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Brief Implicit Association Test: Validity and utility in prediction of voting behavior

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We employed the Brief Implicit Association Test (a recently developed short version of IAT) to measure implicit political attitudes toward four political parties running for Serbian parliament. To test its criterion validity, we measured voting intention and actual voting behavior. In addition, we introduced political involvement as a potential moderator of the BIAT's predictive and incremental validity. The BIAT demonstrated good internal and predictive validity, but lacked incremental validity over self-report measures. Predictive power of the BIAT was moderated by political involvement – the BIAT scores were stronger predictors of voting intention and behavior among voters highly involved in politics.

Key words: Brief Implicit Association Test, political attitudes, voting behavior, political involvement

There is mounting evidence that individuals' everyday behavior, thoughts and feelings is influenced by automatic processes. Various measurement techniques have been introduced in order to capture this automaticity: they typically require from respondents to react as quickly as possible to a presented stimulus so the answers at least partially result from processes that are beyond intention, awareness and control (e.g., De Houwer & Moors, 2007; Fazio & Olson, 2003).

One of the recently introduced techniques for implicit attitude measurement is Brief Implicit Association Test (BIAT, Sriram & Greenwald, 2009), a short version of a widely acknowledged Implicit Association Test (IAT, Greenwald, McGhee, & Schwartz, 1998). The IAT is designed to measure the strength of associations between concepts and evaluative attributes using a categorization task. Its shorter version intended not only to reduce the number of trials, but also to reduce spontaneous variation in subjects' response strategy. Because the BIAT is a relatively recent development, evidence for its validity is scarce.

The main aim of this research was to provide evidence of the utility of the BIAT in measuring political attitudes. This included verifying BIAT effects, examining relationships between the BIAT and parallel self-report measures,

testing the BIAT's predictive and incremental validity over self-report measures, as well as testing political involvement as a potential moderator in this field. Friese and Fiedler (2010) stated that correlations of BIAT measures with manifest behaviors, as a gold standard of validation, should be of special interest to researchers. Following their recommendation, the current study investigated the incremental validity of the BIAT over and above corresponding self-report measures and used actual voting behavior as a criterion. In line with previous research, we expected the BIAT to show modest but significant incremental predictive validity in the prediction of voting behavior over and above explicit self-report measures (e.g., Friese, Bluemke, & Wänke, 2007). In addition, we expected political involvement to moderate the predictive validity of implicit measures in voting and politics. The experiment was conducted in Belgrade, Serbia in a period three to one week prior to the 2008 Parliamentary Elections. At that time, four major political parties were running for parliament: the Democratic Party (DP) and Liberal Democratic Party (LDP) represented liberal political options, while the Democratic Party of Serbia (DPS) and Serbian Radical Party (SRP) represented conservative options. The fact that there were multiple attitude objects to evaluate led us to decide to use the brief version of Implicit Association Test as this was stated to be one of the situations it was especially suitable for.

We will first provide a short overview of the logic behind the BIAT and evidence of its validity in different domains; we will then discuss the nature of the relationship between implicit and explicit measures. Our focus will be on validity of both sets of measures: the question central to this study is whether the implicit measures (specifically BIAT measure) can independently contribute to behavior prediction and if involvement can moderate the predictive validity of the implicit measures.

BRIEF IMPLICIT ASSOCIATION TEST (BIAT): MEASUREMENT OF POLITICAL ATTITUDES

Just like the IAT, the BIAT measures the degree to which two target concepts (e.g., Liberal vs. Conservative position in politics) are associated in memory with positive or negative evaluations (e.g., words representing evaluative concepts *Good* or *Bad*). Respondents categorize the stimuli representing the target and evaluative concepts by using the assigned response key. The underlying assumption is that when two associated concepts share the same response key (e.g., Liberal and Good or Conservative and Bad in the case of liberal political supporters), this will facilitate the responses. In contrast, if two non-associated concepts share the same key, it will lengthen the response latencies. The difference in response latencies between the categorization tasks represents an implicit attitude estimate (e.g., "political orientation").

Although the IAT and its shorter modification share the same logic, the BIAT introduced significant modifications to the standard procedure. In

comparison to the IAT, in which respondents classify stimuli into four different categories (two categories of target concepts: e.g., Liberal and Conservative political option and two categories of attribute dimension: e.g., Good and Bad), the BIAT focuses on only two focal categories (for the detailed structure of the BIAT see Table 1): one pole of the attribute dimension (authors advise usage of positive pole as the focal one, e.g., Good) and one, focal pole of the concept dimension (e.g., Liberal). This means that participants respond with the focal key whenever an exemplar of one of the two focal categories is presented, and press the other key for “all other”, i.e. any stimuli that does not represent a focal category. As Sriram and Greenwald (2009) report, this modification results in shorter administration time and a reduction in the order effect (i.e. the order of the blocks within a procedure that may influence the IAT effect). BIAT measures are highly correlated with IAT measures, and the test seems to be equally reliable as the IAT (Sriram & Greenwald, 2009).

The BIAT is an effective technique when attitudinal objects have three or more categories for comparison (e.g., measuring attitudes towards several political parties). In such cases, determining implicit attitudes would imply combining several IATs, whereas the BIAT enables the creation of a comprehensive test with a reasonable duration. More precisely, the IAT comprises seven blocks and typically between 150 and 200 trials, while the BIAT consists of only three blocks and may have as few as 32 trials (Sriram & Greenwald, 2009). Therefore, applying the standard IAT for measuring political attitudes towards, for example, four political parties would consist of at least 900 trials and would require at least twice the amount of time as the BIAT procedure. Political system in Serbia is a multi-party system, with four major political parties grouped into two political blocks, and for that reason the BIAT represented an optimal solution for comprehensive measurement of Serbian voters' implicit political preferences.

There are few studies providing empirical evidence of the BIAT's validity: Sriram and Greenwald (2009) reported substantial correlations between BIAT attitude measures and corresponding self-report measures (correlations ranged from .46 to .76); so far, the predictive validity of the test was mostly investigated in psychiatry, for example in the studies where implicit attitude towards a certain medication was used as a predictor of patient's adherence to a treatment (Rüsch, Corrigan, Todd, & Bodenhausen, 2010; Rüsch, Todd, Bodenhausen, Weiden, & Corrigan, 2009). To our knowledge, no published study has tested the BIAT's predictive and incremental validity (over standard self-report measures) within the domain of voting behavior.

IMPLICIT AND EXPLICIT ATTITUDES

Despite the fact that researchers assume that explicit (self-report) and implicit attitude measures differ, and that they tap into different underlying processes (i.e., spontaneous versus deliberate) (e.g., Nosek, 2007; Nosek & Smyth, 2007), it is also suggested that these measures are related because latent factors (i.e.,

associations between certain concepts) are responsible for their shared variance (Olson & Fazio, 2009). Therefore, one of the most controversial questions in the validation of implicit measures is their relationship with explicit measures.

In a large meta-analysis, Hofmann et al reported that correlations between IAT measures and explicit measures from 126 independent studies ranged from .01 (for ethnic prejudice) to .47 (for consumer attitudes) ($r_M = .24$) (Hofmann, Gawronski, Gschwender, Le, & Schmitt, 2005). Such a wide span between the correlation coefficients led to a thorough empirical investigation of potential moderators of the explicit-implicit relationship. Rather than focusing on *whether these concepts relate*, researchers focused on *when they relate*. The findings suggest that a low correlation typically occurs in one of the following situations: (a) motivation to simulate an attitude (Hofmann et al., 2005; Lane, Banaji, Nosek, & Greenwald, 2007; Nosek, 2005, 2007); (b) central (versus peripheral, automatic) processing (Lane et al., 2007; Nosek, 2005, 2007); (c) low attitude strength or low attitude importance (Karpinski, Steinman, & Hilton, 2005; Nosek, 2005, 2007) and/or (d) lack of introspective insight (Hofmann et al., 2005).

Different studies typically demonstrate high implicit-explicit correlations for political attitudes (e.g., Greenwald, Poehlman, Uhlmann, & Banaji, 2009; Nosek, 2005; Nosek, Banaji, & Greenwald, 2002). It seems that there are two possible reasons for this. Firstly, self-presentation and social desirability biases may be relatively low when reporting political attitudes (e.g., Nosek, 2005; 2007) and secondly it is possible that introspective insight (i.e., access to stored knowledge) is greater for political attitudes in comparison to other domains (Hofmann et al., 2005). Namely, in comparison to prejudice for example, people need to provide argumentation to support their political attitudes as they are more often articulated in social interaction. This fact may lead to higher accessibility of this type of attitudes.

PREDICTIVE AND INCREMENTAL VALIDITY OF IMPLICIT MEASURES

Because the ultimate goal of every psychological measure is to predict human behavior, the following important questions regarding implicit measures emerge: (a) do they predict specific behaviors more accurately than explicit measures? and/or (b) do they contribute independently to certain behavior predictions? A meta-analysis of 122 research reports in nine different domains found that the average correlation between IAT measures and behavioral, judgment and physiological measures was .27 (Greenwald et al., 2009). This study demonstrated that IAT measures represent valid predictors of behavior across all measured domains, with the largest correlations obtained for *political preferences* ($r_M = .48$). Moreover, Greenwald and associates (2009) established that IAT measures show incremental validity over self-report measures. The average partial correlation of IAT measures with criterion measures (when the correlation with self-report measures was partialled out) was .18, while the average partial correlation of self-report measures (when the correlation with IAT

measures was partialled out) was .32. Regarding measures of political attitudes, both types of measures possess incremental validity, but the incremental validity of self-report measures is substantially superior to the incremental validity of the corresponding IAT measures (Greenwald et al., 2009). The validity of IAT measures in measuring political attitudes was comprehensively tested in a study conducted prior to the 2006 Italian federal elections on a representative sample (Roccatò & Zogmaister, 2010). The authors showed a significant and consistent relation between IAT and voting behavior and reported that IAT added significant, although modest, incremental predictive power to explicit attitudes. Friese and associates (2007) reported similar findings using the single target IAT (ST-IAT¹). They found that this measure showed incremental validity over and above explicit measures in the prediction of both voting intention and self-reported voting behavior and that it improved the prediction of voting behavior over and above voting intention.

MODERATORS OF THE PREDICTIVE VALIDITY OF IMPLICIT ATTITUDE MEASURES

In addition to investigating the main effects of implicit measures, research has addressed conditions under which implicit measures predict behavior. Research shows that measures are generally better than the corresponding explicit measures in predicting spontaneous behaviors and behaviors related to socially sensitive topics (Greenwald et al., 2009; Perugini, Richetin, & Zogmaister, 2010). The sensitivity of the topic typically triggers impression management processes and therefore affects self-report measures, reducing their predictive validity. Because voting is a deliberate act and is typically not considered a socially sensitive topic, it can be assumed that implicit measures would show modest incremental power in the prediction of voting behavior.

Individual differences in attitude accessibility can also serve as moderators of the predictive power of implicit measures. When people are not aware of their attitudes and are thus not able to report them, implicit measures take precedence over the explicit measures in behavior prediction. Within the domain of political attitudes, Arcuri and associates showed that implicit measures exceeded explicit measures in their predictive power of voting behavior among self-reported undecided voters (Arcuri, Castelli, Galdi, Zogmaister, & Amadori, 2008; Galdi, Arcuri, & Gawronski, 2008).

A manifold of studies have shown that various indicators of attitude strength (e.g., attitude importance, personal involvement, attitude accessibility) moderate the relationship between explicit attitudes and behavior. Within the domain of political attitudes, several studies found greater attitude-behavior consistency among people who considered the particular attitude as more

1 The ST-IAT represents a version of the IAT in which one target category is used instead of two (for a detailed description, see Friese et al., 2007).

personally important (e.g., Jaccard & Becker, 1985; Krosnick, 1988). For example, Krosnick (1988) showed that attitudes on specific policy issues were more likely to shape voting behavior (i.e., preferences for different candidates) among people who evaluated those policy attitudes as important. By the same token, Fazio reported that attitude-behavior consistency is moderated by the strength of the association between an object and a summary evaluation of the object (Fazio, 1990). In the domain of implicit attitudes, Karpinski and associates (2005) demonstrated that attitude importance moderates the relationship between IAT and self-report measures such that as attitude importance increases, the strength of the relationship between IAT and self-report measures increases as well. Therefore, it can be hypothesized that personal involvement in politics, as an indicator of attitude importance, may moderate the predictive validity of implicit measures of political attitudes. It is more likely for implicit measures of political attitudes to be a good predictor of future voting behavior among people who are involved in politics, emotional towards political issues and with high levels of introspective insight.

STAGE ONE: THE BIAT AS A MEASURE OF POLITICAL ATTITUDES

The purpose of this stage of the research was to determine the effects of the BIAT and its metric characteristics in measuring political attitudes, particularly the relationship between BIAT measures and corresponding explicit measures. We expected implicit and corresponding explicit measures of political attitudes to correlate significantly, as has been previously reported by several studies using the IAT (e.g., Arcuri et al., 2008; Nosek et al., 2002; Roccoato & Zogmaister, 2010) and the BIAT (e.g., Sriram & Greenwald, 2009).

Method

BIAT measures. Six different BIATs were designed and administered to assess implicit political preferences towards four political parties from Serbia that represented BIAT target concepts (i.e. LDP, SRP, DP, DPS). There were six different BIAT measures (and 12 different BIAT blocks) because the present study measured implicit preferences of every chosen political party over the other (LDP over SRP, LDP over DP, LDP over DPS, SRP over DP, SRP over DPS and DP over DPS). Attribute categories in each BIAT were the same as those in the BIAT study by Sriram and Greenwald (2009), i.e., *good* and *bad*. We decided the focal category of an attribute concept in each BIAT to be *good*, as the BIAT procedure with the *Bad* focal category demonstrated relatively low reliability and criterion validity (Sriram & Greenwald, 2009). Each block had 24 trials that included the following: six exemplars of attribute category *good*, six exemplars of attribute category *bad*, six exemplars of one target category (i.e., political party) and six exemplars of the other target category. Subjects received one of eight pre-randomized sequences that varied the position of different BIATs within the overall sequence. An example of the Liberal Democratic Party over Serbian Radical Party BIAT is provided in Table 1. Following the recommendation of Greenwald et al. (1998), we counterbalanced the order of different blocks of trials across subjects. Measures of association strength (or strength of implicit preferences) based on the BIATs were computed using the

improved scoring algorithm for *D* measure (as suggested in Greenwald, Nosek, & Banaji, 2003). *D* measure represents an effect-size-like measure with a possible range from -2 to $+2$; the higher absolute score on this measure indicated stronger preference towards one party over the other, and the number sign indicated which of the two parties from a pair is preferred.

Table 1. *Structure of Liberal Democratic Party – Serbian Radical Party attitude BIAT*

Blocks	Number of trials	Items assigned to left/nonfocal key	Items assigned to right/focal key
1	24	Serbian Radical Party & Unpleasant words	Liberal Democratic Party & Pleasant words
2	24	Liberal Democratic Party & Unpleasant words	Serbian Radical Party & Pleasant words

Stimuli. Names of the political parties, their acronyms, as well as the full names and photographs of their political leaders were used as category exemplars of the target concepts. Exemplars for the attribute category were selected from the Connotative dictionary for Serbian language (Jankovic, 2000a, 2000b)². Concepts that had prominent positive or negative affective valence were selected. Each chosen concept had a matching opposite. Stimuli from the attribute category *good* were as follows: happiness, joy, success, victory, love and smile. Stimuli from the attribute category *bad* were as follows: sadness, sorrow, failure, defeat, hate and cry. Following the recommendation by Lane et al. (2007), attributes from the *bad* category that began with the letter N were excluded in order to avoid facilitation in the categorization task. From a database of a news portal (www.mondo.rs), headshot photographs of party leaders were selected as exemplars of target concepts. The photographs were of similar resolution and size and placed on a black background. Because affective valence of politicians' facial expressions can confound the BIAT effect, photographs in which political leaders displayed neutral facial expressions were chosen on the basis of independent raters' agreement (see Appendix 1). Respondents' familiarity with the photographs was pretested and all respondents recognized the portrayed leaders. This fact, along with the argument that the IAT effects are driven primarily by the properties of the categories and not exemplars (De Houwer, 2009), led us to believe that the risk of multiple categorization of photos in BIAT in our study was minimal.

Explicit measures. Each participant provided ratings of all political parties and their leaders on a seven-point semantic differential scale anchored with *1-bad* and *7-good*, the same attributes that were used in the BIAT. For each participant, an overall rating of particular political option was computed as an average of the respondent's evaluation of a leader and corresponding political party. An explicit measure indicating preference of one political option over the other was constructed by subtracting the ratings of these political options. In this manner, six measures of explicit political preference (corresponding to six BIAT measures of implicit political preference) were obtained, with a range from -6 (extreme preference of second party in pair over the first) to 6 (extreme preference of first party over the second). A zero score on this parameter indicated that a participant did not favor one political option over the other.

2 Connotative dictionary is the large set of standardized, emotionally-evocative words that includes contents across a wide range of semantic categories. It was developed to provide a set of normative lexical stimuli that can be used for further experimental investigations of affective meaning-related phenomena.

Other measures. Additionally, we asked participants about their voting intentions regarding the upcoming elections for Serbian parliament and their involvement in politics. We made use of this measure in the second stage of this research, and will describe them in more detail in that section.

Participants. A total of 221 undergraduate psychology students from the University of Belgrade, Serbia participated in the study in exchange for course credits. All participants were eligible to vote in the 2008 Parliamentary Elections. They were given the option of taking the test under a code name, and 58 of them choose to do so.

Procedure. Subjects provided data on their political attitudes using notebook computers in individual cubicles. The order of measurement collection of implicit versus explicit measures was counterbalanced across subjects.

Results

Implicit and explicit measures. In order to avoid extensive and detailed multiple comparisons of all single BIAT measures and corresponding explicit measures, and more importantly to provide a systematic overview of our results, we decided to introduce an overall composite BIAT measure and to put an emphasis on this measure in further analysis. As LDP and DP were representatives of liberal political options in Serbia, and SRP and DPS both represented conservative options, we computed a composite D measure of implicit preference of conservative over liberal political block. Following the algorithm for D measure calculation (Greenwald et al., 2003), this measure was computed by subtracting the average RT from those BIAT blocks where liberal stimuli (stimuli representing LDP and DP) were matched with pleasant words, from the average RT from BIAT blocks where conservative stimuli (stimuli representing SRP and DPS) were matched with pleasant words, and dividing the outcome by the overall SD of RTs in these blocks. We computed a corresponding composite explicit measure by subtracting the average evaluations of leaders and political parties from the liberal political block from those from the conservative political block. The average value of the composite BIAT measure was 0.19 and it ranged from -0.62 to 0.97. The corresponding explicit measures ranged from -3 to 2.75, with an average value of -1.07. The majority of the participants (75.6%) expressed an explicit preference towards liberal over conservative political parties, 18.1% expressed a preference towards conservatives and 5.4% provided identical ratings for both the conservative and liberal political option³.

BIAT effect. The results of two-way ANOVA showed a significant interaction effect of explicit political preference (three levels: liberal, conservative and neutral) by different BIAT tasks (two levels: good-liberal and good-conservative) on the average categorization time of the respondents ($F(2, 216) = 39.95, p < .001, \eta^2 = .27$). This indicates that liberal, conservative political supporters and neutral individuals performed differently on the two BIAT categorization tasks. Specifically, participants who explicitly preferred the conservative political option were faster on trials in the good – conservative option block ($M = 782.87, SE = 22.73$) than

3 The distribution of political preferences did not reflect that of the general population.

on trials in the good – liberal option block ($M= 825.14$, $SE= 26.93$), $t(39) = -3.16$, $p=.003$, $\eta^2= .20$. Likewise, participants who explicitly preferred liberals over conservatives were faster on trials in the good – liberal option block ($M= 751.03$, $SE= 9.46$) in comparison to trials in the good – conservative option block ($M= 829.43$, $SE= 10.34$), $t(166)= 13.80$, $p<.001$, $\eta^2= .53$. Subjects who reported the same ratings for both options had nearly the same average response time in both blocks ($M= 895.90$, $SE= 35.38$ and $M= 896.31$, $SE= 50.71$), $t(11)= -0.01$, ns and were significantly slower than other subjects (see Figure 1), $t(217)= -2.70$, $p=.008$, $\eta^2= .03$. Explicit political preference by different BIAT tasks interaction effects were obtained on all single BIAT measures as well. In all cases, except for the Democratic Party of Serbia over Serbian Radical Party BIATs, respondents were faster in performing the BIAT task that was congruent with their explicit preference than in performing the incongruent task, while undecided participants responded equally slow in both tasks.

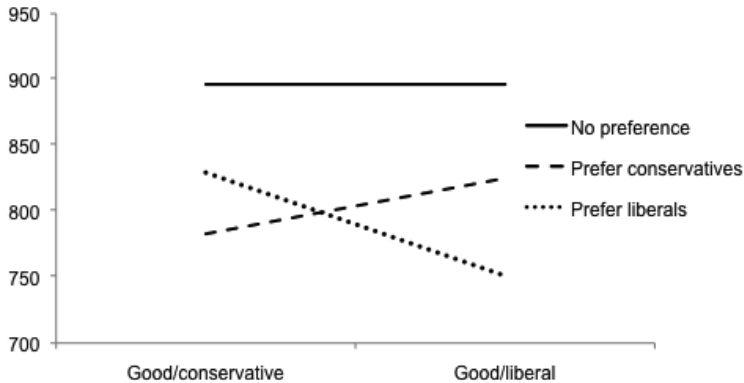


Figure 1. Average RTs for subjects with different political preferences in the opposite BIAT blocks

Reliability and criterion validity of the BIAT. Following the procedure of Karpinski and Steinman (2006), we split each combined BIAT block into thirds and calculated the BIAT score separately for each third of the trials, without dividing it by its standard deviation. We then obtained the measure of internal consistency by calculating the average intercorrelation among these scores. Finally, we adjusted it by applying the Spearman–Brown method of correction to compensate for the underestimation of the true internal consistency due to splitting the BIAT into thirds. The composite BIAT score showed reasonable internal consistency ($\alpha=.75$). The internal consistency of single BIAT measures ranged from .48 to .77, with a median of .64. Given that the single BIATs had a significantly fewer number of trials than the composite BIAT and that the obtained consistency coefficient was only slightly lower than those typically

obtained using the IAT (e.g., meta-analysis of a large number of studies showed that the average internal consistency of the IAT is .79, Hofmann et al., 2005), it can be stated that the BIAT measure generally retained acceptable internal consistency even with significantly lower number of trials.

The correlation between the composite BIAT measure and the parallel explicit measure was $r = .64$, $p < .001$. Correlation coefficients between single BIATs and corresponding measures of explicit attitudes ranged from .16 to .51, with a median of .35, and were all significant at the $p < .001$ level, except one correlation coefficient ($r = .16$) that was significant at the $p < .05$ level. Such criterion validity coefficients were in line with those obtained with the IAT measure (e.g. $r_M = .24$, Hofmann et al., 2005).

Discussion

The current results suggest that, depending on their self-reported political preferences, people differed in their response time to different BIAT tasks in a logical fashion – they needed more time to process stimuli in incongruent conditions than in congruent ones. Interestingly, however, participants with no political preferences responded markedly slower than groups with a clear preference. The fact that they did not have any preferences might have led to their inability to simplify the tasks, i.e. they were unable to use the commonalities in terms of valence connotation of the target and attribute categories in order to reduce the task difficulty in any of the blocks.

The BIAT score calculated on the bases of the difference in response time demonstrated both satisfactory internal consistency for an RT measure and strong criterion validity. Strong correlations between explicit and implicit measures additionally implied that explicit and implicit measures of political attitudes reflect the same construct and that they likely tap similar underlying processes.

STAGE TWO: TESTING THE BIAT'S PREDICTIVE AND INCREMENTAL VALIDITY

The purpose of the second stage of the research was to examine the predictive and incremental validity of the BIAT in the prediction of both voting intentions and actual voting behavior. Previous studies that employed procedures similar to the BIAT, such as the IAT (Roccatò & Zogmaister, 2010) and ST-IAT (Friese et al., 2007), suggested that implicit measures of politic preferences add to the predictive power of explicit measures. It is hypothesized that personal involvement in politics, as an indicator of attitude importance, moderates the predictive validity of the BIAT.

Method

Subjects and procedure. In the second phase of data collection, which was conducted two days after the elections, we asked our respondents about their actual voting behavior. A total of 152 subjects from the previous stage participated in this phase.

Dependent variables. The following served as dependent measures: (a) **Voting intention**, defined as respondents' choice on the following question: *Which political party will you vote for in the coming Parliamentary Elections?* They chose between the four main Serbian political parties, an "other" option and a non-voting option. (b) **Involvement in politics**, assessed by a five-item Likert-type attitude scale (e.g., *I am well informed about political affairs in my country; I often talk about politics with my friends; I am engaged in politics*) that was anchored with 1 (*I do not agree*) and 5 (*I completely agree*). The total level of involvement was computed as a sum of the scores on these five items. The scale demonstrated satisfactory internal validity ($\alpha=.84$). (c) Finally, respondents' **actual voting behavior** was defined as the choice that they marked on the following question: *Which political party did you vote for in these Parliamentary Elections?* (the non-voting option was included).

Results

Voting intention and behavior. Most respondents stated that they planned to vote for the Democratic Party (38.4%); 19.6% said that they would vote for the Liberal Democratic Party, while considerably fewer respondents declared that they would vote for the conservative political options (10.5% in total for the Serbian Radical Party and the Democratic Party of Serbia). Only 2.7% of participants answered that they would vote for a party not listed among these (*other* option). A significant number of respondents (28.8%) reported that they did not plan to vote.

Regarding actual voting behavior, the majority of respondents from the second phase did not vote (50.7%)⁴; 28.9% of respondents reported that they voted for the Democratic Party; 14.5% stated that they voted for the Liberal Democratic Party. Few people stated that they voted for conservative political parties (5.2%), and only 0.7% of them answered that they voted for a party that was not among the offered answers. Because this significant restriction in voting behavior appeared, we conducted the analysis of the BIAT's predictive and incremental validity regarding actual voting behavior on a sample of non-voters and liberal voters (a total of 143 respondents).

Voting intention: predictive and incremental validity of the BIAT and political involvement as their moderator. Both composite and single BIAT measures were tested for their predictive and incremental validity. The criterion measure consisted of the following five different categories: four groups of respondents who reported that they would vote for one of the four major political parties and a fifth group who reported that they did not plan to vote⁵. Results of one-way

4 The most frequently reported reasons for not voting were remoteness of polling stations (72.7%), lack of interest (26.0%) and sickness (1.3%).

5 Since only 2.7 % of the participants reported that they would vote for a political party that was not listed among the offered answers, they were excluded from the analysis.

ANOVA showed that the composite BIAT measure significantly discriminated against people of different voting intentions ($F(4, 208) = 17.59, p < .001, \eta^2 = .25$). A stepwise predictive discriminant analysis was conducted to determine the overall predictive and incremental validity of all single BIAT measures; it yielded two significant discriminant functions. The first function primarily consisted of measures that represent preferences *between* opposite political blocks (e.g., SRP-DP BIAT), (Eigenvalue = .43; Canonical correlation = .55; Wilks's lambda = .63), $\chi^2(12, N=213) = 94.02, p < .001$. On the other hand, the second function had the largest absolute correlations with measures representing the preference *within* political blocks (i.e., DP-LDP BIAT), (eigenvalue = .09; Canonical correlation = .28; Wilks's lambda = .91), $\chi^2(6, N=213) = 19.29, p = .004$. These functions correctly classified 50% of the original grouped cases. These results suggest that BIAT measures of political attitudes represent significant predictors of voting intention. Conversely, when both explicit and implicit measures were entered into the stepwise discriminant analysis procedure and used for voting intention prediction, the BIAT measures became redundant, indicating that the BIAT measures do not have incremental validity over explicit measures.

Based on their score on the involvement in politics scale, respondents were classified into three groups using the following split: non-involved (lower 25%), moderately involved (medium 50%) and highly involved (upper 25%). Results showed that the predictive power of the BIAT increased with involvement. Namely, while the composite BIAT measure remained predictive of voting intention among those who were highly and moderately involved ($F(4, 47) = 4.49, p = .004, \eta^2 = .28$; $F(4, 106) = 9.30, p < .001, \eta^2 = .26$, respectively), it was not a significant predictor of voting among non-involved participants ($F(3, 46) = 2.15, ns$). Furthermore, regarding the predictive validity of single BIAT measures, the stepwise discriminant analysis yielded significant canonical functions for highly involved ((eigenvalue = .56; canonical correlation = .60; Wilks's lambda = .64), $\chi^2(4, N=52) = 21.21, p < .001$) and moderately involved participants ((eigenvalue = .54; canonical correlation = .59; Wilks's lambda = .63), $\chi^2(8, N=110) = 48.88, p < .001$), but the canonical function for the non-involved group was statistically insignificant. When explicit measures were entered into the prediction model along with BIAT measures, BIAT measures remained redundant on all three levels of involvement. This indicated that the status of the BIAT's incremental validity over explicit measures does not change based on different levels of involvement.

Voting behavior: predictive and incremental validity of the BIAT. Because respondents who reported their voting behavior were mainly voters of the Democratic Party or Liberal Democratic Party or had not voted, only the predictive and incremental validity of a single BIAT measure of preference between these two political parties was tested. However, this BIAT measure did not differentiate between respondents who voted for the Democratic Party, Liberal Democratic Party and non-voters, $F(2, 140) = 1.49, ns$.

Regarding the moderating effects of the involvement in politics, results of one-way ANOVA showed that the BIAT score of implicit preference for DP over LDP differentiates between different voting choices among highly involved subjects ($F(2, 33) = 4.49, p = .019, \eta^2 = .21$), but not among moderately or non-involved participants ($F(2, 71) = 0.18, ns$ and $F(2, 31) = 0.31, ns$, respectively). To further assess this measure's incremental validity, we conducted the stepwise discriminant analysis on the group of highly involved subjects. The criterion comprised the following three categories: DP voters, LDP voters and nonvoters. The results again showed that after adding the corresponding explicit measure to the model, the BIAT measure was redundant.

Since it was possible that both lack of the incremental validity of the BIAT measures, as well as the moderating effect of involvement on the BIAT's predictive validity, could have emerged as a mere consequence of the large number of participants who did not vote, we excluded non-voters from our sample and conducted the same analysis on the sample of voters only. The results were similar to those obtained on the total sample – the BIAT score of implicit preference for DP over LDP was again predictive among highly involved subjects, but not among those who were moderately or non-involved. The incremental validity was not obtained.

Discussion

The results indicate that BIAT measures (both the composite measure that indicates implicit preference for conservative or liberal block and single measures that indicate implicit preference for a specific party over the other) represent valid predictors of voting intentions, with their predictive power moderated by subjects' involvement in politics. That is to say, BIAT scores retain their predictive power for people who are highly or moderately involved in politics, but it seems that the voting intentions of people who regard politics as unimportant cannot be predicted from their BIAT scores. A similar moderation effect was evident for the prediction of actual voting. The BIAT discriminated between the different voting behavior of highly involved subjects, but not of moderately and non-involved participants. Such moderation effect of political involvement is in line with recent findings of Friese et al. suggesting that greater elaboration of attitudes (which could come as a result of greater political involvement) produces stronger convergence between implicit and explicit attitudes (Friese, Smith, Plischke, Bluemke, & Nosek, 2012). This finally results in better predictive validity of implicit measures.

While the evidence generally supported the predictive validity of BIAT measures, these measures' incremental validity over standard explicit measures remained questionable. Since the explicit ratings were collected together with the voting intention, it was possible that their strong predictive validity and consequential lack of the BIAT's incremental validity appeared because participants might have felt the need to be consistent when providing explicit

ratings together with their voting intentions. However, correlation coefficients between the voting behavior (which was collected a month to ten days after the collection of explicit measures) and explicit measures were generally higher than those between the voting intention and explicit measures (e.g. correlation between the voting behavior and the composite explicit measure of preference toward liberal/conservative block was $r=.35$, $p<.01$, while the correlation between voting intention and the same composite explicit measure was $r=.28$, $p<.01$). If the need for consistency was indeed the reason for the predictive power of explicit measures, one could have expected the opposite pattern of correlations. With this option ruled out, we concluded that the predictive power of implicit measures stemmed from their relationship with explicit measures.

Limitations of the study

One of the major limitations of our study was that the most of the participants expressed the intention to vote for one of the liberal political options and virtually all participants who did vote voted for one of the liberal parties. Such restriction in political attitudes and behavior, as well as the reduction of bipolarity of the obtained implicit measures (see Nosek, 2005; 2007), might have yielded the lower predictive and the lack of incremental power of the BIAT, especially in the context of voting behavior prediction. Namely, it was probably more difficult for the BIAT to discriminate between voters of the two liberal parties than it would have been to discriminate between voters of conservative and liberal parties.

From 220 participants who were recruited in the first phase of this study, only 75 of them reported their voting choice. There are two main reasons for such sample attrition. One of them was administrative in nature and could not be considered a selective drop-out (e.g. some students were impossible to reach as their schedule changed, they were ill or they were engaged in fieldwork). The second one referred to participants' decisions not to vote. However, this decision could have been determined by variables other than political attitudes (e.g., distance from polling station – see Footnote 4); this fact could have diminished the BIAT's predictive validity.

Even in such conditions of low bipolarity and sample attrition the BIAT proved to be a valid predictor of both voting intention and behavior. Such unfavorable conditions could have, however, influenced the test's incremental validity. This fact calls for additional research.

GENERAL DISCUSSION

The main goal of the present study was to provide evidence for the predictive and incremental validity of the Brief Implicit Association Test, employing voting intentions and real voting behavior as a criterion measures. In addition, we addressed the moderating role of political involvement defined as interest in politics and impact of politics in everyday life of a person. As the

attitude object we aimed to assess was multiple (there were four major political parties running for Serbian parliament), we decided to employ the short version of the Implicit Association Test.

The main results of our study can be summarized as follows: (1) The BIAT measures demonstrated both satisfactory internal consistency and strong criterion validity; (2) Both voting intentions and actual voting behavior could be predicted on the basis of the BIAT scores; (3) There was a moderating effect of political involvement on the relationship between the BIAT scores and voting intention as well as the relationship between the BIAT scores and actual voting behavior – in both cases, the implicit measures were stronger predictors among voters who were more involved in politics; (4) The BIAT measures did not demonstrate incremental power over self-report measures in prediction of voting intentions and behavior.

The decision to compare reaction times of different types of participants on different BIAT blocks, led us to discover that undecided participants on average need more time to respond to the BIAT tasks. This fact corroborates Rothermund and Wentura's (2010) suggestion, that participants with no clear preference might be unable to benefit from task-recoding processes and therefore unable to reduce the task difficulty in any of the blocks of IAT-like procedures.

Our findings add on the existing data of the BIAT's psychometric properties (e.g. Sriram & Greenwald, 2009; Rusch et al., 2009; 2010), suggesting that the short version of test could replace the standard IAT procedure, especially when measuring attitudes towards multiple objects. Furthermore, strong correlations between explicit and implicit measures obtained in this research suggest that explicit and implicit measures of political attitudes reflect the same construct and that they likely tap similar underlying processes. While the evidence from the present study generally supported the predictive validity of implicit measures, these measures' incremental validity over standard explicit measures remained questionable.

Employing measures of behavior is what makes our study ecologically valid, but at the same time it implies certain methodological drawbacks, especially in terms of controllability. The voting behavior in our study was probably determined by many factors other than the voting attitudes itself (e.g. distance from the polling station); the general political apathy and cynicism in Serbia could account for the large number of nonvoters (see for example Žeželj, 2007). Regardless of these shortcomings, the BIAT performed relatively well in terms of behavior prediction. On the other hand, in the prediction of voting behavior, the BIAT measures did not bring anything new over and above the standard explicit measures and although political involvement moderated the predictive power of the BIAT, it did not moderate the BIAT's incremental validity. However, one should be cautious before drawing final conclusions. Having in mind that our sample consisted of voters with relatively similar, liberal preferences, the future research could introduce more variety by drawing from non-student populations. Validity of BIAT should be further investigated (a) for more spontaneous political behaviors (e.g. tolerance toward political opponents), (b) in people whose political attitudes are less accessible (e.g. undecided voters) and (c) in domains where one

might expect greater incongruence between implicit and explicit attitudes (e.g. prejudice) as in these situations and for these groups one could expect greater contribution of implicit attitudes in behavior prediction.

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Appendix 1

Photographs of political leaders used as stimuli

