecision that prevents them from choosing one option over the other. Therefore, they should be considered from a logical point of view equally distant from the two options. In accordance to what was observed in Study 1, individuals who describe themselves as 'undecided' between two choice options should show at level of consciously held beliefs a pattern of inconsistent propositions which make them unable to reach a definite choice. At the same time, they should reveal, at level of implicit preference, a set of defined and well structured different mental associations toward the two proposed options that can play a very important role in decision-making. In fact, results from Study 1 demonstrated that these differences are related to future decisions.

The first aspect, as above depicted, was the starting point of this research, in which we deeper investigated the explicit attitudinal judgements of individuals who claim to be undecided.

A sample of participants was recruited for a period going from the end of March to the end of May 2007. We assessed their consciously held beliefs about a bill on *the facto* relationships using a survey, and their automatic mental associations regarding '*the facto* relationships' as opposed to 'traditional families' using an IAT. We selected this topic because it implied a complex judgement and it should be able to generate conflict between religious and political beliefs, producing a more complex system of propositions at level of conscious beliefs. In this way, we could have had a clearer picture of the implicit and explicit component of participants' attitude. A personal decision (in favor, or against the bill) was also registered.

The main hypothesis was that future choices of undecided individuals should be at a significant extent determined by their earlier automatic associations with conscious beliefs being unrelated with future decisions.

2.2.2. Method

Participants

A total of 80 participants took part in the study. Data from eighteen participants had to be excluded from the analyses. Seven participants did not finish the questionnaire measure at Time 1; eleven additional participants showed more than 25% errors in at least one of the two combined blocks of the IAT performance. The final sample consisted of 32 male and 30 female (46 decided and 16 undecided participants at the time of the first measurement), whose age ranged from 18 to 65 years. They lived in different urban districts of Padova (Italy). Participants were tested individually at two measurement occasions, which were held one week apart for all participants. No credits, gifts or money were given to them.

Procedure

To each participant was given a different numerical code, which was used to match their responses to the different measures at Time 1 and Time 2.

At the beginning of the first session (Time 1), participants were asked to read a brief evaluatively neutral description of the bill, and than to complete an IAT to assess their implicit preference for *the facto* relationships over traditional families. For the target categories, the IAT used the labels *the facto relationships* and *traditional family*; for the attribute categories, the labels were *positive* and *negative*. Specifically, four pictures of *the facto* relationships and four pictures of traditional families represented the target stimuli; five positive and five negative words represented the evaluative dimension (Appendix 2). The inter-trial interval was 150 ms long. Incorrect responses were highlighted by a red cross which remained on the screen for 200 ms. In one of the two critical blocks, participants were randomly presented with 40 trials (20 trials for the evaluative words, and 20 trials for the target pictures), and they were asked to classify pictures representing *de facto* relationships and positive words using the same response D key, and pictures representing traditional families and negative words using the K key. In the other critical block, participants were again randomly presented with 40 trials, but pictures of *de facto* relationships and negative words had to be classified with the K key, and pictures of traditional families and positive words with the D key. The order of administration of these two critical double-categorization blocks was counterbalanced among participants to avoid order effects.

Participants were subsequently asked to indicate their personal decision (if they were in favor of the bill, undecided, or against the bill), and to complete a survey including questions about their political and religious beliefs, and two items (ranging from 0 to 10) particularly designed to assess their conscious beliefs about the bill.

The order of the implicit and explicit measures was counterbalanced across participants. At the end of the first session, undecided participants were invited to think about the topic during the next week in order to try to clarify their opinion and to express a definite choice at the end of the second session.

One week later (Time 2), all participants were contacted again and invited to complete the same IAT and to indicate their personal decision (in favor of the bill or against the bill) a second time.

At the end of the second session, participants were thanked and fully debriefed.

2.2.3. Results

For each respondent, a Diat index of preference for '*de facto* relationships' or 'traditional families' was computed (according to Greenwald et al. 2003) such as higher values indicated a more positive implicit evaluation of the *de facto* relationships. After that, the Diat indexes were z-standardized.

Responses to survey items were averaged to provide an overall index of participants' conscious beliefs regarding the bill. These two items were combined so that a higher score indicated more positive conscious beliefs about the bill, and a lower score indicated more negative conscious beliefs. The internal consistency of the resulting score was reasonably high with Cronbach's Alpha value of .80.

Since the order of administration of the two critical blocks did not significantly influence the Diat index, and the order of administration of the implicit and explicit measures did not significantly influence the results, these two factors were not considered in the subsequent analyses.

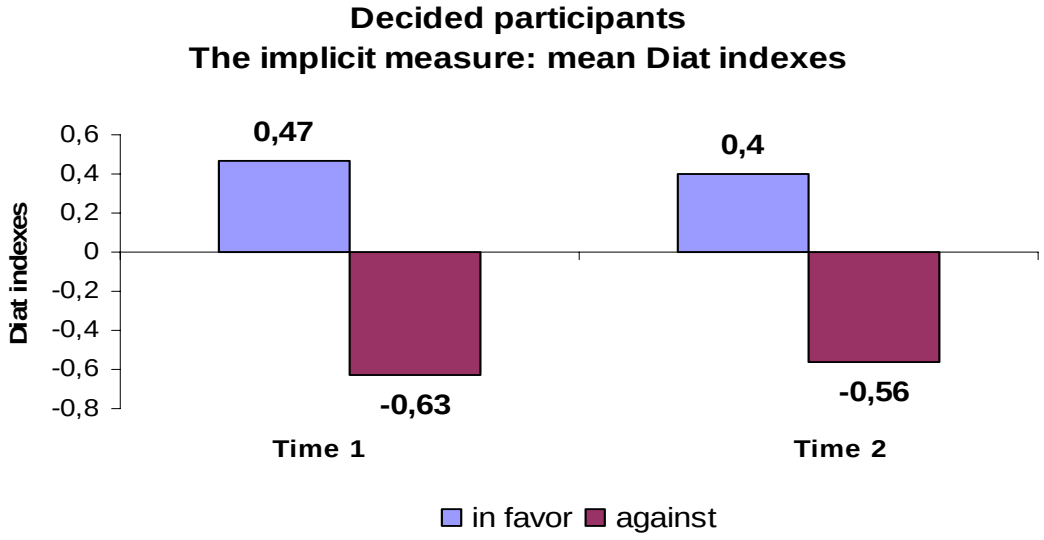
Decided participants. Nineteen participants were against the bill, and twenty-seven in favor of the bill, both at Time 1 and Time 2.

An analysis of variance was carried out on the Diat indexes at Time 1 and Time 2 entering the decision (in favor, or against the bill) as between-participants factor. Results showed that the Diat indexes of those who were in favor and those who were against the bill were significantly different both at Time 1 [$F(1,44) = 20.168$, $p < .001$, $\eta^2 = .314$] and Time 2 [$F(1,44) = 12.882$, $p = .001$, $\eta^2 = .226$]. The mean Diat index for each group is presented in Figure 1. A correlation analysis between the IAT at Time 1 and the IAT at Time 2 revealed a significant stability of implicit associations ($r = .72$, $p < .001$).

As expected, those who described themselves to be in favor of the bill showed a higher mean survey score, and those who described themselves to be against the bill had a lower mean survey score. The mean survey scores are presented in Figure 2. An analysis of variance was conducted on the survey

scores, considering the choice (if they were in favor, or against the bill) as between participants factor. Results indicated that the mean scores of these two categories were significantly different [F(1,44) = 38.32; p < .001, η2 = .466].

Figure 1: Mean Diat index (standardized) for decided participants who were in favor or against the bill.



To further investigate the relationships of automatic associations and conscious beliefs to future decisions, participants' choices at Time 2 (in favor or against) were regressed into automatic associations and consciously held beliefs at Time 1 (Fig. 3). Results showed that decisions at Time 2 were primarily predicted by consciously held beliefs [$t(33) = 4.56$, $p < .001$], with automatic associations at Time 1 being significantly related, though to a lesser extent, to future choices [$t(43) = 2.60$, $p = .013$].

Figure 2: Mean survey score for decided participants who were in favor or against the bill.

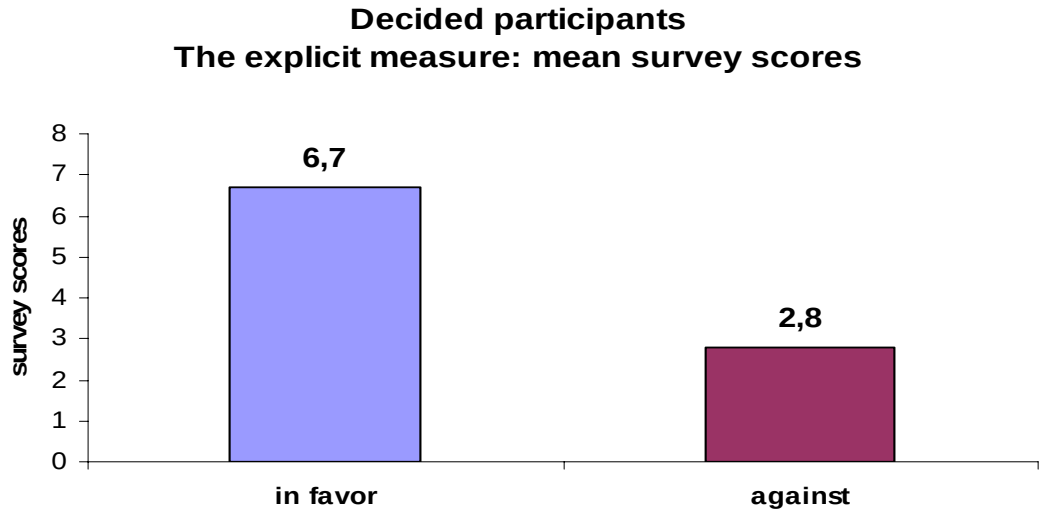
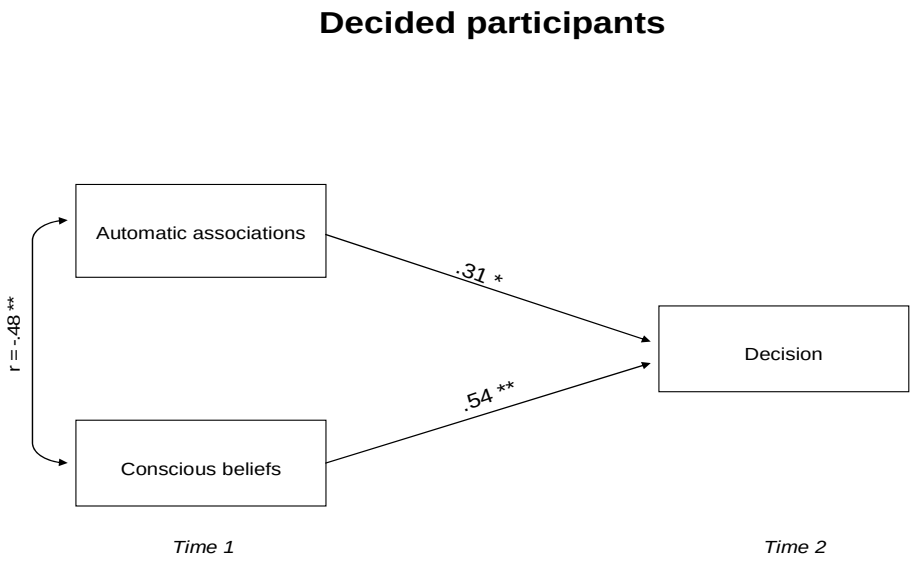
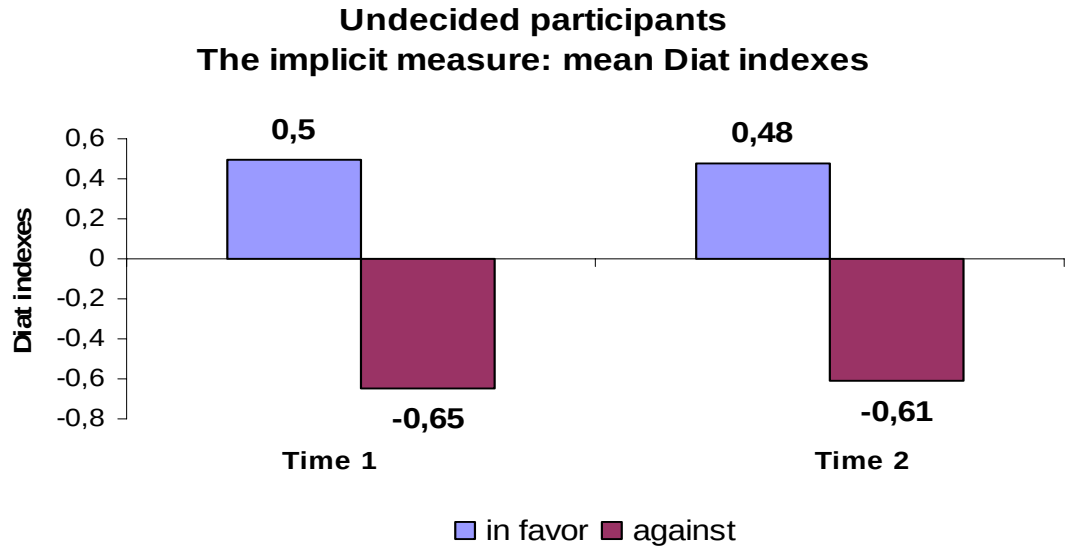


Figure 3: Prediction of future decisions (in favor or against) at Time 2 by automatic associations and conscious beliefs at Time 1. The figure shows beta-values of multiple regression analyses (* p < .05; ** p < .01; *** p < .001).



Undecided participants. At Time 1, sixteen participants were undecided. At Time 2, nine participants self-reported to be in favor of the bill and 7 participants self-reported to be against the bill. In line with the results of the first study, participants who one week later expressed to be in favor of the bill on average displayed a higher and positive mean Diat index, and participants who expressed to be against the bill displayed a lower and negative mean Diat index both at Time 1 and Time 2 (Fig.4).

Figure 4: Mean Diat index (standardized) for undecided participants who were in favor or against the bill at the end of Time 2.

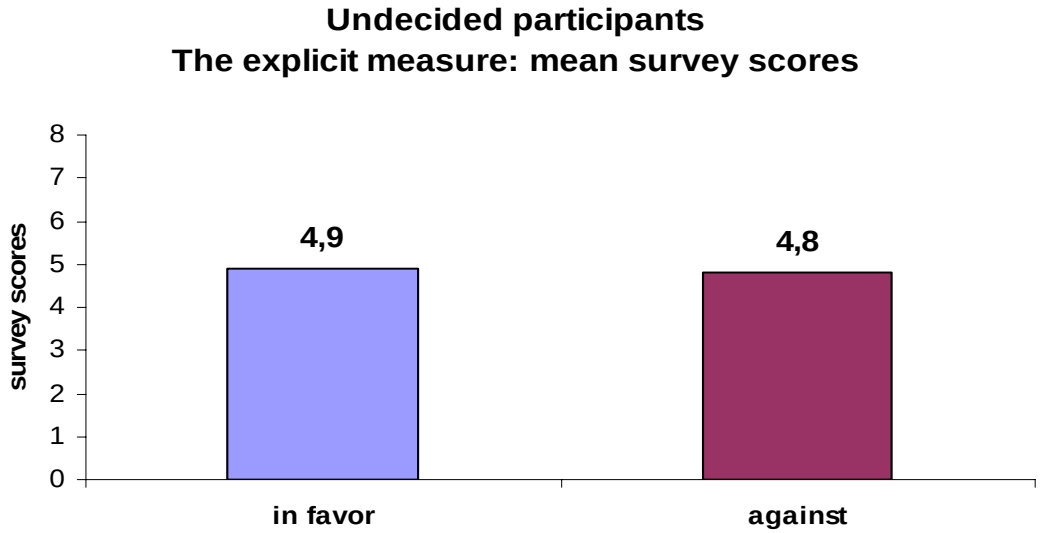


An analysis of variance was carried out on the Diat indexes at Time 1 and Time 2 entering the choice (in favor of or against) at the end of Time 2 as between-participants factor. Results showed that the Diat indexes of those who subsequently indicated to be in favor and those who subsequently indicated to be against the bill were significantly different both at Time 1 [$F(1,14) = 7.47$; $p = .016$, $\eta 2 = .348$], and Time 2 [$F(1,14) = 6.30$; $p = .025$, $\eta 2 = .311$]. A correlation

analysis between the IAT at Time 1 and the IAT at Time 2 revealed a significant stability of implicit associations (r = .69, p = .003).

A second analysis of variance was conducted on the survey score, considering the decision at the end of Time 2 (in favor, or against the bill) as between participants factor. As hypothesized, results (Fig. 5) showed that there were not differences [F(1,14) = .01; p = ns].

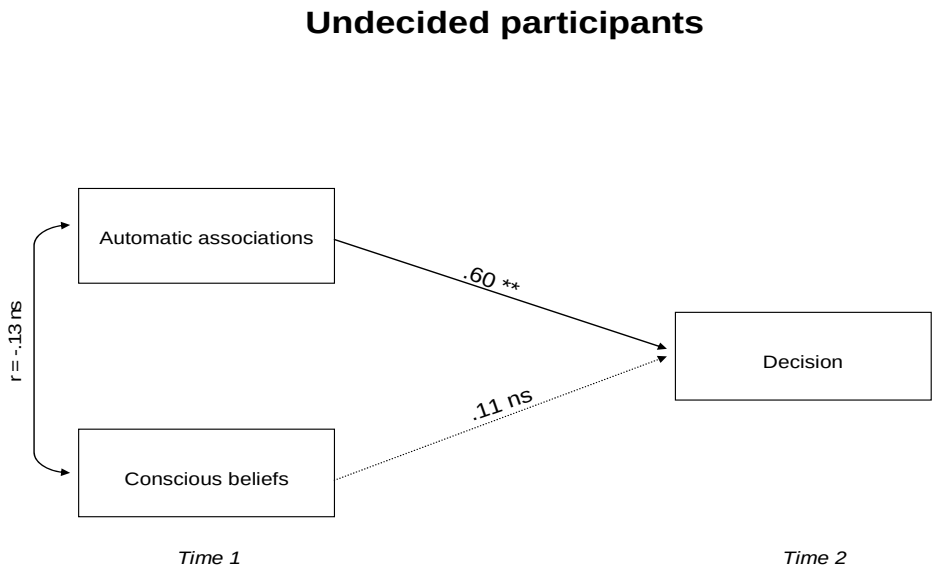
Figure 5: Mean survey score for undecided participants who were in favor or against the bill at the end of Time 2.



Finally, to investigate the relationships of automatic associations and conscious beliefs to future decision, participants' choices at Time 2 (in favor or against) were regressed into automatic associations and consciously held beliefs at Time 1 (Fig. 6). Results showed that decision at Time 2 was significantly predicted by automatic associations at Time 1 [t(13) = 2.70, p = .018], with consciously held beliefs showing a positive, though non significant relationships, to future choice [t(13) = .49, p = ns]. These findings confirmed the hypothesis that

future choices of undecided individuals are to a significant extent determined by their earlier automatic associations.

Figure 6: Prediction of future decisions (in favor or against) at Time 2 by automatic associations and conscious beliefs at Time 1. The figure shows beta-values of multiple regression analyses (* p < .05; ** p < .01; *** p < .001).



2.2.4. Discussion

Data considered in the present study showed a large consistency between automatic mental associations, consciously held beliefs, and future decisions of decided respondents. More interestingly, their future choices were significantly predicted by earlier conscious beliefs, with automatic associations showing a positive relationship, though to a lesser extent, toward future decisions. These results suggest that future choices of decided individuals are primarily based on consciously held beliefs rather than automatic mental associations.

Confirming and expanding the results of the first study, these data showed at level of consciously held beliefs of undecided individuals, a pattern of propositions which were equally distant from the two choice options. On the other hand, these results confirmed the presence of a set of defined and well structured different mental associations, which were congruent with future decisions expressed one week later. These automatic associations, that resulted not to be reflected in explicit self-reports, played a very important role in decision making. In fact, confirming our main hypothesis, future choices of undecided decision-makers were to a significant extent determined by earlier automatic associations, with conscious beliefs being unrelated with decisions expressed one week later.

Taken together, these findings strongly suggest a differential impact of automatic mental associations and consciously held beliefs on future decisions by individuals who claim to be decided versus undecided.

2.3. Study 3: The enlargement of the U.S military base in Vicenza

2.3.1. Overview and main hypotheses. The Study 2 presents at least two main limits. The first is that participants' conscious beliefs were assessed using only two items: an inadequate number of item in order to test the complex set of propositions that represent an individual's explicit attitudinal judgement. The second limit is that conscious beliefs were assessed at Time 1. At Time 2, the only explicit measure used was the personal decision. In order to overcome these two points, a new study was conducted. Specifically, the aim of the present study was to verify if automatic mental associations and conscious beliefs have a different role in predicting future choices, changes in automatic associations and changes in consciously reported beliefs of decided versus undecided individuals.

From the end of October to the end of December 2007, a sample of residents of the city of Vicenza (Italy) completed various measures assessing their attitudes toward the enlargement of a U.S. military base in their city. At the time of our data collection, the enlargement plans were controversially debated by the media leading to a strong polarization among residents of Vicenza. The measures

included a single item question to verify if participants were in favor of the enlargement, undecided, or against the enlargement, a 10-item survey on participants' conscious beliefs about environmental, political, economic, and social consequences of the enlargement, and a SC-IAT designed to assess participants' automatic evaluative associations regarding the U.S. military base (Galdi, Arcuri, Gawronski, 2008).

2.3.2. Method

Participants

A total of 132 participants took part in this study. Data from three participants had to be excluded from analyses. One participant did not finish the questionnaire measures at Time 1; two additional participants showed excessive error rates on the SC-IAT of more than 20% in at least one of the two combined blocks. The final sample consisted of 55 male and 74 female participants (at Time 1, 96 were decided and 33 were undecided), whose age ranged from 18 to 65 years. All participants were tested individually at two measurement occasions, which were one week apart for all participants. No credits, gifts, or money were given to them.

Procedure

Each participant was assigned a distinct numerical code, which was used to match their responses on the different measures at Time 1 and Time 2.

At the beginning of the first session (Time 1), participants were asked to read a brief, evaluatively neutral description of the proposed enlargement of the U.S. military base in Vicenza, and to indicate their personal decision (in favor of the enlargement, undecided, against the enlargement).

Immediately afterwards, they were asked to complete a modified variant of the Single Category Implicit Association Test (Karpinsky, Steinman, 2006) to assess their automatic mental associations regarding the U.S. military base. In the present SC-IAT, on each trial of the task, an attribute word or a picture appeared in the centre of the screen until participants gave their response. The

inter-trial interval was 150 ms long. Incorrect responses were highlighted by a red cross which remained on the screen for 200 ms. Participants were instructed to respond as fast and accurately as possible. For the target category, the SC-IAT used the label *U.S. military base*; for the attribute categories, the labels were *positive* and *negative*. Five pleasant and five unpleasant words were used as attribute stimuli; five pictures of the U.S. military base in Vicenza were used to represent the target category (see Appendix 3).

In one of the two critical blocks, participants had to respond with a right-hand key (K) to negative words and with a left-hand key (D) to positive words and pictures of the military base. To keep the number of required left-hand and right-hand responses equivalent, the five positive words and the five pictures were each presented twice, and the five negative words were each presented four times, summing up to a total of 40 trials. In the other critical block, participants had to respond with a right-hand key (K) to negative words and pictures of the military base and with a left-hand key to positive words (D). Following the procedure employed in the second block, the five positive words were each presented four times and the five negative words and the five U.S. military base pictures were each presented twice. The order of the two combined categorization tasks was counterbalanced across participants.

Participants were subsequently asked to complete a survey designed to assess their conscious beliefs about the U.S. military base by means of 10 item (ranging from 0 to 10), including questions on environmental (2 items), political (4 items), economic (3 items), and social (1 item) consequences of the proposed enlargement for Vicenza city.

The order of the measures was counterbalanced across participants.

Finally, to the undecided participants were given two booklets, one of which included six arguments in favor of the enlargement and the other one including six arguments against the enlargement. Participants were invited to think about the topic during the next week in order to try to clarify their opinion and to express a definite choice at the end of the second session.

One week later (Time 2), all participants were contacted again and invited to complete for the second time the same SC-IAT and the same questionnaire

measures. At the end of the second session, participants were thanked and fully debriefed.

2.3.3. Results

For each respondent, an index of automatic associations regarding the U.S. military base was calculated by means of the D-algorithm (Greenwald et al. 2003) that was particularly designed for analyzing data with IAT. The index was so calculated that higher scores reflect more positive associations. The internal consistencies of the two SC-IATs were reasonably high with Cronbach's Alpha values of .93 (Time 1) and .96 (Time 2).

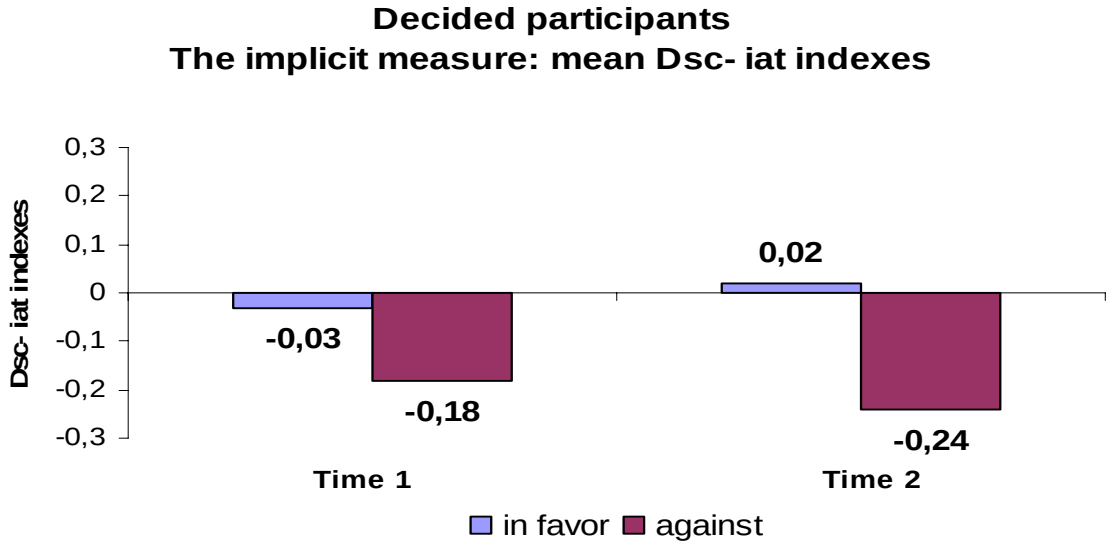
The 10 survey items were aggregated in a single score of conscious beliefs about the U.S. military base, with the highest scores indicating the highest positiveness toward the military base. The internal consistencies of the two resulting scores were reasonably high with Cronbach's Alpha values of .93 (Time 1) and .94 (Time 2).

Since preliminary analyses showed that the order of administration of the two critical blocks did not significantly influence the Dsc-iat index, and the order of administration of the implicit and explicit measures did not significantly influence the results, these two factors were not considered in the subsequent analyses.

Decided participants. Sixty-five participants were against the enlargement, and thirty-two participants were in favor of the enlargement, both at Time 1 and Time 2.

The analysis of variance on the Dsc-iat indexes at Time 1 and Time 2 showed that the mean indexes of those in favor and those against the enlargement were different, though not significant, at Time 1 [$F(1,94) = 2.10$; $p = .15$, $\eta 2 = .022$], and significantly different at Time 2 [$F(1,94) = 8.15$; $p = .005$, $\eta 2 = .080$]. The mean SC-IAT index for each group is presented in Figure 1.

Figure 1: Mean SC-IAT index for decided participants who were in favor or against the enlargement of the U.S. military base.



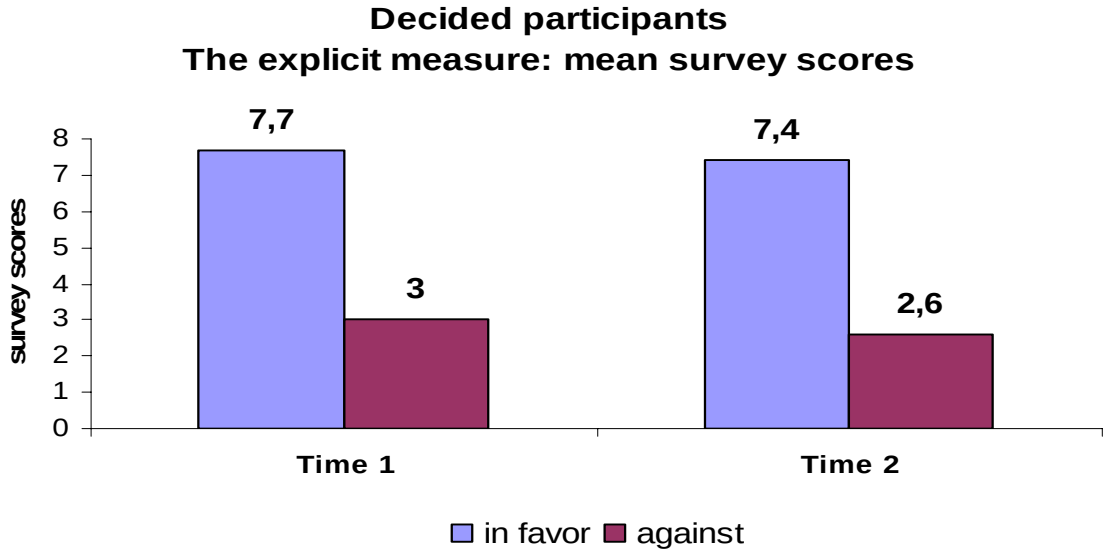
A second analysis of variance on the survey scores at Time 1 and Time 2 confirmed that the mean score of those who described themselves being in favor was significantly different from the mean score of those who described themselves to be against the enlargement at Time 1 [$F(1,94) = 234.37$; $p < .001$, $\eta 2 = .714$], and also at Time 2 [$F(1,94) = 251.13$; $p < .001$, $\eta 2 = .728$]. The mean survey score for each group is presented in Figure 2.

Undecided participants. At Time 1, thirty-three participants were undecided. One week later, at the end of the second session, nine participants were in favor of the enlargement, 10 participants were against the enlargement, and 14 participants were still undecided.

Both at Time 1 and Time 2, the mean Dsc-iat index of those who were in favor of the enlargement at Time 2 was on average the highest, and the mean Dsc-iat index of those who were against the enlargement was the lowest. The SC-IAT indexes of these two groups of participants resulted significantly different at Time 1 [$F(2,30) = 7.91$; $p < .002$, $\eta 2 = .346$], and also at Time 2 [$F(2,30) = 8.69$; $p < .001$, $\eta 2 = .367$]. Those who were still undecided at the end of Time 2 showed, at

Time 1 and also at Time 2, a negative mean Dsc-iat index, that was non different from the mean Dsc-iat index of those who self-reported being against the enlargement (Fig. 3).

Figure 2: Mean survey score for decided participants who were in favor or against the enlargement of the U.S. military base.



An analysis of variance was carried out on survey scores at Time 1 and Time 2 entering the choice (if they are in favor of the enlargement, still undecided, against the enlargement) at the end of Time 2 as between-participants factor. The results showed that there were not differences in conscious beliefs of these three categories at Time 1. On the contrary, at Time 2, those who indicated to be in favor of the enlargement showed a higher score, those who indicated to be against showed a lower score, and those who were still undecided were exactly in the middle (Fig.4). The difference between the mean survey scores of those who were in favor and those who were against was highly significant [$F(2,30) = 9.32$; $p < .001$, $\eta 2 = .383$].

Figure 3: Mean SC-IAT index for undecided participants who were in favor, still undecided, or against the enlargement of the U.S. military base at the end of Time 2.

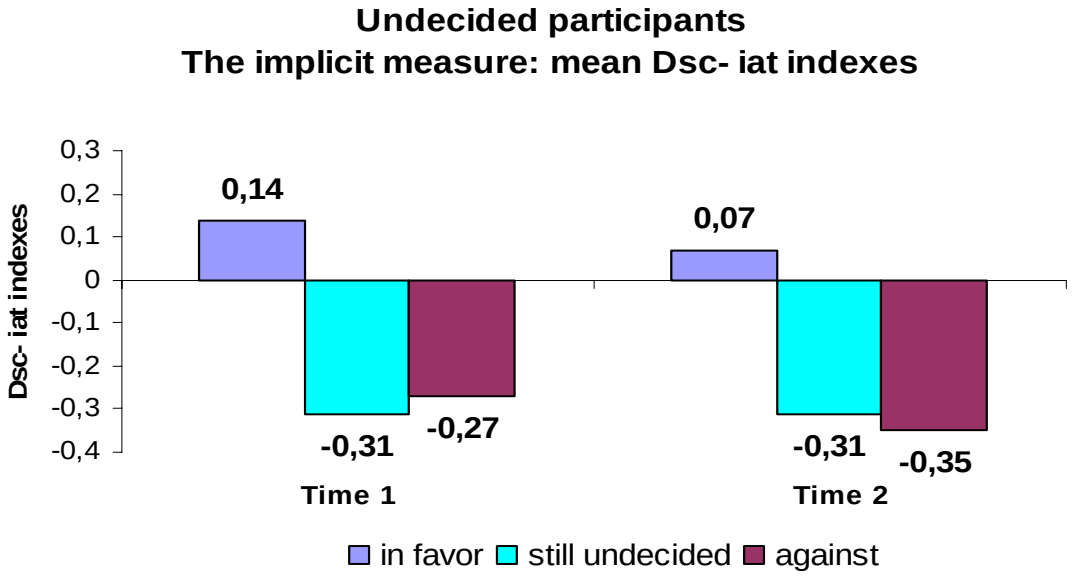
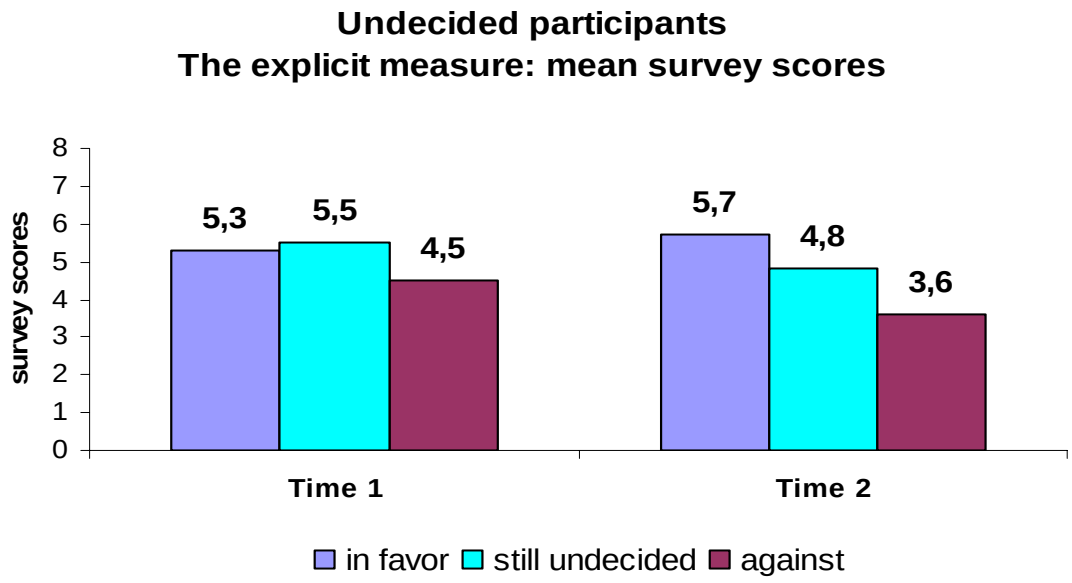


Figure 4: Mean survey score for undecided participants who were in favor of the enlargement, still undecided, or against the enlargement at the end of Time 2.



Follow up analyses. To test the relationships among automatic associations, consciously held beliefs, and future decisions, we first investigated the mutual relationships between automatic associations and conscious beliefs for participants who indicated to be decided versus undecided at Time 1 using multiple regression and a two-wave-two-variable panel design (Fig. 5). The results indicated that automatic associations were relatively stable for both undecided participants [$t(30) = 2.30$, $p < .03$] and decided participants [$t(93) = 5.12$, $p < .001$]; conscious beliefs were relatively stable for undecided participants [$t(30) = 4.08$, $p < .001$] and highly stable for decided participants [$t(93) = 33.66$, $p < .001$]. More importantly, automatic associations at Time 1 significantly predicted changes in conscious beliefs in the course of time for undecided participants [$t(30) = 2.82$, $p < .009$], but not for decided participants [$t(93) = -0.86$, p = ns]. On the contrary, conscious beliefs at Time 1 significantly predicted changes in automatic associations in the course of time for decided participants [$t(93) = 3.07$, $p < .003$], but not for undecided participants [$t(30) = -1.23$, p = ns].

To further investigate the relationships of automatic associations and conscious beliefs to future decisions, we simultaneously regressed participants' decisions at Time 2 (in favor, undecided, against) into automatic associations and consciously held beliefs at Time 1 (Fig. 6). Results showed that for decided participants, decisions at Time 2 were uniquely predicted by their consciously held beliefs at Time 1 [$t(93) = 15.40$, $p < .001$], with automatic associations being unrelated to future decisions [$t(93) = -0.15$, p = ns]. On the contrary, for undecided participants, decisions at Time 2 were significantly predicted by automatic associations at Time 1 [$t(30) = 2.65$, $p < .01$], with consciously held beliefs showing a positive, though non-significant, relationship to future decisions [$t(30) = 1.69$, $p < .10$].

Figure 5: Stability and change in automatic associations and conscious beliefs from Time 1 to Time 2 for decided and undecided participants at Time 1. The figure shows standardized beta-values of simultaneous multiple regression analyses using a two-wave-two variable panel design (* $p < .05$; ** $p < .01$; *** $p < .001$).

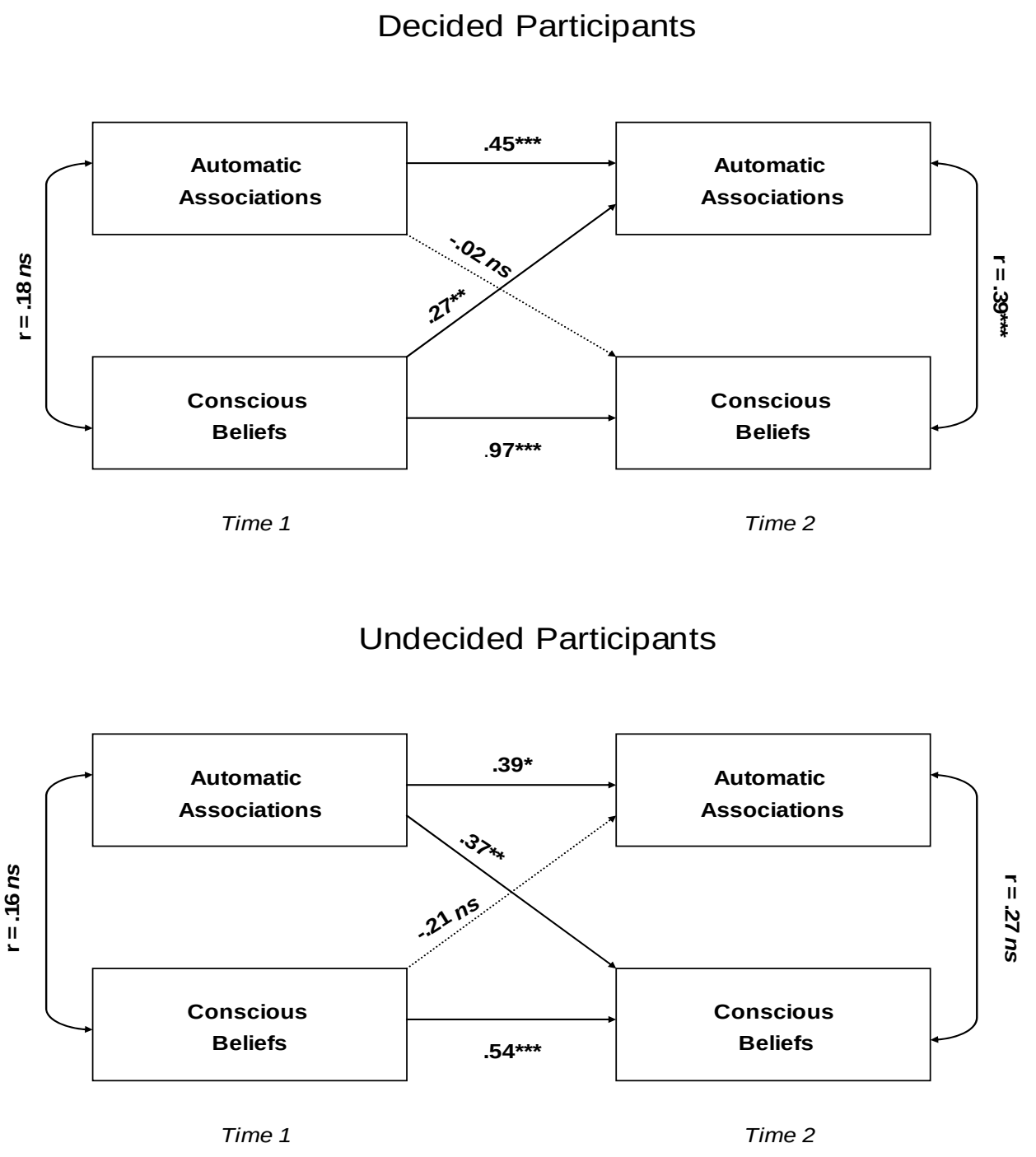
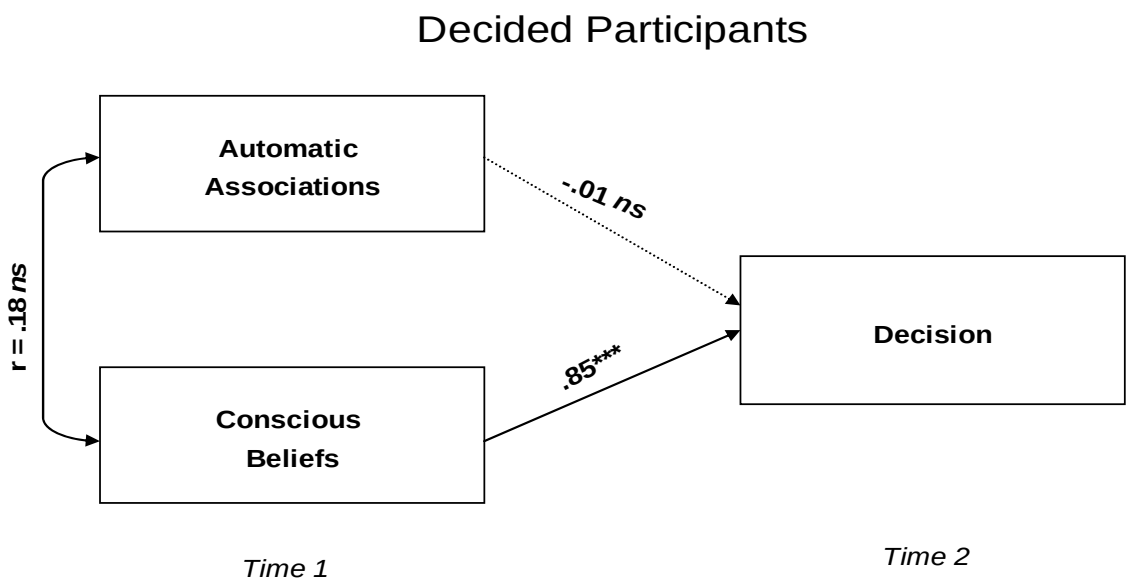
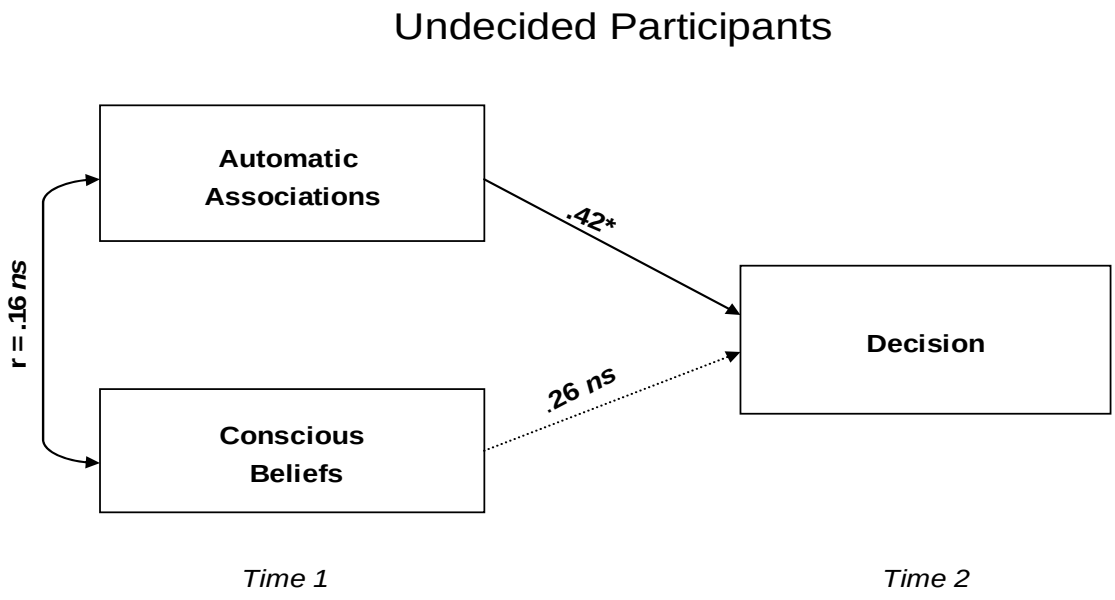


Figure 6: Prediction of future decisions (in favor, undecided, against) at Time 2 by automatic associations and consciously held beliefs at Time 1 for decided and undecided participants at Time 1. The figure shows standardized beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).





2.3.4. Discussion

The main goal of this study was to overcome the limits and expand the longitudinal design of Study 2. Submitting a controversial political issue to a sample of participants, we recorded automatic mental associations by means of the SC-IAT, and we used self-report measures to assess consciously held beliefs and decisions during two measurement occasions held for all participants one week apart.

The obtained results were particularly interesting. Examining the relationships between automatic mental associations and conscious beliefs recorded at Time 1 and Time 2, we found that for undecided participants future conscious beliefs are to a significant extent determined by their earlier automatic associations, even though these participants had consciously reported being undecided at the time of the first measurement. On the other hand, in the case of decided participants, conscious beliefs predict changes in automatic associations, presumably reflecting a consolidation of their consciously held beliefs. That is, conscious beliefs may have strengthened those associations that are in line with these beliefs, so these associations become automatic in the course of time.

Confirming the results of Study 2, data from the present study showed that decisions are primarily based on earlier consciously held beliefs. Such effects occur only for decided but not for undecided decision makers, whose automatic mental associations bias future choices in such a way that these decisions reflect the evaluations implied by earlier automatic associations.

Even though the longitudinal design of this study did not include a direct measure of biased information processing, earlier research suggests that automatic associations can bias the processing of new information in a way that is in line with the meaning of these associations (Gawronski, Geschke, & Banse, 2003; Huegenberg & Bodenhausen, 2003). Considered the level in which information about choice options is often mixed and heterogeneous, biased processing of that information can bring future decisions of undecided individuals in line with their already existing automatic associations.

So being the case one could say that people sometimes have already made up their mind, even though they do not know it yet.

2.4. General discussion

Findings from Study 2 and Study 3 have important implications for social sciences that aim at predicting future decisions of public interest, one the most intriguing examples being the prediction of voting decisions.

Over the past decades, political scientists have been quite successful in predicting election outcomes by means of standard survey methodology. Furthermore, there have been repeated cases in which tight races among political candidates made the prediction of election outcomes rather difficult. In fact, there have been several examples in which voters indicated to be undecided until the very day of the election. The present results suggest that in such cases the prediction of election outcomes might be enhanced by including modern measures of automatic associations, as the ones employed in the present studies.

Taken together, these findings also suggest to follow this intriguing advice: When you are interested in convincing undecided people to choose in favor of one choice option over another, you should act in advance. Every attempt during the days near the coming decision probably will produce an ineffective effort.

Chapter 3

The strategies at the basis of future decisions of decided and undecided individuals

3.1. Introduction

In 1957, Festinger proposed the theory of cognitive dissonance, which focuses on inconsistency among cognitions to describe how behavior and beliefs change their attitudes. The basic idea that informs the cognitive dissonance theory is that sometimes people have related cognitions, but they may be opposite. These cognitions are termed as 'dissonant'. For example, I believe that smoking causes cancer and it is expensive; at the same time, I smoke anyway, because I believe that smoking tastes good and it is relaxing. When someone experiences two or more dissonant cognitions (or conflicting thoughts), they cause an aversive state of arousal. To reduce this uncomfortable feeling, people can change their behavior, their attitudes, or the personal relevance of an attitude object. They can also change their attitude-relevant cognitions in various ways: for example, adding or subtracting cognitions to increase the ratio of consonant against dissonant ones, or reducing the importance of dissonant cognitions.

Researches on cognitive dissonance have repeatedly shown that a drive to reduce the uncomfortable feeling caused by inconsistent cognitions often leads to a change in an individual's attitude-relevant cognitions. Consequently, people often avoid cognitions that are inconsistent with an attitude or a behavior. In fact, consistency theorists in general posit that people avoid information that increases dissonance and seek out, notice, interpret data, and, more in general, favor information consistent with their attitudes. In this way individuals may also reinforce their attitudes: people who tend to pick friends, to read magazines, or to watch television show that they reinforce their attitudes, which, in turn, are reinforced by those which agree with others.

Researches on selective exposure have shown that various conditions that increase dissonance also increase selective exposure (for example, Fischer, Jonas, Frey, & Schulz-Hardt, 2005; Holbrook, Berent, Krosnick, Visser, & Boninger, 2005; Isaacowitz, 2005; Jonas, Greenberg, & Frey, 2003; Jonas, Schulz-Hardt, Frey, & Thelen, 2001). Thus, under particular conditions, selective exposure to attitude-consonant information occurs (see also for a review Frey, 1986).

The APE model (Gawronski and Bodehausen, 2006) suggests that both, the cause of experiences and the process of dissonance reduction, are inherently propositional.

With regard to the causes of dissonance experiences, the APE model claims that propositional thinking usually relies on the particular associations that are temporarily activated when a specific object is encountered, and it generally accepts the affective reactions which result from these activated associations, using them as a basis for the evaluative judgement. At the same time, the propositional thinking can also be independent from activated associations. This instance occurs every time that the propositional implication of an activated association is inconsistent with one or more other propositions that are temporarily considered to be relevant for the judgement. More specifically, such inconsistency results when two or more propositions are regarded as true, and ones follows from the opposite of the others. Given these assumptions, it is clear that cognitive consistency implies a propositional representation of its elements (Gawronski, Strack, 2004). And then, such cognitive consistency is an inherently propositional phenomenon based on syllogistic rules that specify the logical relationship among propositions.

With regard to dissonance reduction, the APE model posits that people usually use the activated associations as a basis for their evaluative judgements, unless a propositional implication of a given affective reaction is inconsistent with one or more other propositions that are temporarily considered for the judgement. The inconsistency within a given set of propositions can be overcome in two main ways: explicitly rejecting automatic associations as a basis for the evaluative judgement, or finding one or more additional propositions able to resolve such inconsistency. Supporting the assumption that both, the cause of dissonance experiences and the process of dissonance reduction, are inherently a propositional phenomenon, in two studies Gawronski and Strack (2004) investigated the consequences of cognitive dissonance on implicit evaluative associations and explicit attitudinal judgements. The two authors found that dissonance-related attitude changes emerged only for explicit attitudes but not with respect to implicit attitudes. Moreover, accordingly with the idea that

propositional evaluations are usually based on associative evaluations unless cognitive inconsistency leads to a rejection of these associations as false, they showed that explicit and implicit attitudes were highly correlated under control conditions, but not under conditions of dissonance-related attitude change.

To summarize, according to the APE model, people are generally aware of the resulting discrepancy between explicit and implicit attitudes as well as its specific nature (for example: a negative implicit evaluation rejected in favor of a positive explicit evaluative judgement). More importantly, as we said above, individuals can avoid cognitive inconsistency by selectively searching for information that is consistent with their judgement.

Data from Study 3 clearly showed that future decisions of decided individuals were primarily based on earlier conscious beliefs, that also significantly predicted changes in automatic associations during a period of one week. The aim of next studies was to have a first look at a strategy by which conscious beliefs could influence automatic associations, and consolidate themselves in the course of time. Starting from cognitive dissonance theory (Festinger, 1957) and APE model (Gawronski & Bodenhausen, 2006) as conceptual references, we focused on selective exposure.

We believe that selective exposure is a strategy by means conscious beliefs of decided individuals consolidate themselves and influence automatic associations in the course of time. That is, the propositional thinking searches and acquires information that is consistent with the explicit attitudinal judgement in order to avoid cognitive inconsistency. This selective exposure should be also used by propositional thinking as (i) an additional basis for consolidating consciously held beliefs; (ii) as an additional basis for strengthening those associations that are in line with the explicit judgement, such that these associations become stronger and more automatic in the course of time; (iii) and/or, at the same time, as an additional basis for weakening those associations that are inconsistent with conscious beliefs.

This claim first of all implies that selective exposure should be predicted by explicit but not implicit attitudes. More importantly, this claim also implies that propositional thinking of decided individuals should affect automatic associations

and conscious beliefs directly, and indirectly by means of selective search and choice of information. In other words, considering that conscious beliefs of decided individuals should be well structured and strong, and than they should be able to act on theirs own account, we believe that for decided individuals selective exposure plays a partial mediation role in the relationship between conscious beliefs and automatic associations, and in consolidating of conscious beliefs in the course of time. Moreover, a discrepancy between implicit and explicit attitudes should lead to an enhanced selective search for additional information consistent with explicit evaluative judgement. This enhanced selective exposure should reach the purpose of corroborating the rejection of the affective reaction and of weakening those particular mental associations at the root/basis of this affective reaction. That is, in the case of people who rejected a negative implicit evaluation in favor of a positive explicit judgement, or people who rejected a positive implicit evaluation in favor of a negative explicit evaluation, the hypothesized partial mediation role of selective exposure should be stronger.

3.2. Study 4: The 2008 Italian General Election

3.2.1. Overview of the research and main hypotheses. Data from Study 3 clearly show that automatic mental associations and conscious beliefs of decided and undecided individuals have a different role in predicting future decisions, changes in automatic associations, and changes in consciously held beliefs in the course of time. Specifically, future decisions of decided participants resulted primarily based on earlier conscious beliefs; at the same time, these conscious beliefs significantly predicted changes in automatic associations in the course of time. On the contrary, future decisions of undecided participants were primarily based on earlier automatic associations, that also significantly predicted changes in conscious beliefs. Starting from these results, the aim of the present study was to try to have a first look at one of the possible processes by which conscious

beliefs of decided individuals influence automatic associations, so these associations tend to become in line with conscious beliefs in the course of time.

This study, carried out before the 2008 Italian Political General Election, investigated the impact of the selective choice of information on automatic associations of those voters who claimed to have already made their voting decision at the moment of the pre-electoral interview.

In the context of the Italian Political General Election of April 13, 2008, two main parties, the 'Popolo delle Libertà' (PdL, the right–wing party) and the 'Partito Democratico' (Pd, the left–wing party), headed respectively by Silvio Berlusconi and Walter Veltroni, were the main competitors. Several hundred people were contacted approximately one week before the election, and asked if they had already made their voting decision. Only respondents who claimed to be decided to vote for the PdL party or the Pd party were eligible for the present study. They were administered a selective exposure task and two IATs, one at the beginning (Time 1) and the other one at the end (Time 2) of the experimental session. Since the whole electoral campaign of these two parties was focused on their two leaders, we investigated the relative implicit preference either for Berlusconi or Veltroni.

The starting point of our hypothesis was the perspective that selective exposure is driven by the desire to avoid cognitive dissonance (Frey, 1986) and cognitive dissonance is inherently a propositional phenomenon (Gawronski, Strack, 2004). Specifically, to avoid cognitive dissonance experiences, the propositional thinking generally tends to acquire information that is consistent with the explicit attitudinal judgement by means of selective search and choice of information. For example, a decided voter, with more favorable conscious beliefs with regard to candidate A compared to candidate B, should prefer to choose information in favor of A and against B rather than information in favor of B and against A. This selective exposure could provide an additional basis for consolidating consciously held beliefs in the course of time and strengthening those associations that are in line with the explicit judgement, so these associations become stronger and automatic in the course of time.

This claim implies that conscious beliefs of decided individuals should affect automatic associations directly (because they are well structured and strong, and than they are able to act on theirs own account), and indirectly by means of selective choice of information.

In other words, the main hypothesis of this study was that the relationship between conscious beliefs at Time 1 and automatic associations at Time 2 should be in part mediated by selective exposure strategy.

Considering that results from Study 3 showed that choices of decided individuals are primarily based on conscious beliefs, we tried to verify this hypothesis even though we could record only the participants' personal decision.

3.2.2. Method

Participants

Seventy-five decided voters were recruited approximately from the 1st to the 10th of April, 2008. The data regarding seven participants had to be excluded from the analyses. Four participants did not finish the selective exposure task, and three participants produced more than 25% of errors in at least one of the two combined blocks.

The final sample consisted of 39 male and 29 female, whose age ranged from 18 to 65 years. They lived in different urban districts of Padova (Italy). Participants were tested individually in a single measurement occasion, and no gifts or money were given to them.

Procedure

To each participant was assigned a different numerical code, which was used to match their responses to the different measures.

At the beginning of the session (Time 1), participants were asked to indicate their personal voting decision (if they would have voted for PdL party or Pd party), and to complete an IAT to assess their implicit relative preference for Silvio Berlusconi or Walter Veltroni.

Five pictures of Berlusconi and five pictures of Veltroni were used as target stimuli, together with five positive and five negative words (see Appendix 4).
The whole procedure of this IAT was similar to Study 1 and Study 2, but, because we were interested in individual differences and not in the absolute IAT effect on the group level, the order of the two critical blocks was the same for all participants (see Egloff & Schmukle, 2002; Gawronski, 2002). So, in the first critical block, all participants were asked to classify pictures representing Walter Veltroni and positive words with D key, and pictures representing Silvio Berlusconi and negative words with K key. In the other critical block, pictures of Silvio Berlusconi and positive words had to be classified with D key, and pictures of Walter Veltroni and negative words had to be classified with K key.

Participants were subsequently asked to perform a selective exposure task. They were given a booklet including 10 couples of headlines taken from the four main Italian daily newspapers. Five couples of headlines were each made up of a favorable headline about the Pd party and an unfavorable headline about the PdL party; the remaining five couples of headlines included a favorable headline about the PdL party and an unfavorable headline about the Pd party. Participants were invited to read one couple of headlines at a time, and, for each couple, to choose and indicate the headline they would have liked to investigate in a deeper way reading the whole article.

Finally, participants were invited to complete the same IAT and to indicate their personal voting decision a second time (Time 2). At the end of the session, participants were thanked and fully debriefed. On the whole, the participation to the studytook about 20 minutes.

3.2.3. Results

Forty-six participants had a clear intention to vote for the Pd party, and 22 participants had a clear intention to vote for the PdL party. They indicated the same choice both at the beginning (Time 1) and at the end (Time 2) of the session. For each respondent, a Diat index of preference for 'Veltroni' or 'Berlusconi' was computed (according to Greenwald et al. 2003) so higher and positive values

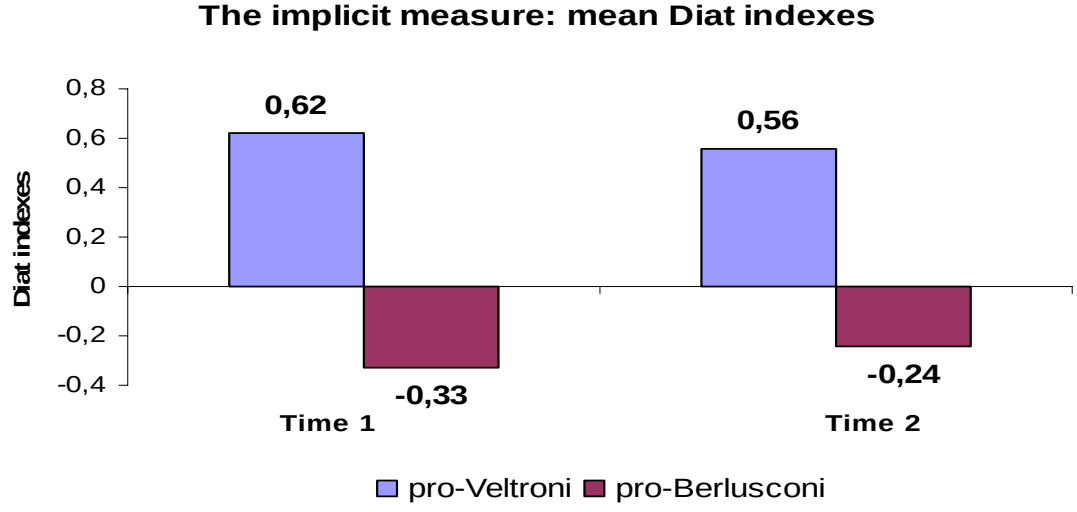
indicated a relative preference for Veltroni against Berlusconi. The internal consistencies of the two IATs were reasonably high with Cronbach's Alpha values of .91 (Time 1) and .93 (Time 2).

Responses to the selective exposure task were combined to provide an overall index of selective exposure. Specifically, for each participant, the number of selected headlines in favor of the Pd party and the number of selected headlines against the PdL party were added. Hence, higher values indicated a selective choice of information in favor of the Pd party.

An analysis of variance was carried out on the IAT indexes at Time 1 and Time 2, entering the voting decision (if they would have voted for Pd party or PdL party) as the between-participants factor.

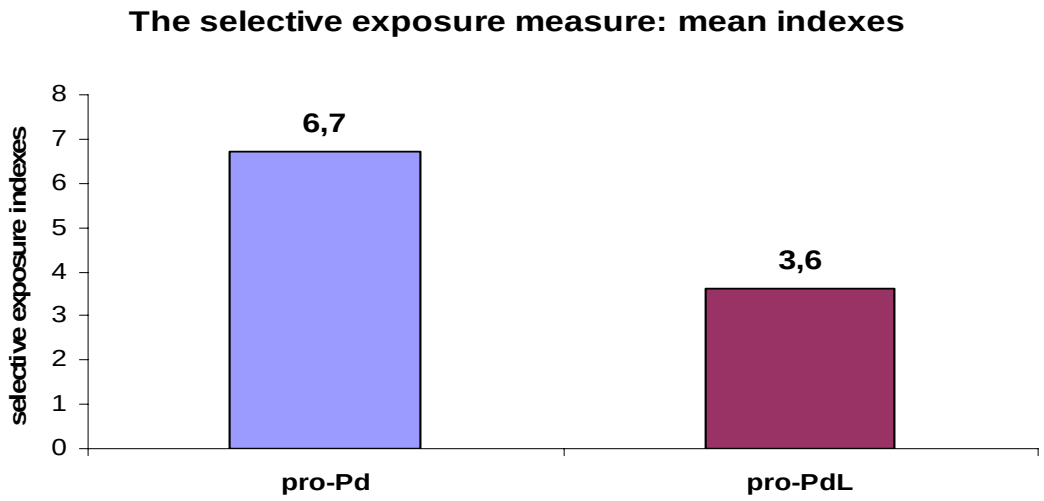
Those who intended to vote for Pd party showed a higher mean Diat index, and those who intended to vote for PdL party had a more negative mean Diat index (Fig. 1). The IAT indexes of these two groups of participants were significantly different both at Time 1 [$F(1,66) = 63.91$; $p < .001$, $\eta 2 = .492$] and Time 2 [$F(1,66) = 60.81$; $p < .001$, $\eta 2 = .480$], confirming that implicit associations were largely in line with participants' voting intention.

Figure 1: Mean Diat index for participants who intended to vote for Pd and participants who intended to vote for PdL.



A second analysis of variance was conducted on the index of selective exposure, entering the voting decision (Pd party or PdL party) as between-participants factor. As expected, those who intended to vote for Pd party showed higher scores of selective exposure, and those who intended to vote for PdL party had lower scores (Fig. 2). For these two categories of participants, the indexes of selective exposure were clearly divergent ([$F(1,66) = 36.97$; $p < .001$, $\eta 2 = .359$]).

Figure 2: Mean index of selective exposure for participants who intended to vote for Pd and participants who intended to vote for PdL.

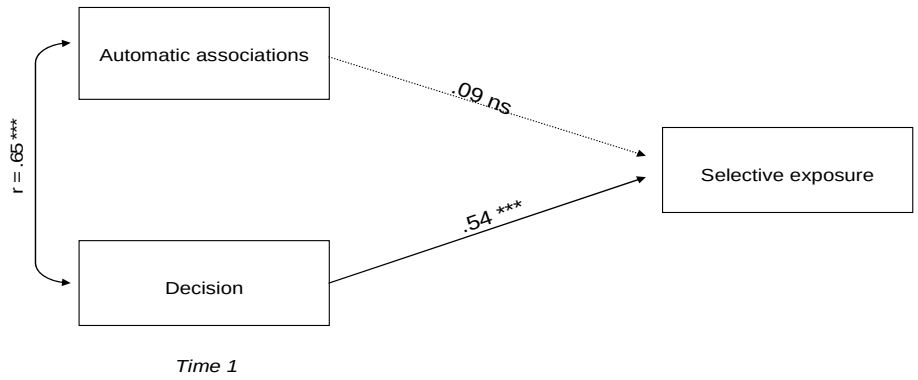


To investigate the relationships between automatic associations and voting decision, a logistic regression analysis was conducted on voting decisions at Time 2, in which automatic associations at Time 1 (Veltroni vs. Berlusconi) were entered as predictors. The results showed that automatic associations had an almost perfect reliability in the prediction of voting decision at the individual level [$t(67) = 7.99$, $p < .001$].

To further test the relationships between automatic associations and choices at Time 1 to selective choice of information, a multiple logistic regression

analysis was conducted on the index of selective exposure, in which automatic associations and voting decisions at Time 1 (Pd party vs. PdL party) were entered as predictors. The results (Fig. 3) showed that participants' performances in the selective exposure task were primarily predicted by voting decisions [$t(65) = 4.15$, $p < .001$], with automatic associations at Time 1 showing a not significant relationship to selective exposure [$t(65) = -0.72$, $p = .47$]. These results confirmed the claim that selective choice of information is a propositional strategy: In fact, participants' performances on selective exposure task were predicted by decision, which is primarily based on conscious beliefs, but not by automatic associations.

Figure 3: Prediction of participants' performance by automatic associations and decisions at Time 1. The figure shows standardized beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).



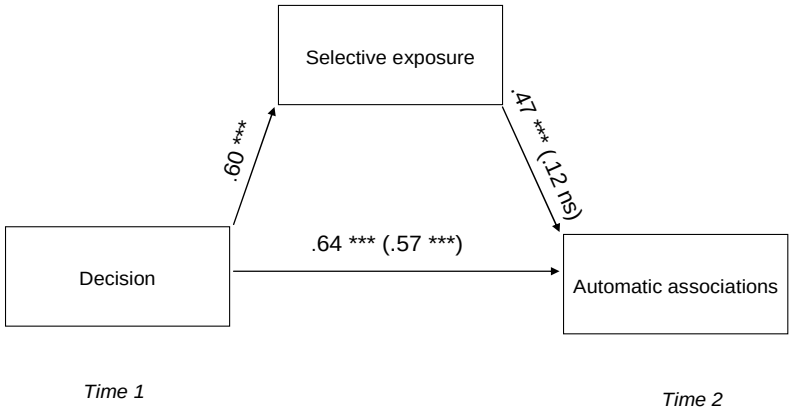
Subsequently, we conducted follow-up analyses to provide deeper insights into the psychological mechanisms that underlie the findings reported above.

Specifically, our main hypothesis was that conscious beliefs of decided individuals could affect future automatic associations directly, and indirectly by means of selective exposure. In terms of statistical tests of mediation (Baron & Kenny, 1986), this hypothesis implied that (i) decisions at Time 1 should predict automatic associations at Time 2; (ii) decisions at Time 1 should predict the selective choice of information; (iii) the selective choice of information should predict automatic associations at Time 2; and (iv) the relationship between decisions at Time 1 and automatic associations at Time 2 should be reduced after controlling for selective exposure, with the relationship between selective exposure and automatic associations at Time 2 still being statistically significant.

These hypotheses were tested using multiple regression analyses (Fig. 4). The results showed that decisions at Time 1 significantly predicted automatic associations at Time 2 [$t_{(66)} = 6.86$, $p < .001$) and participants' performances in the selective exposure task [$t_{(66)} = 6.08$, $p < .001$]. Participants' performances in the selective exposure task significantly predicted automatic associations at Time 2 [$t_{(66)} = 4.28$, $p < .001$]. The relationship between decisions at Time 1 and automatic associations at Time 2 was still significant after controlling for selective exposure [$t_{(65)} = 4.86$, $p < .001$], and the relationship between selective choice of information and automatic associations at Time 2 was still positive, but reduced to nonsignificance [$t(65) = 1.06$, $p = .29$]. A Sobel test confirmed a not significant mediation of selective exposure [$Z = 1.05$, $p = .29$].

These results suggest that decision at Time 1 influences future automatic associations and selective exposure strategy directly. However, the relationship between selective exposure and automatic associations is spurious.

Figure 4: Prediction of automatic associations at Time 2 by decisions at Time 1 and participants' performances in the selective exposure task. The figure shows (standardized) beta-values of simultaneous multiple regression analyses (* p < .05; ** p < .01; *** p < .001).



3.3.4. Discussion

The main goal of this study was to verify if the selective choice of information is a strategy by which conscious beliefs influence automatic associations in the course of time.

The obtained results showed that conscious beliefs had a strong influence on selective exposure. This finding makes sense of the perspective that selective choice of information is a strategy to avoid cognitive dissonance (Frey, 1986) that is an inherently propositional phenomenon (Gawronski & Strack, 2004).

Starting from this perspective, we expected that conscious beliefs of decided individuals should have affected automatic associations directly, and indirectly by means of selective exposure, so automatic associations that converge with

conscious beliefs become stronger in the course of time ~~also~~ because of the influence of selective exposure too. In terms of statistical tests of mediation, this hypothesis implied that the relationship between decisions at Time 1 and automatic associations at Time 2 should be reduced after controlling for selective choice of information, with the relationship between selective exposure and automatic associations at Time 2 still being statistically significant. The results did not confirm this hypothesized mediation. We found that the relationship between decisions at Time 1 and automatic associations at Time 2 was still significant after controlling for selective exposure, but the relationship between selective choice of information and automatic associations at Time 2, though still positive, was reduced to nonsignificance. In other words, the selective choice of information resulted causally irrelevant for consolidation of automatic associations in the course of time.

A possible explanation of these results could be that we hadn't a direct measure of conscious beliefs. Even though we demonstrated that decisions of decided individuals are primarily based on conscious beliefs (Galdi, Arcuri, Gawronski, 2008), there is no doubt that choices may be considered as a consequence of the explicit attitudinal judgement, but not as a measure of conscious beliefs. So, we assume that directly monitoring conscious beliefs, we should find that the selective exposure should show the partial mediation role that we hypothesized.

3.3. Study 5: The bridge over the Straits of Messina

3.3.1. Overview of the research and main hypotheses. The results of Study 4 showed that the selective exposure is a propositional strategy: It was predicted by decision, which is primarily based on conscious beliefs, but not by automatic associations. However, our main hypothesis was not confirmed: In fact, the selective choice of information resulted causally irrelevant for the strengthening of automatic associations in the course of time.

That study presents at least two main limits. The first is that we did not directly assess participants' conscious beliefs. The only explicit measure used was the personal decision about the choice of one of the two political candidates. The other limit was that the sample included only decided participants, and we could not investigate the role played by selective exposure for undecided individuals. In order to overcome these two points, a new study was conducted.

From the end of July to the end of September 2008, a sample of residents of Sicily and Veneto regions (Italy) completed several measures assessing their attitudes toward the plan to throw a bridge over the Straits of Messina (Italy). The measures included a single item question on whether participants were in favor, undecided or against the plan, a 8-survey items on participants' conscious beliefs about environmental, economic and social consequences of the plan, a SC-IAT designed to assess participants' automatic evaluative associations regarding the bridge, and a selective exposure task.

Results from Study 2 and Study 3 showed that in a situation of uncertainty there is not a clear and consolidate explicit attitudinal judgement yet. Instead, there is a pattern of propositions that, being all equally distant from the choice options, prevent individuals from choosing one option rather than the other. In other words, an undecided respondent hasn't that reference frame (that for a decided individual is represented by his overall consciously held beliefs) that allows him to establish if the propositional implication of a given affective reaction can be used as basis for the evaluative judgement, or it has to be rejected as a valid basis for the judgement (Gawronski, Strack, 2004; Gawronski, Bodenhausen, 2006). So, if it is true that selective exposure is driven by propositional thinking and it should be an additional strategy by which conscious beliefs consolidate themselves in the course of time, that strengthens those automatic associations that are in line with consciously held beliefs, and, at the same time, weakens those ones which are inconsistent with conscious beliefs, then we should not find selective choice of information for undecided participants. On the other hand, in line with the previous study, we hypothesized that for decided participants the relationships between conscious beliefs at Time

1 and automatic associations and conscious beliefs at Time 2 should be in part mediated by selective choice of information.

3.3.2. Method

Participants

A total of 90 participants took part in the study. Data from three participants had to be excluded from the analyses. One participants did not finish the selective exposure task, and two participants showed more errors than 20% in at least one of the two combined blocks of the SC-IAT. The final sample consisted of 47 residents of the Sicily region and 40 residents of the Veneto region (47 male and 45 female), whose age ranged from 18 to 65 years. Of them, 53 participants were decided and 32 were undecided at Time 1. Participants were tested individually in a single measurement phase, and the overall session took about 30 minutes. No gifts or money were given to them.

Procedure

To each participant was assigned a different numerical code, which was used to match their responses to the their responses on the different measures.

At the beginning of the session (Time 1), participants were asked to read a brief, neutral description of the plan to throw a bridge over the Straits of Messina, and to indicate their personal decision (against the bridge, undecided, or in favor of the bridge) using a continuum ranging from 0 to 15. Participants were then invited to complete a SC-IAT to assess their automatic mental associations as regards the bridge. Five pictures of the bridge represented the target category, and five positive and five negative words represented the evaluative dimension (Appendix 5). The whole procedure of this SC-IAT was similar to Study 3, but (according to Egloff et al. 2002; Gawronski, 2002), the order of the two critical blocks was the same for all participants. So, in the first critical block, all participants were asked to classify pictures of the bridge and positive words with D key, and negative words with K key. In the other critical block, positive words

had to be classified with D key, and pictures of the bridge and negative words had to be classified with K key.

Participants were subsequently asked to complete a survey including 8 items (ranging from 0 to 10) to assess their conscious beliefs about environmental (3 items), social (2 items), and economic (3 items) consequences of the bridge for the South of Italy and the Sicily island in particular. The order of measures was counterbalanced among participants.

After the survey, to the participants was given a booklet in which were included 6 couples of headlines drawn from four main Italian daily newspapers. Each couple included a favorable and an unfavorable headline about the bridge. Participants were invited to read one couple of headlines at a time, and, for each couple, to choose and indicate the headline they would have liked to investigate in a deeper way reading the whole article.

To the participants were subsequently given the 6 articles they had chosen, inviting them to read them.

Immediately after (Time 2), participants completed the same SC-IAT and the same questionnaire measures for a second time. At the end of the session, participants were asked to indicate their personal decision again, and those who were still undecided were invited to express in any case their preference (against or in favor of the bridge) (Time 3). Finally, participants were thanked and fully debriefed.

3.3.3. Results

For each participant, a index of automatic associations regarding the bridge was calculated by means of the D-algorithm (Greenwald et al. 2003). Scores were calculated so a higher index reflected more positive associations. The internal consistencies of the two SC-IATs were reasonably high with Cronbach's Alpha values of .87 (Time 1) and .93 (Time 2).

The 8 survey items were aggregated in a single score of conscious beliefs about the bridge, with higher scores indicating higher positiveness toward the

bridge. The internal consistencies of the two resulting scores were reasonably high with Cronbach's Alpha values of .82 (Time 1) and .85 (Time 2).

Finally, responses to the selective exposure task were combined to provide an overall index of selective exposure. For each participant, the index was computed dividing the total number of headlines (12) by the number of selected headlines in favor of the bridge. So, higher values indicated a selective choice of information in favor of the bridge.

Since the mean index of the second SC-IAT (Time 2) was not reliable (it did not show any stability for the decided and undecided participants, and it did not correlate with any of the other variables), this score was not considered in the subsequent analyses.

So, the present data couldn't allow us to investigate the relationships between automatic associations and conscious beliefs at Time 1 to automatic associations at Time 2.

*Decided participant*s. Thirty-three participants were against the bridge, and 20 participants were in favor of the bridge, both at Time 1 and Time 2.

An analysis of variance on the Dsc-iat index at Time 1 showed that the mean indexes of those who were in favor and those who were against the bridge were significantly different [$F(1,51) = 8,39$; $p = .006$, $\eta 2 = .141$]. The mean Dsc-iat index for each group is presented in Figure 1.

As expected, those who were in favor of the bridge had a higher mean survey score, and those who were against had a lower mean survey score. The mean survey scores are presented in Figure 2.

The analysis of variance showed that the mean scores of these two categories were significantly different both at Time 1 [$F(1,51) = 108.44$; $p < .001$, $\eta 2 = .680$] and Time 2 [$F(1,51) = 77.60$; $p < .001$, $\eta 2 = .603$].

In line with the results of Study 4, participants who were in favor of the bridge selected a larger number of favorable headlines, and participants who were against selected a larger number of unfavorable headlines (Fig. 3).

The indexes of selective exposure of these two group of participants were significantly divergent [$F(1,51) = 36.83$; $p < .001$, $\eta 2 = .419$].

Figure 1: Mean Dsc-iat index for decided participants who were in favor or against the bridge.

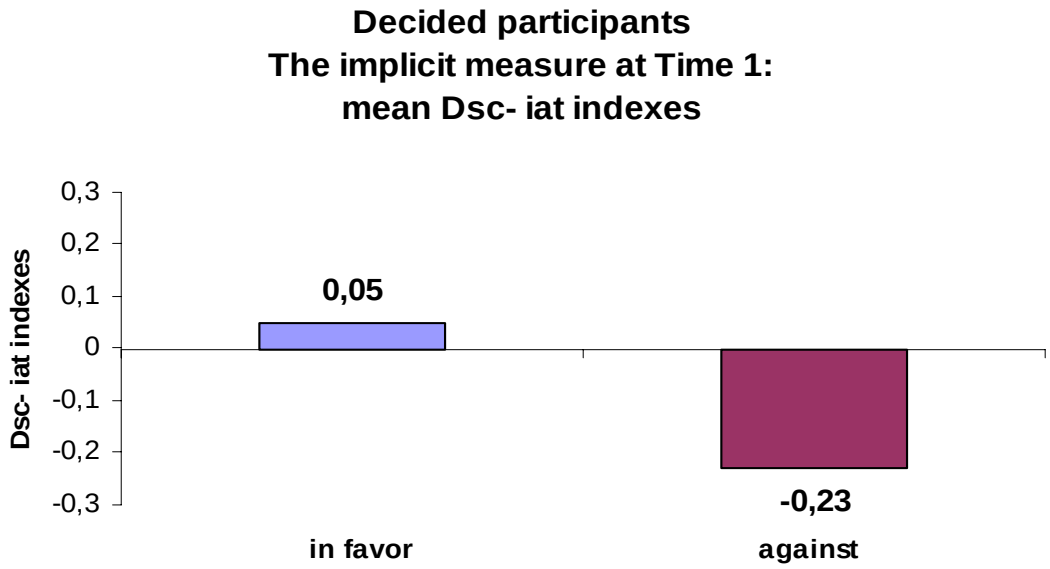


Figure 2: Mean survey score for decided participants who were in favor or against the bridge.

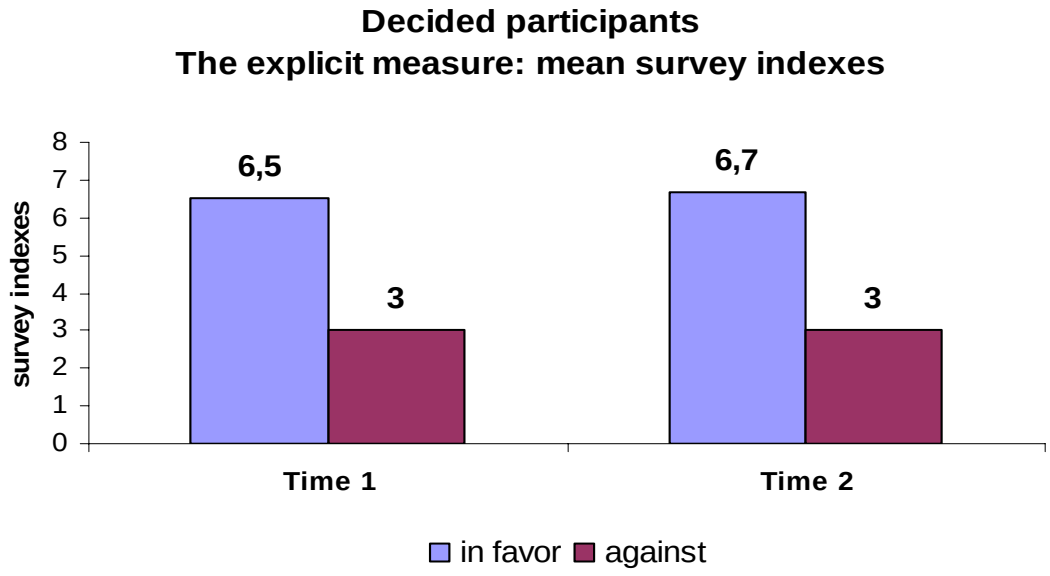
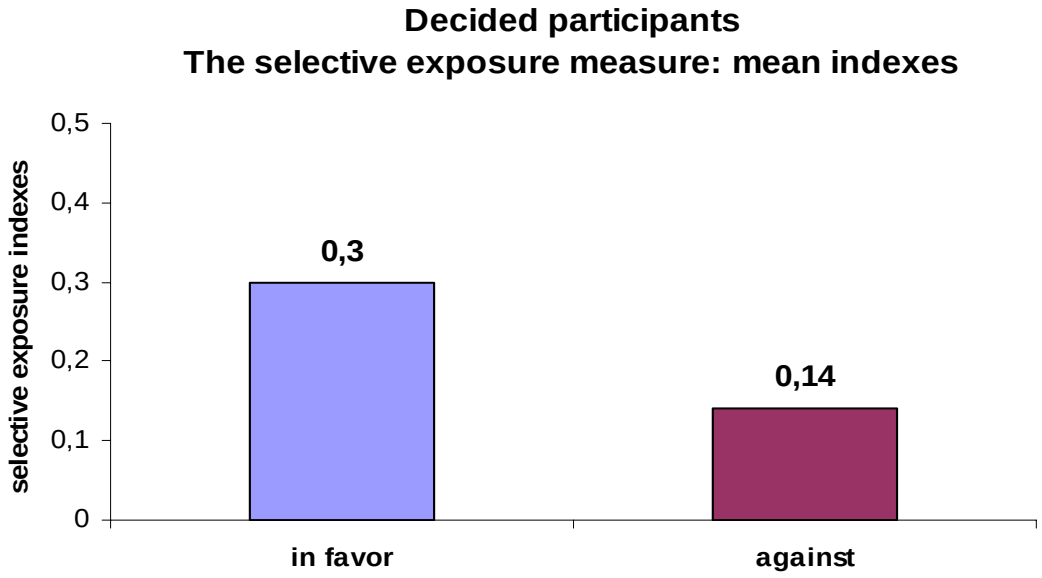


Figure 3: Mean index of selective exposure for decided participants who were in favor or against the bridge.



To test the relationships between automatic associations and conscious beliefs at Time 1 to conscious beliefs at Time 2 a multiple regression analysis was performed. The results (Fig.4) showed that conscious beliefs were highly stable [$t(52) = 20.98$; $p < .001$] and automatic associations at Time 1 were unrelated to conscious beliefs at Time 2 [$t(52) = 1.35$; $p = .18$].

A second multiple regression analysis was performed in order to verify the relationship between automatic associations and conscious beliefs at Time 1 to future choices (Fig. 5). Results showed that decision at Time 2 was significantly predicted by consciously held beliefs at Time 1 [$t(52) = 9.51$; $p < .001$], with automatic associations being unrelated to future choices [$t(52) = -.53$; $p = .59$].

These results clearly provided further evidence that findings from Study 3 were accurate: future choices and conscious beliefs of decided decision-makers are primarily based on earlier consciously held beliefs.

Figure 4: Prediction of changes in conscious beliefs of decided participants at Time 2 by automatic associations and conscious beliefs at Time 1. The figure shows standardized beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).

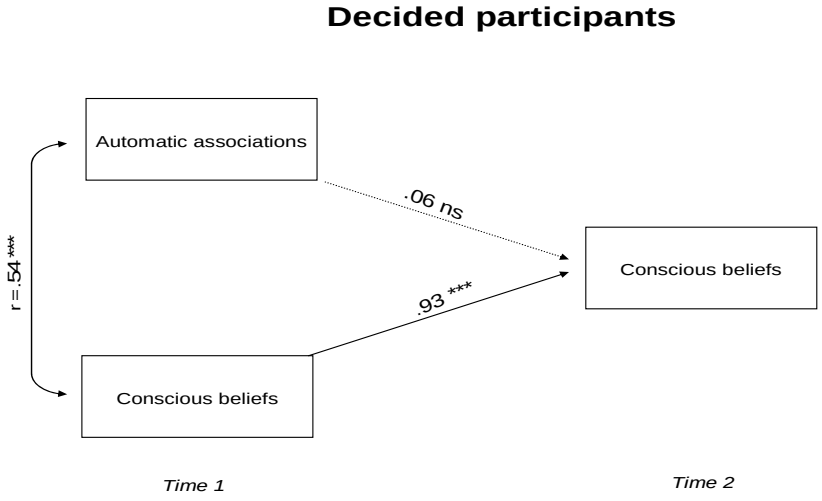
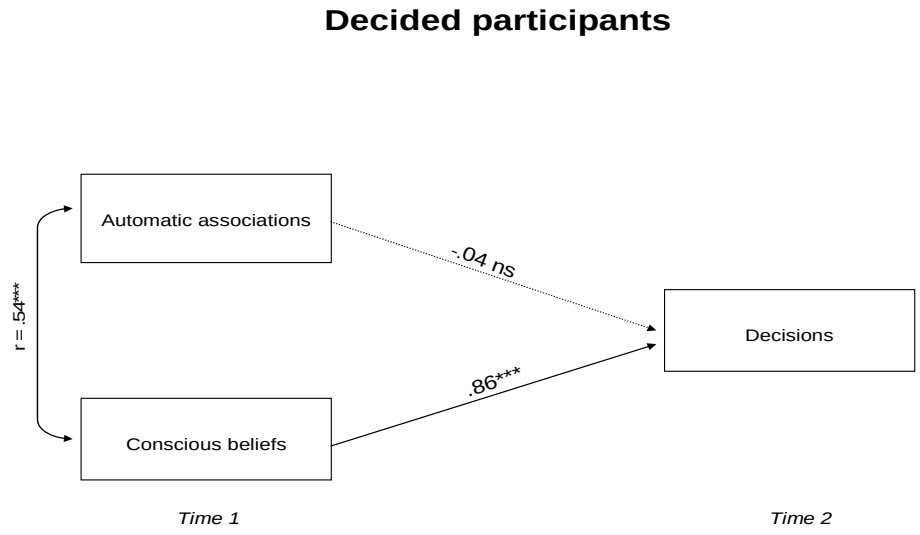


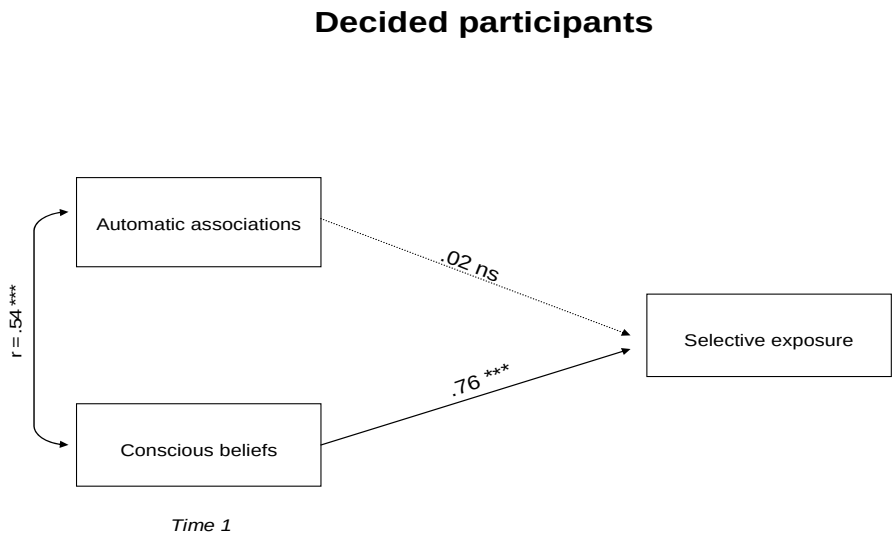
Figure 5: Prediction of future decision at Time 2 by automatic associations and consciously held beliefs at Time 1 for decided participants at Time 1. The figure shows standardized beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).



To investigate the relationships of automatic associations and conscious beliefs to selective choice of information, we simultaneously regressed participants' performances on the selective exposure task into automatic associations and consciously held beliefs at Time 1.

As expected (Fig. 6), the results indicated that participants' performances on the selective exposure task were uniquely predicted by conscious beliefs [$t(52) = 6.82$; $p < .001$].

Figure 6: Prediction of selective processing of information by automatic associations and conscious beliefs at Time 1. The figure shows standardized beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).

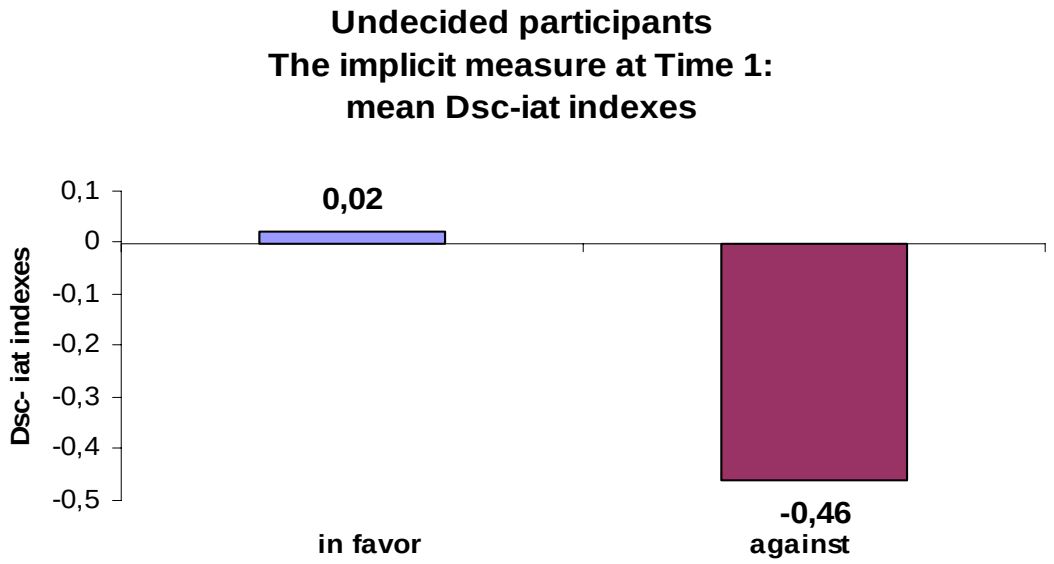


Undecided participants: Thirty-two participants were undecided at Time 1. At Time 2, ten of them were against the bridge, and 4 were in favor. The remaining 18 participants were still undecided, and they were invited to express in any case their preference. Ten of them indicated to be in favor, and 8 indicated to be against the bridge (Time 3). We focused on these 18 actual undecided

participants, and participants who reached the decision at Time 2 were excluded from the analyses.

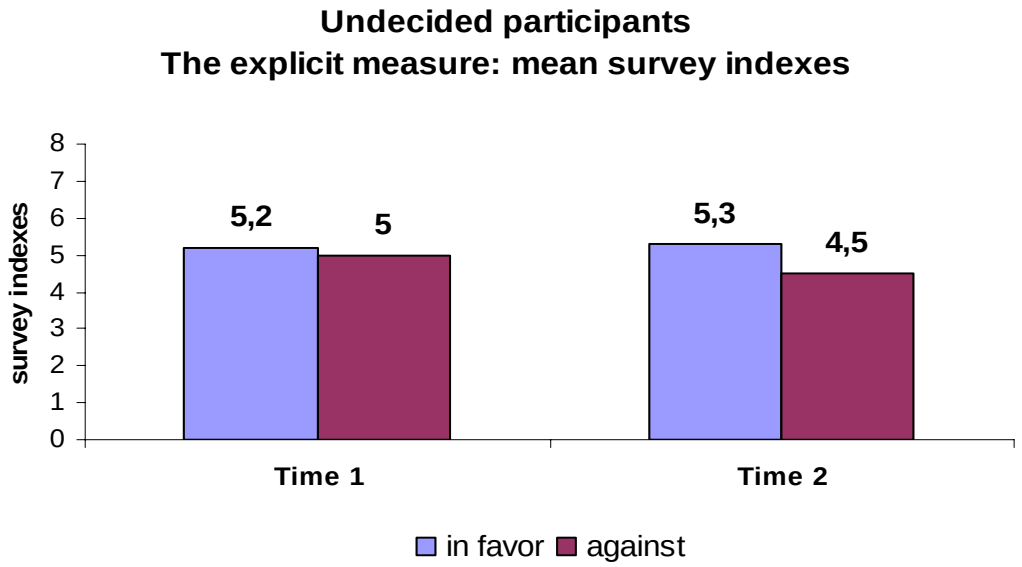
An analysis of variance on the Dsc-iat index at Time 1 showed that the mean indexes of those who were in favor and those who were against the bridge at Time 3 were significantly different [$F(1,16) = 8.94$; $p = .09$, $\eta 2 = .359$]. The mean Dsc-iat index for each group is presented in Figure 7.

Figure 7: Mean Dsc-iat index for undecided participants who were in favor or against the bridge at Time 3.



The obtained mean survey scores are presented in Figure 8. The analysis of variance indicated that there were not differences at Time 1; at Time 2, the mean scores of those who were subsequently in favor were significantly different from the mean scores of those who were subsequently against [$F(1,16) = 6.14$; $p = .025$, $\eta 2 = .278$]. This latest result may be explained as a consequence of the reading of the articles.

Figure 8: Mean survey score for undecided participants who were in favor or against the bridge at Time 3.



Those participants who were in favor of the bridge at Time 3 showed mean index of selective exposure that was not different from the mean index of selective exposure of those undecided participants who were subsequently against (Fig.9). As expected, this result clearly indicates that there is not selective exposure in the case of undecided participants.

A first regression analysis was conducted on decision at Time 3, in which conscious beliefs and automatic associations at Time 1 were entered as predictors (Fig.10). The results demonstrated that choices at Time 3 were predicted by automatic associations [$t(17) = 3.09$; $p = .007$], with conscious beliefs being unrelated to future decisions [$t(17) = 1.12$; $p = .28$]. These findings confirmed that automatic mental associations of undecided individuals bias future choices in such a way that these decisions reflect the evaluations implied by earlier automatic associations.

Figure 9: Mean index of selective exposure for undecided participants who were in favor or against the bridge at Time 3.

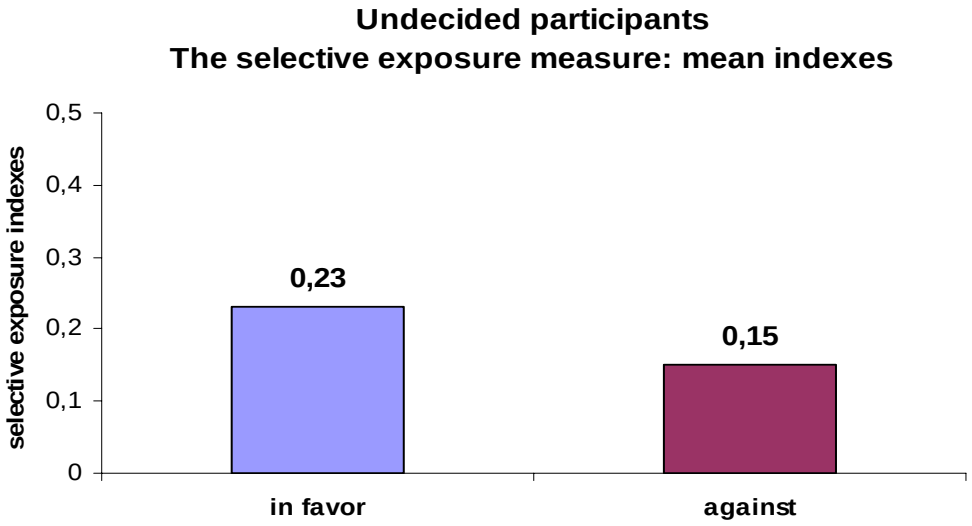
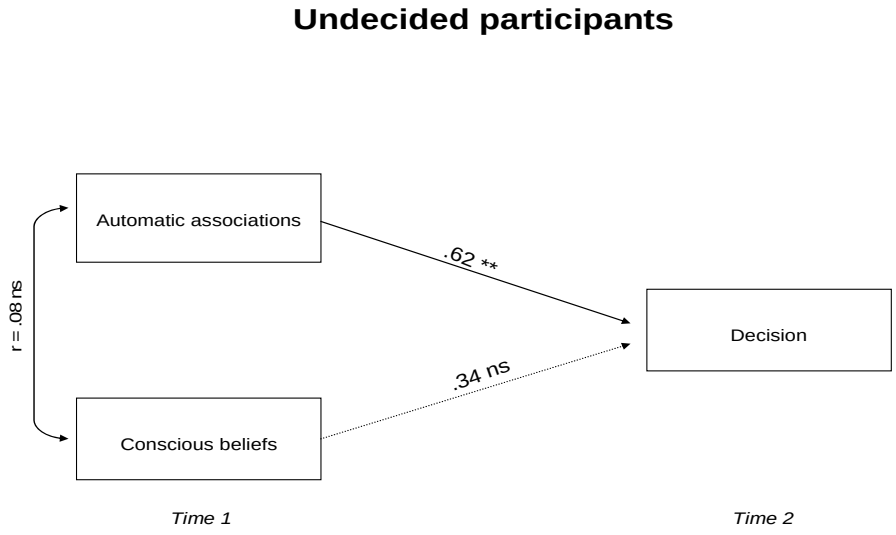


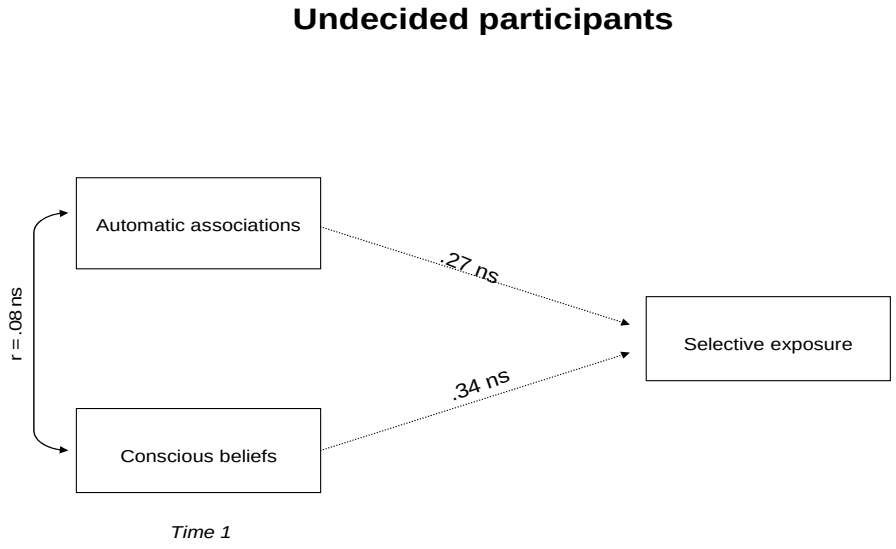
Figure 10: Prediction of future choices of undecided participants at Time 3 by automatic associations and conscious beliefs at Time 1. The figure shows standardized beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).



To further investigate the relationships of automatic associations and conscious beliefs at Time 1 to selective exposure, we simultaneously regressed participants' performances on the selective exposure task into automatic associations and consciously held beliefs at Time 1.

Confirming our hypothesis, the results (Fig.11) indicated that participants' performances on the selective exposure task were predicted neither by conscious beliefs at Time 1 [$t(17) = 1{,}46$; $p = .16$] nor by automatic associations at Time 1 [$t(71) = 1{,}17$; $p = .25$].

Figure 11: Prediction of participants' performances on the selective exposure task by automatic associations and conscious beliefs at Time 1. The figure shows standardized beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).



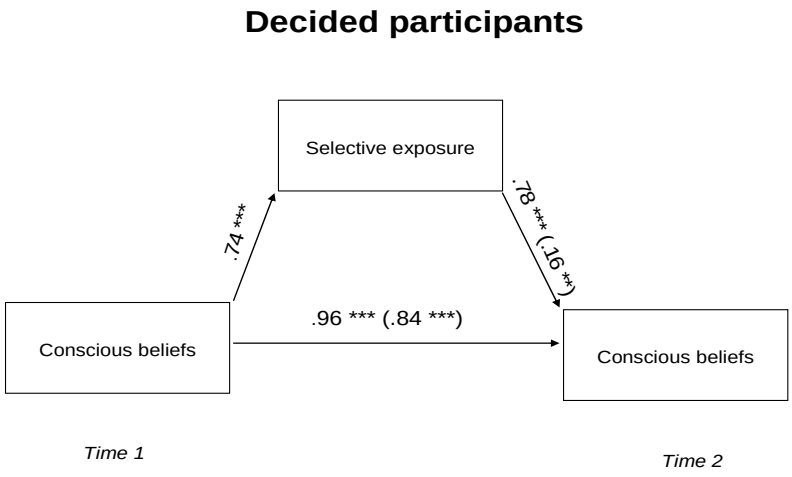
The mediation role of selective exposure. Follow-up analyses were conducted in order to verify if the consolidation of consciously held beliefs of decided individuals is in part mediated by selective choice of information.

According to Baron and Kenny (1986), the hypotheses were that (i) conscious beliefs at Time 1 should predict changes in conscious beliefs at Time 2; (ii) conscious beliefs at Time 1 should predict the selective choice of information; (iii) the selective choice of information should predict conscious beliefs at Time 2; and (iv) the relationship between conscious beliefs at Time 1 and conscious beliefs at Time 2 should remain significant after controlling for selective exposure, with the relationship between selective exposure and conscious beliefs at Time 2 being still statistically significant.

The results (Fig. 12) showed that conscious beliefs at Time 1 significantly predicted conscious beliefs at Time 2 [$t(51) = 25.23$, $p < .001$], and the selective choice of information [$t(51) = 7.97$, $p < .001$]. The selective choice of information significantly predicted conscious beliefs at Time 2 [$t(51) = 9.08$, $p < .001$]. The relationship between conscious beliefs at Time 1 and conscious beliefs at Time 2 remained significant after controlling for selective exposure [$t(50) = 15.85$, $p < .001$], with the relationship between selective exposure and conscious beliefs at Time 2 being still significant [$t(50) = 2.91$, $p = .005$]. A Sobel test showed a significant mediation of selective choice of information [$Z = 2.709$, $p = .006$]. This result confirmed the hypothesis that selective exposure is a propositional strategy that represents an additional basis through which conscious beliefs consolidate themselves.

This latest result suggested us a further step. As we stated in the introduction of this chapter, one of our starting hypotheses was that a discrepancy between automatic associations and conscious beliefs should lead to an enhanced selective search for additional information consistent with the explicit evaluative judgement. This enhanced selective exposure should satisfy the aim of corroborating the rejection of the affective reaction and of weakening those particular mental associations at the root of this affective reaction. That is, in the case of people who rejected a negative implicit evaluation in favor of a positive explicit judgement, or people who rejected a positive implicit evaluation in favor of a negative explicit evaluation, the selective exposure should play a stronger mediation role than in presence of consistency between implicit preference and explicit judgement.

Figure 12: Prediction of conscious beliefs at Time 2 by conscious beliefs at Time 1 and performances in the selective exposure task for decided participants. The figure shows (standardized) beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).

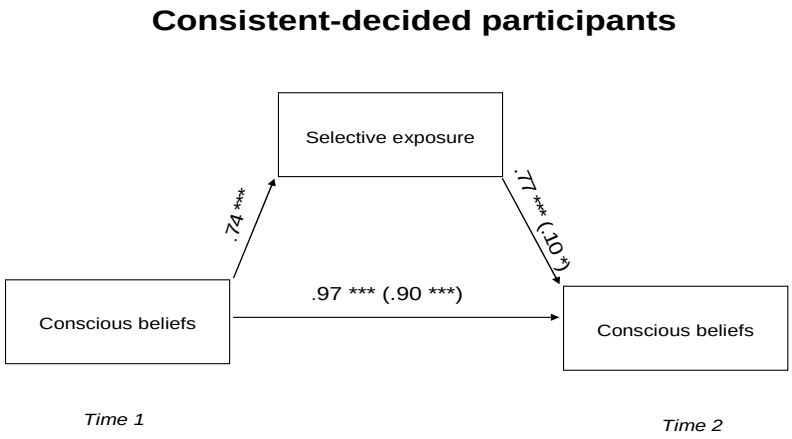


In order to verify this hypothesis, we created two new categories of decided participants. The first group included those decided participants who were against the bridge but displayed a positive Dsc-iat score and those decided participants who were in favor of the bridge but had a negative Dsc-iat score. The other group included those decided participants who displayed Dsc-iat scores consistent with their conscious beliefs. Eighteen 'inconsistent but decided participants' and 35 'consistent and decided participants' were found. In order to explore the role played by selective choice of information in these two new categories of participants, the same follow up analyses described above were conducted again.

As shown in Figure 13, in the case of 'consistent and decided participants', the results indicated that conscious beliefs at Time 1 significantly predicted

conscious beliefs at Time 2 [$t(34) = 25.51$, $p < .001$], and the selective choice of information [$t(34) = 6.38$, $p < .001$]. The selective choice of information significantly predicted conscious beliefs at Time 2 [$t(34) = 6.90$, $p < .001$]. The relationship between conscious beliefs at Time 1 and conscious beliefs at Time 2 remained significant after controlling for selective choice of information [$t(34) = 16.30$, $p < .001$], with the relationship between selective choice of information and conscious beliefs at Time 2 being still significant [$t(34) = 1.76$, $p = .07$]. A Sobel test confirmed a significant mediation of selective exposure [$Z = 1.689$, $p = .07$] for this group of participants.

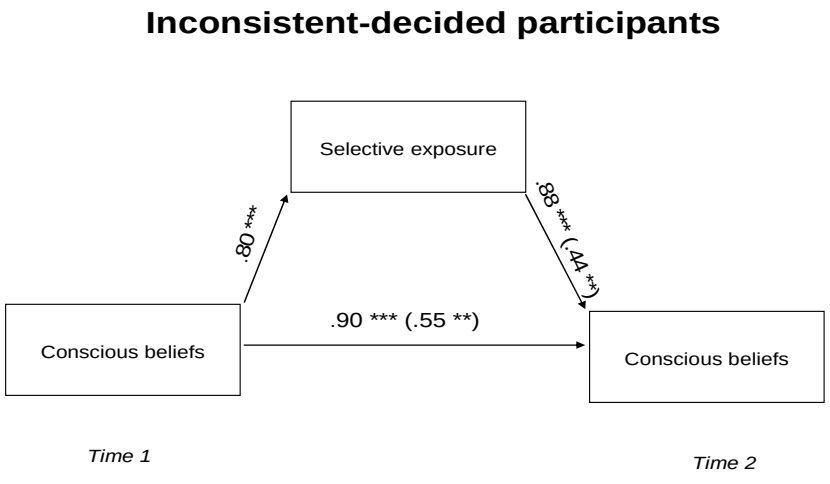
Figure 13: Prediction of conscious beliefs at Time 2 by conscious beliefs at Time 1 and performances in the selective exposure task for consistent and decided participants. The figure shows (standardized) beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).



On the other hand, for 'inconsistent but decided participants' the results were exactly as expected (Fig. 14). In fact, conscious beliefs at Time 1 significantly predicted conscious beliefs at Time 2 [$t(17) = 8.24$, $p < .001$], and the selective

choice of information [$t(17) = 5.34$, $p < .001$]. The selective choice of information significantly predicted conscious beliefs at Time 2 [$t(17) = 7.33$, $p < .001$]. Finally, the relationship between conscious beliefs at Time 1 and conscious beliefs at Time 2 resulted statistically significant after controlling for selective exposure, but to a lesser extent than for consistent and decided participants [$t(17) = 3.65$, $p = .002$]; more interestingly, the relationship between selective exposure and conscious beliefs at Time 2 resulted still statistically significant after controlling for conscious beliefs at Time 1, but to a greater extent than for consistent and decided participants [$t(17) = 2.93$, $p = .010$]. The Sobel test confirmed that the mediation of selective exposure was stronger for inconsistent but decided participants [$Z = 2.57$, $p = .01$] than for consistent and decided participants.

Figure 14: Prediction of conscious beliefs at Time 2 by conscious beliefs at Time 1 and performances in the selective exposure task for inconsistent but decided participants. The figure shows (standardized) beta-values of simultaneous multiple regression analyses (* $p < .05$; ** $p < .01$; *** $p < .001$).



3.3.4. Discussion

Taken together, the obtained results are particularly interesting. Confirming the findings of Study 4, they showed that conscious beliefs have a strong influence on selective choice of information, and that this strategy, carrying out a partial mediation role, provides an additional basis for consolidating consciously held beliefs in the course of time.

More importantly, such effect occurred only for decided but not for undecided participants, whose performances in the selective exposure task were predicted neither by automatic associations nor by conscious beliefs.

This latest result confirms further the claim that selective exposure is an inherently propositional phenomenon, suggesting that the pattern of propositions that constitute the overall consciously held beliefs of undecided individuals is not able to establish if the propositional implication of the arisen affective reaction can be used as a basis for the evaluative judgement, or it has to be rejected as a valid basis for the judgement (Gawronski & Strack, 2004; Gawronski & Bodenhausen, 2006).

As anticipated, the indexes of the second SC-IAT were not reliable, and then we could not directly test if the selective exposure represents a strategy through which conscious held beliefs strength in the course of time those automatic associations that are in line with the overall explicit attitudinal judgement, and, at the same time, weak those associations that are inconsistent with conscious beliefs. Nevertheless, we had the chance to provide deeper insights into the psychological mechanisms that underlie the obtained findings depicted above. We were able to define two categories of decided individuals, and we explored the impact of selective choice of information in those decided participants who displayed automatic associations which were consistent with conscious beliefs, and those decided participants who displayed implicit preferences inconsistent with explicit attitudinal judgements. The results exceeded our expectations, and demonstrated that the selective exposure played a stronger mediation role for inconsistent but decided participants than for consistent and decided participants. We consider this latest result also an indirect evidence that for

decided participants the relationship between conscious beliefs and automatic associations is in part mediated by selective exposure strategy.

3.4. General discussion

We conducted two studies in order to investigate a possible strategy by which conscious beliefs of decided participants influence automatic associations and consolidate themselves in the course of time. Applying cognitive dissonance theory and APE model's conceptualizations to our aim, we hypothesized that selective exposure should be a strategy by which propositional thinking searches and acquires information that is consistent with the explicit attitudinal judgement. Specifically, propositional thinking uses selective search of information in order to avoid the uncomfortable feeling caused by inconsistent cognitions, and in order to acquire further information that may consolidate conscious beliefs about a specific object in the course of time. At the same time, selective exposure should serve the goal of strengthening those associations that are in line with conscious beliefs, so these associations become stronger and more automatic in the course of time. More importantly, in those instances of discrepancy between automatic associations and conscious beliefs, selective exposure should be enhanced as propositional thinking has to corroborate the rejection of the affective reaction, and those particular mental associations at the root of this rejected affective reaction have to be weakened.

To simplify our working hypotheses, we expected that selective exposure strategy should carry out a partial mediation role in the relationship between conscious beliefs and automatic associations, and in the consolidation of consciously held beliefs in the course of time. We think that the obtained results exceeded our expectations. They showed that conscious beliefs influence selective choice of information, that, in turn, plays a partial mediation role in consolidating consciously held beliefs in the course of time. Moreover, they demonstrated that in presence of a discrepancy between implicit and explicit attitudes the partial mediation role of selective exposure is stronger than when implicit and explicit attitudes are consistent.

Considering that the indexes of the second SC-IAT were not reliable in Study 5, we could not directly test the effect of selective choice of information on automatic associations in the course of time. So, even if on the one hand these results are satisfactory, on the other hand they are incomplete. We are fully conscious of this limit, and we hope to overcome it by means of a new study as soon as possible.

General conclusions

1. On the basis of what undecided people make their decisions

The tackled topic and the obtained results deserve some conclusive reflections. With this work we investigated the differential impact of automatic mental associations and consciously held beliefs on future decisions by individuals who claim to be decided versus undecided.

For a long time, empirical research in social cognition has shown scant regard for this issue. As a result, only recently it has come out a line of research aimed at throwing light on how, despite a verbal report of uncertainty in pre-electoral surveys, undecided individuals will find a personal political decision (Galdi, Castelli, Arcuri, 2005; Arcuri, Castelli, Galdi, Zogmaister, & Amadori, 2008; Galdi, Arcuri, Gawronski, 2008).

Initially, our greatest interest was focused on investigating the predictive validity of the IAT as an instrument for the prediction of voting behavior of those who had a clear political preference at the moment of the administration of the test versus those who described themselves as still uncertain about how they will vote.

Thank to several studies, carried out before the 2001, 2006, and 2008 Italian General Elections, and before the 2004 and 2005 Italian Local Elections ~~of~~, we demonstrated that the IAT has an almost perfect ability in the prediction of voting behavior at the individual level, among decided voters (Galdi, Castelli, Arcuri, 2005). More importantly, our first underlying goal was to detect the implicit component of the not-yet structured decision process. In fact, the IAT, even if considered a reliable discoverer of implicit associations, so far has not been applied to the case of undecided individuals. The results described in the first chapter, clearly showed the existence of implicit political preferences in the attitudinal system of undecided voters too. These automatic associations were perfectly congruent with the political choices that were subsequently expressed, approximately one month later, during the vote (Arcuri, Castelli, Galdi, Zogmaister, & Amadori, 2008).

This interesting result encouraged us to step forward to investigate in a deeper way explicit attitudes of decided versus undecided individuals. In fact, ~~a~~ one of the limits of the first study was that we did not directly assess participants' conscious beliefs. The only explicit measure we used was the personal decision about the adoption of one of the two leading political candidates that participants made in the polling booth, the day of the election.

So, in the second study we assessed participants' explicit attitudes about a bill on *the facto* relationships using a survey that included questions about their political and religious beliefs, and two items particularly designed to detect their conscious beliefs about the bill.

The obtained results showed a large consistency between automatic mental associations, consciously held beliefs and future decisions among decided participants. Moreover, their future choices were primarily predicted by earlier conscious beliefs. More interestingly, those data showed at level of consciously held beliefs of undecided individuals a pattern of propositions which were equally distant from the choice options. On the other hand, undecided participants displayed a set of defined and well structured mental associations which were congruent with future decisions they would have expressed one week later. At the same time, those future decisions were to a significant extent determined by earlier automatic associations.

Starting from Gawronski and Bodehausen's APE model (2006), we interpreted this result as an empirical demonstration of what means to be undecided. In fact, the APE model posits that explicit attitudes are those evaluative judgements resulting from syllogistic inferences that specify the logical relationship between propositions. In line with this view, our findings strongly suggest that a situation of uncertainty is characterized by a set of propositional information relevant for the judgement that, being inconsistent and equally distant from choice options, are unable to validate the affective reaction. In other words, our idea is that undecided individuals know that they prefer a choice option over the other, but they don't have any element to establish if this preference is right or wrong. Under these conditions, a clear evaluative judgement cannot be expressed.

Despite the relevance of these results, the second study presented at least two main limits: The first is that participants' conscious beliefs were assessed using only two critical items; the second limit is that conscious beliefs were assessed only at Time 1. So, with the goal of verifying if automatic mental associations and conscious beliefs have a different role in predicting future choices, and, above all, in predicting changes in automatic associations and changes in consciously reported beliefs of decided versus undecided individuals, we conducted a third study.

In this case, the obtained results were judged very significant (Galdi, Arcuri, Gawronski, 2008). Examining the relationships between automatic associations and conscious beliefs recorded at two measurement occasions, which were one week apart for all participants, we found that for undecided participants conscious beliefs detected at Time 2 were to a significant extent predicted by their earlier automatic associations. Conversely, for decided participants conscious beliefs predicted changes in automatic associations in the course of time. Data from the third study also showed that for decided participants decisions recorded at Time 2 were uniquely predicted by earlier conscious beliefs, with automatic associations being unrelated to future choices; in contrast, future decisions of undecided participants were uniquely predicted by earlier automatic associations, with consciously held beliefs showing a non-significant relationship to future choices. So being the case one could say that people sometimes have already made up their mind, even though they don't know it yet.

2. What are the possible strategies by which automatic associations and conscious beliefs influence future decisions?

The findings depicted above raised an intriguing question. What are the possible strategies by which automatic associations of undecided individuals bias future decisions and changes in consciously held beliefs in the course of time At the same time, what are the possible strategies by which conscious beliefs of decided individuals affect future decisions and changes in automatic associations

in the course of time We chose to focus on decided decision-makers, and with the latest two studies we investigated the role played by selective exposure strategy.

Starting from cognitive dissonance theory (Festinger, 1957) and from the assumption that both the causes of dissonance experiences and the process of dissonance reduction are inherently a propositional phenomenon (Gawronski, Bodenhausen, 2006; Gawronski, Strack, 2004), we expected that propositional thinking should use selective choice of information in order to avoid the uncomfortable feeling caused by inconsistent cognitions, and in order to acquire further information which could consolidate pre-existent conscious beliefs about an attitudinal object in the course of time. In addition, we hypothesized that selective choice of information should reach the purpose of strengthening those associations which are in line with conscious beliefs, so these associations become stronger and automatic in the course of time. At the same time, in those instances of discrepancy between automatic associations and conscious beliefs, selective choice of information should be enhanced as propositional thinking has to corroborate the rejection of the affective reaction, and those particular mental associations at the root of this rejected affective reaction have to be weakened.

Conversely, considering that selective exposure should be driven by propositional thinking, and that a situation of uncertainty is characterized by a set of propositional information relevant for the judgement that, being inconsistent and equally distant from choice options, are unable to validate the affective reaction and prevent an individual from expressing a clear evaluative judgement, we expected that such strategy should occur only for decided, but not for undecided decision makers.

Results from Study 4 and Study 5 confirmed our working hypotheses. They displayed that for decided participants performances on the selective exposure task were uniquely predicted by conscious beliefs, with automatic associations being unrelated to selective choice of information. On the other hand, we did not find selective exposure in the case of undecided participants, and their performances on the selective exposure task were predicted neither by conscious beliefs nor by automatic associations. Our findings also demonstrated that for decided participants the relationship between conscious beliefs recorded at Time

1 and conscious beliefs recorded one week later remained significant after controlling for selective exposure, with the relationship between selective exposure and conscious beliefs at Time 2 being still statistically significant. In other words, selective choice of information, carrying out a partial mediation role, actually represents an additional basis for consolidating consciously held beliefs in the course of time. More interestingly, we provided evidence that in presence of a discrepancy between automatic associations and consciously reported beliefs the partial mediation role of selective exposure is stronger than when implicit and explicit attitudes are consistent.

3. Unresolved issues and future researches

Even if, unfortunately, we could not directly test the effect of selective choice of information on automatic associations in the course of time, we believe that results from the third chapter give a strong support to the idea that selective exposure is the strategy by which conscious beliefs of decided individuals not only consolidate themselves over time and affect future decisions, but also determine changes in automatic associations. In any case, our first aim for next future is to overcome the limits of Study 5 and to provide new data able to complete the findings depicted above.

Another unsolved issue is represented by the possible strategies by which automatic associations of undecided individuals bias future decisions and changes in consciously held beliefs in the course of time. Results from Study 3 clearly showed that automatic mental associations of undecided individuals bias future choices in such a manner that these decisions reflect the evaluations implied by earlier automatic associations. Earlier research suggests that automatic associations are capable of biasing the processing of new information in a manner that is in line with the meaning of these existing associations. For example, in two studies conducted by Hugenberg and Bodehausen (2003), white participants were asked to watch some movie clips in which the facial expressions of Black and White faces morphed from unambiguous hostility to unambiguous happiness (study 1), or morphed from unambiguous happiness to unambiguous

hostility (study 2). Depending on the particular study, participants' task was to indicate when the initial hostile expression ended, or to detect the onset of hostile expression. Moreover, participants completed a measure of their explicit racial attitudes and a racial IAT designed to detect their implicit prejudice. Results showed that participants identified hostility earlier or for a longer period in Black compared to White faces. More interestingly, enhanced perceptions of hostile expressions in Black faces increased as a function of automatic negative associations regarding Blacks, and such effect was unrelated to conscious beliefs. In another interesting study conducted by Gawronski and colleagues (2003), German participants were asked to read a short story about a young male target who was (depending on conditions) a Turkish or a German young man. The story described a target behavior that was held ambiguous with respect to a positive or a negative interpretation. Participants' task was to evaluate the target–behavior, and to predict his behavior in a number of hypothetical situations that could evoke either positive or negative behavior. Subsequently, participants were administered an IAT to assess the strength of negative associations toward Turkish compared with German people. Participants' explicit beliefs about Turkish people and their motivation to control prejudiced reactions were also assessed. The obtained results clearly showed that the described behavior was rated less negative when the target was German than when it was Turkish. Specifically, participants with strong negative associations towards Turkish people rated the behavior more negative when the target was Turkish than when he was German. More importantly, such bias effect tied to automatic associations remained unqualified by enhanced motivation to control biased responses. These results strongly suggest that automatic associations may influence information processing beyond conscious awareness.

Taken together, these studies suggest that automatic associations could distort the processing of new information by means of biased interpretations, so future decisions that are based on such distorted information will be in line with previously existing automatic associations.

Our second goal for the next future is therefore to complete results of Study 3 with the final objective to better understand the psychological processes by

which automatic associations of undecided people lead to a decision. The present work has moved towards this direction suggesting that, probably, uncertainty is an object less mysterious and inscrutable than it has been considered so far.

4. Some conclusive reflections

With the present work, we believe to have contributed to add a new perspective to the study of decision-making processes. Applying some social cognition's principles on decision making, we demonstrated that decision cannot be always considered as a very rational process, and that sometimes implicit preferences bias individuals' choices. The current results also offer a useful insight to research into persuasion, suggesting that when you are interested in convincing undecided individuals to choose in favor of one choice option against the other, you must act in advance. Every attempt during the days near the coming decision will be probably an ineffective effort.

In addition to their theoretical implications, this work is also particularly relevant for those engaged in the forecast of electoral results. Undecided voters often represent a relevant proportion of the electorate, and in many cases make the difference in the verdict of the polls. Especially in circumstances like these, an indication about the political preferences of those undecided people could be extremely valuable for people interested in voting forecasts. When the electoral choice is made very late, sometimes even inside the polling booth, implicit measures could improve our predictions. Polling agencies may combine probabilistic sampling with the simultaneous collection of both implicit and explicit political attitudes measures. In this way, implicit attitude measures may represent additional predictors that are expected to increase the ability to foresee future voting behaviors and electoral outcomes. We consider this latest aspect particularly relevant: Only using implicit and explicit measures jointly it is possible to achieve more clear and comprehensive results, which allow to provide useful insights about aspects that neither indirectly assessed attitudes, nor self-reported attitudes alone would be able to catch.

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Appendix 1

Stimuli used in the Implicit Association Test

Positive words: gioia [joy], amore [love], paradiso [heaven], felicità [happiness], piacere [pleasure], stupendo [wonderful]

Negative words: orribile [awful], dolore [pain], pericolo [danger], brutto [ugly], disastro [disaster]
Morte [death]

Pictures of Giancarlo Galan:

Pictures of Massimo Carraro:

Appendix 2

Stimuli used in the Implicit Association Test

Positive words: gioia [joy], amore [love], felicità [happiness], piacere [pleasure], stupendo [wonderful]

Negative words: orribile [awful], dolore [pain], brutto [ugly], disastro [disaster], morte [death]

Pictures of *the facto* relationships:

Pictures of traditional families:

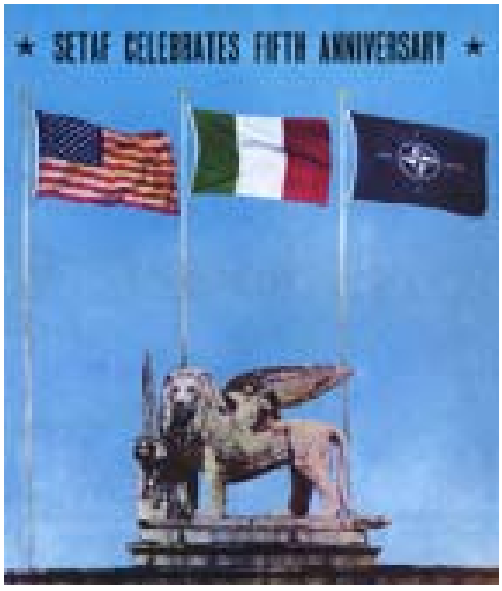
Appendix 3

Stimuli used in the Single Category Implicit Association Test

Positive words: gioia [joy], fortuna [lucky], serenita' [serenity], felicità [happiness], piacere [pleasure]

Negative words: orribile [awful], dolore [pain], pericolo [danger], brutto [ugly], disastro [disaster]

Pictures of the U.S. military base:



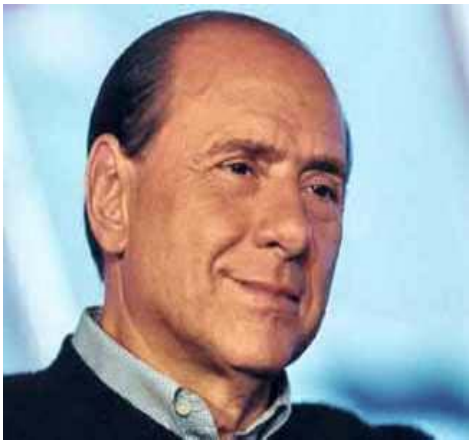
Appendix 4

Stimuli used in the Implicit Association Test

Positive words: gioia [joy], fortuna [lucky], serenità [serenity], felicità [happiness], piacere [pleasure]

Negative words: orribile [awful], dolore [pain], pericolo [danger], brutto [ugly], disastro [disaster]

Pictures of Silvio Berlusconi:



Pictures of Walter Veltroni:

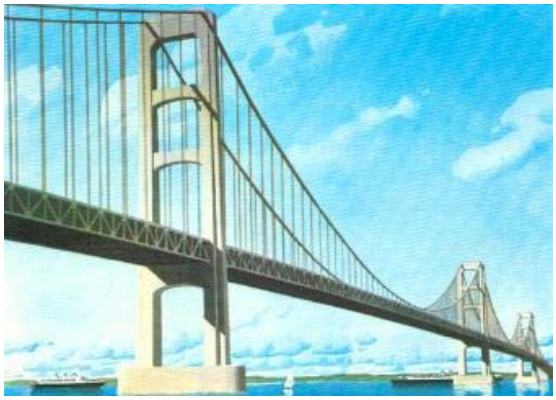
Appendix 5

Stimuli used in the Single Category Implicit Association Test

Positive words: gioia [joy], fortuna [lucky], serenità [serenity], felicità [happiness], piacere [pleasure]

Negative words: orribile [awful], dolore [pain], pericolo [danger], brutto [ugly], disastro [disaster]

Pictures of the bridge over the Strait of Messina:



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