Unconscious motivation.
Part I: Implicit attitudes toward L2 speakers

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Abstract

This paper reports the first investigation in the second language acquisition field assessing learners' implicit attitudes using the Implicit Association Test, a computerized reaction-time measure. Examination of the explicit and implicit attitudes of Arab learners of English (*N* = 365) showed that, particularly for males, implicit attitudes toward L2 speakers are associated with self-reported openness to the L2 group and with strength of correlations among attitudinal and motivational variables. Implicit attitudes also moderated important paths in the L2 Motivational Self System. The paper concludes that implicit attitudes seem to be a meaningful individual difference variable, adding a new dimension to our understanding of language motivation.

Keywords: implicit attitudes; Implicit Association Test; motivation; ideal L2 self; explicit–implicit correspondence

> *we may—no matter how deeply we explore—*
> *discover that this simple, conscious report is the*
> *whole truth. It can be taken at its face value.*
> Gordon Allport (1953, p. 114)

1. Introduction

For many readers, the claim that there are implicit, or unconscious, influences on human motivation would seem commonsense. Indeed, implicit processes constitute an important aspect of investigation in some second language (L2) subdisciplines such as learning, teaching, and testing (e.g., Ellis et al., 2009; Rebuschat, 2015; Trofimovich & McDonough, 2011). Curiously, however, language learner psychology in general—and L2 motivation in particular—has paid little systematic attention to such implicit processes to date. Major language motivation theories have instead focused primarily on explicit constructs (e.g., integrative motivation, intrinsic motivation, the ideal L2 self), thus portraying the learner as a rational agent who first weighs the pros and cons of a certain activity and then decides whether to engage in it based on that explicit forethought.

As an illustration, Dörnyei (2005, p. 107) states that "the Ideal and Ought-to L2 Selves are by definition involved in pre-actional *deliberation* [emphasis added]." Even more explicitly, Lanvers (2016) claims that "many students calculate the benefits of languages as a formula" and then "this calculation might lead students to consider language learning as worthwhile, or not" (p. 87). To date, L2 motivation theory has not seriously considered the possibility of a parallel unconscious motivation influencing language learning. Therefore, conscious motivation is, in effect, treated as if it is the "whole truth," just as Allport claimed over half a century ago.

The consequences of a conscious-only view of motivation are not limited to theoretical conceptualizations only but also extend to the types of data that researchers would collect to further advance these conceptualizations. Language motivation research today still relies predominantly on self-report measures, such as questionnaires and interviews (Ushioda, 2013). Just as they have justified a conscious-only view of motivation by resorting to pre-actional deliberation and formulaic calculation, some motivation researchers have also tried to justify their reliance on self-report measures. For instance, some have argued that "language learners' self-reports might contain sufficient clues" and so "to get to the bottom of this . . . all we need to do is ask the right questions!" (Dörnyei & Ushioda, 2011, pp. 98-99). This state of affairs was foreseen decades ago by David McClelland, a major proponent of unconscious motives, when he stated, "and the hope still persists that asking a person just the right questions will yield a measure of implicit motives" (McClelland, Koestner, & Weinberger, 1989, p. 691).

Recent interest in dynamic systems theory (Dörnyei, MacIntyre, & Henry, 2015) has led researchers to draw from some innovative measurement instruments. Nevertheless, the learner's conscious perspective is typically still at the heart of these instruments. In the idiodynamic method, for example, it is not

clear how the researcher can make sense of the data without recourse to the "respondent's interpretation" (MacIntyre, 2012, p. 363) of these idiodynamic ratings at the end of the day. Due to the lack of a systematic alternative, it is left up to "the skill of the researcher in carefully probing *participants' perceptions* [emphasis added] during the stimulated recall interview" (Ushioda, 2015, p. 50), and thus we are limited to what the participant might "rationalise retrospectively" (Ushioda, 2013, p. 236).

In the spirit of Ushioda's (2013) call for multimethod investigations, this paper examines the potential of using an implicit test to tap into the unconscious side of the individual's attitudinal/motivational disposition. It starts by reviewing evidence for implicit attitudes and motives in mainstream psychology in order to gain some insights for our field. It then presents data supporting the relevance of implicit attitudes to language motivation.

2. The unconscious in motivational psychology

Contemporary motivational psychology has started to reconsider some of the fundamentals of the cognitive revolution (for reviews, see e.g., Al-Hoorie, 2015; Bargh, Gollwitzer, & Oettingen, 2010). More specifically, there has been a resurgence in the interest in attitudes and motivation that operate outside conscious awareness. Human motivation and behavioral engagement are no longer seen as the sole product of conscious premeditation by a rational agent.

One line of inquiry providing evidence for this view is research on *implicit attitudes*. Implicit attitudes are defined as "introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects" (Greenwald & Banaji, 1995, p. 8). We live in a complex world, in which survival requires efficient navigation, and therefore humans have evolved the ability to simplify the overwhelming amount of information they encounter everyday. This simplification process is so efficient that it allows us to make evaluative judgments "without having to think about it much, sometimes without really thinking at all" (Nosek & Banaji, 2009, p. 84). Conscious, deliberative processing is more resource-intensive of our cognitive capacity, and therefore it is typically reserved for unfamiliar situations. In familiar situations, it is more efficient to leave things on autopilot (for more on this functional analysis, see Macrae, Milne, & Bodenhausen, 1994; Macrae, Stangor, & Milne, 1994).

Unfortunately, this efficiency can come at the expense of behaviors that are not endorsed by our conscious evaluation. For example, having a more favorable implicit attitude toward one group can prejudice our perception and be-

havior against another group. In one study, Green et al. (2007) compared the explicit and implicit racial attitudes of medical doctors with their medical recommendations. At the explicit level, all doctors expressed equal preference for Black and White patients, as expected. At the implicit level, however, the more they favored White patients, the more they also offered them better medical recommendations. Thus, their behavior was in line with their implicit—not explicit—attitudes. Other research on implicit attitudes has generated similar results in a variety of areas, such as successfully predicting how far away from an obese woman one would choose to sit (Bessenoff & Sherman, 2000) and how friendly one behaves toward a White versus Black female confederate (McConnell & Leibold, 2001). These findings might reflect attitudes that participants are unwilling to express, or attitudes they themselves are unaware of. The latter might be inferred from the recurring observation that many participants first report (conscious) egalitarian attitudes in questionnaires and then express considerable surprise and disbelief at the empirical evidence showing their biases. Indeed, "when it comes to socially sensitive issues or personality characteristics, implicit measures may reveal attitudes or traits that people are reluctant to admit even to themselves" (Ajzen, 2005, p. 18).

A second research tradition demonstrating the importance of unconscious influences has investigated *implicit motives*. Unlike implicit attitudes, implicit motives have typically been limited to a few, biologically-constrained needs such as achievement, affiliation, and power (Schultheiss & Brunstein, 2010). These implicit motives are unconscious affective predispositions acquired from experiences very early in life (McClelland, 1987). Explicit and implicit motives are related to two different types of motivated behavior. More specifically, explicit motives stem from external social incentives, and so they predict immediate responses to specific tasks, while implicit motives stem from the pleasure of the activity itself and so they predict long-term engagement (e.g., McClelland et al., 1989). Because implicit motives are concerned with long-term engagement, their impact extends even to the physiological system, as individual differences in implicit motives are associated with different health conditions, such as Type I diabetes and infectious diseases (McClelland, 1989).

Research shows that explicit and implicit motives generally do not correlate with each other (e.g., Schultheiss, Yankova, Dirlikov, & Schad, 2009). However, for some individuals, explicit and implicit motives do display a positive correlation and these individuals consequently experience "personality coherence," which takes place when one embraces his/her "true self" and its "deeply rooted affective proclivities" (Thrash & Elliot, 2002, p. 746). This explicit–implicit congruence predicts positive outcomes related to flow, volitional strength, identity, and well-being (e.g., Thrash, Maruskin, & Martin, 2012). In contrast, a lack of

correlation between explicit and implicit motives is associated with fragmentation due to adopting social norms not compatible with one's preexisting implicit values. This explicit–implicit incongruence is undesirable because success in long-term pursuits requires both (explicit) proactive organization of goals, as well as (implicit) spontaneous inclination to keep pursuing these goals (Thrash, Cassidy, & Maruskin, 2010).

Thus, the emerging evidence from psychological research casts serious doubt on the view that humans are rational agents who always weigh the advantages and disadvantages of a course of action consciously and systematically before engaging in it. Conscious motivation does play a role, but without considering the role of unconscious influences also, a substantial proportion of human motivation may go unaccounted for.

3. Insights for language motivation

It is possible for the language motivation field to gain insights from the above literature. One of the most central concepts in L2 motivation theory is the notion that positive attitudes toward L2 speakers play an important facilitative role in L2 learning success. First introduced by Gardner and Lambert (1959), the claim that learning an L2 is unlike other school subjects—because of the social baggage it entails—has enjoyed continuing popularity throughout the decades. In more recent developments, L2 motivation has been construed cognitively in terms of future self-guides (e.g., Dörnyei, 2009; Dörnyei & Kubanyiova, 2014), and because L2 speakers are the closest parallel to a desired future self-guide, the new self interpretation is "fully compatible" with traditional emphasis on attitudes toward L2 speakers (Dörnyei, 2009, p. 28). However, research on learners' attitudes toward L2 speakers has generally focused on explicit attitudes, as evident from the reliance on self-report questionnaires and interviews. It is plausible that another, implicit dimension also plays a role in language motivation. The present study therefore investigated this possibility by adopting implicit attitudes as a broad framework, and by drawing from some aspects from the implicit motives tradition.

In addition, the role of implicit attitudes might be gender-specific. Research has shown that females tend to show more implicit positivity toward language and arts (vs. math and science) than do males (Nosek, Banaji, & Greenwald, 2002). This effect has also been observed in schoolchildren as young as 6 years of age (Cvencek, Meltzoff, & Greenwald, 2011). These findings mirror results from the L2 motivation field, where a "recurring source of systematic variation" (You, Dörnyei, & Csizér, 2016, p. 100) is that females exhibit more positive attitudes toward language learning. This study therefore examined the relationship between gender

and implicit attitudes. More detailed discussion of the insights that this study gained from the above literature is discussed next.

3.1. Openness to the L2 group

Since L2 motivation is associated with openness to the L2 group (Dörnyei, 2009), this study investigated whether learners with positive implicit attitudes would exhibit more openness. Openness might be indicated directly by more favorable attitudes toward the L2 group, or indirectly by lower L1 group affiliation such as ethnocentrism and fear of assimilation (see Freynet & Clément, 2015). Especially in Europe, another indication of L1 group affiliation is religiosity, which is commonly viewed as a hindrance to openness to other groups (e.g., Foner & Alba, 2008). Since the participants of this study are L1 Arabic learners of English in the UK (see Section 5.1), and since Islam is inseparable from one's L1 identity for many Arabs, this study also investigated the association between religiosity and implicit attitudes toward the L2 group. Religiosity has not been investigated systematically in the context of language learning previously (for an exception, see Wong, Kristjansson, & Dörnyei, 2013).

Furthermore, rather than simply comparing learners with positive versus negative attitudes, this study examined the congruence between explicit and implicit attitudes. Drawing from the literature on explicit–implicit congruence, one might think of attitudes as varying along two dimensions. An individual's attitude toward a certain social object might be congruently favorable (or unfavorable) at the explicit and implicit levels, or it may be incongruently favorable on one dimension but not the other, as shown in Table 1.

Table 1 The four types resulting from the two-dimensional conceptualization of attitudes

| Type | Attitudes | | Comment |
	Explicit	Implicit	
1	Positive	Positive	Most favorable scenario
2	Negative	Negative	Least favorable scenario
3	Negative	Positive	Norm of mediocrity?
4	Positive	Negative	Resilient motivation?

Note. Although attitude falls along continua, this categorical classification (positive vs. negative) is intended for illustrative purposes.

Type 1 in Table 1 is the ideal scenario, while Type 2 is the least preferable one. Type 3 would be unusual, and might be a reflection of the norm of mediocrity (see Dörnyei & Ushioda, 2011; Taylor, 2013). The norm of mediocrity refers to the situation where some learners deliberately show mediocre motivation and achievement in order to avoid being penalized by their peers. Type 4

can arguably be seen as the most interesting scenario for the present purposes because it parallels Type 1 in terms of explicit attitudes. Individuals in both types express positive attitudes explicitly, but they differ in their implicit attitudes. Comparison of these two types could shed important light on the role of implicit attitudes. For this reason, the first research focused on Types 1 and 4 by first selecting learners who expressed positive attitudes at the explicit level, and then dividing them into those with congruently positive and incongruently negative attitudes at the implicit level.

Still, because this type of classification might seem artificial, cluster analysis was also conducted.[1] As detailed below, the results of the two approaches led to very similar results. The first research question could be summarized as follows:

RQ 1: Compared with incongruent learners, do congruent learners exhibit more openness to the L2 group?

3.2. Personality coherence

Based on the personality coherence literature, the explicit–implicit conflict is uncomfortable and therefore individuals with incongruent attitudes (i.e., Types 3 & 4) may tend to adopt explicit attitudes that are aligned with their implicit attitudes. This is certainly good news for individuals whose implicit attitudes are positive. However, when implicit attitudes are negative (e.g., against another group), research shows that these negative implicit attitudes can be counteracted by factors such as high explicit motivation. For example, Devine et al. (2002) have shown that when participants had implicit biases against an outgroup but also had internalized motivations to control these biases, they were able to control their prejudice better than participants with similar biases but without the motivation (see also Glaser & Knowles, 2008, for similar results).

When it comes to language learning, it is therefore plausible that the effect of negative implicit attitudes toward L2 speakers may not be the same across the board: While some learners might submit to these attitudes (by adopting explicit attitudes that are also negative), others may have sufficiently high motivation to actively counteract them (and adopt positive explicit attitudes instead). The latter can happen when the learner recognizes the value of the language in degree attainment or career advancement. From this perspective, then, learners with negative implicit attitudes range from those adopting their negative attitudes explicitly (for the sake of psychological comfort) to those counteracting them (for the sake of the pragmatic value of the language). In contrast, those with already positive attitudes implicitly would have little reason to adopt negative attitudes explicitly.

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[1] I thank an anonymous reviewer for this suggestion.

Thus, the personality coherence literature suggests that individuals with positive versus negative implicit attitudes may be two distinct groups. If this is the case, then treating them as a single group can be misleading. In the context of correlational analysis, for example, pooling heterogeneous groups and then calculating correlation coefficients has been described by some statisticians as nonsensical (Hassler & Thadewald, 2003). Because correlational analysis is by far one of the most common statistical procedures in language research (Plonsky, 2013), it would be interesting to find out whether taking implicit attitudes into account changes the resulting correlations. This study therefore compared the correlations among attitudinal and motivational variables within each of these two groups. The second research question can be formulated as follows:

> RQ 2: Do learners with positive versus negative implicit attitudes exhibit equivalent correlations among attitudinal and motivational scales?

3.3. The moderating effect of implicit attitudes

Although finding novel results is interesting in itself, it is also important to consider how they relate to existing theory. One particularly popular theory of L2 motivation at present is the L2 motivational self system (L2 MSS; Dörnyei, 2005, 2009). In this model, which is schematically represented in Figure 1, attitudes toward L2 speakers predict the strength of the individual's ideal L2 self, which in turn predicts both the criterion measures and attitudes toward learning the language. The current study focuses on Arrows A and B in Figure 1 (Arrow C is relatively weak; see for example Taguchi, Magid, & Papi, 2009; You et al., 2016; for a discussion, see Islam, Lamb, & Chambers, 2013, p. 239). The analysis explored whether implicit attitudes moderate either of these two paths. Because this was the first attempt to integrate implicit attitudes with the L2 MSS, no prior expectations were made about the direction of the effects. The relevant research question can be stated as follows:

> RQ 3: Do implicit attitudes toward L2 speakers moderate the relationship between explicit attitudes toward L2 speakers and the ideal L2 self, and between the ideal L2 self and attitudes toward learning English?
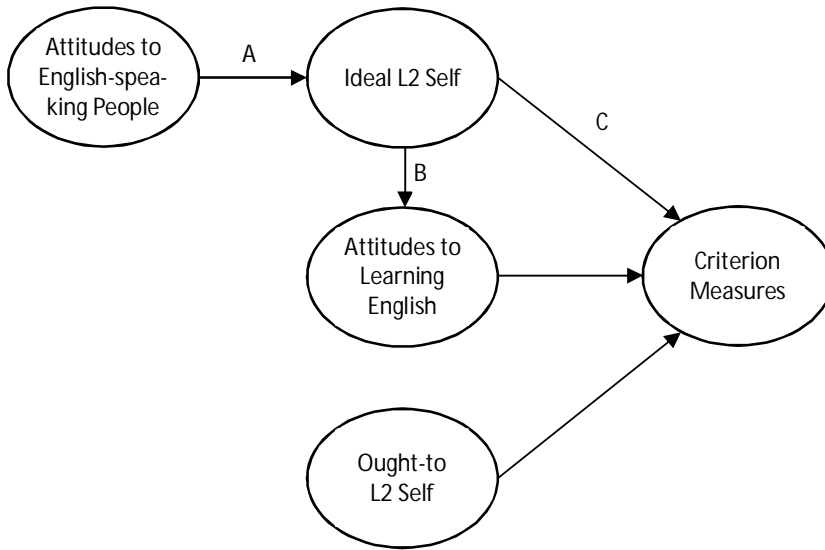
Figure 1 Schematic representation of the L2 motivational self system (adapted from Taguchi et al., 2009)

4. The Implicit Association Test

An important question now is how to investigate implicit attitudes. If the individual is unaware of these influences, then explicit self-report (via a questionnaire or an interview) would be of limited utility: Any adequate measure would have to tap into these influences indirectly. At present, the most widely used measure of implicit attitudes is the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). The IAT is a computerized reaction-time measure that simply requires classifying a series of words to the right or left as fast as possible. As an illustration of how this test works, Figure 2 gives an example of the Flower–Insect IAT. This test measures how strongly the participant associates flowers and insects with good and bad. In the first part of the test (Figure 2A), a stimulus appears in the middle of the screen (e.g., *Roses*) and the participant has to decide which box this stimulus belongs to by pressing one of two designated buttons on the keyboard. The correct answer in Figure 2A is the left box. Afterward, another stimulus appears and, again, the participant has to decide which of the four categories the stimulus belongs to in order to classify it to the correct box. The stimuli may belong to *Flowers* (e.g., roses, orchids, tulips), *Insects* (e.g., cockroaches, mosquitoes, wasps), *Good* (e.g., smart, friendly, clean), or to *Bad* (e.g., dumb, enemy, dirty).

Note that this is not an attitude test per se. The stimuli are shown to the participant in advance with their correct categorization, and so the participant's

task is not to guess (or express their attitude about) the correct response, but to simply perform the test as fast as possible. Most participants therefore find the configuration in Figure 2A very easy to perform and breeze through it. In the second part of the test (Figure 2B), *Flower* is paired with *Bad* while *Insect* with *Good*. This part suddenly feels considerably harder. This is because, in the first part, *Flower* and *Good* form one higher category (e.g., pleasant things), and *Insect* and *Bad* form another category (e.g., unpleasant things). Therefore, the participant in effect classifies the stimuli into only two—rather than four—categories (i.e., simply move all pleasant things to the left and unpleasant things to the right). In the second part, however, the participant has to sort the stimuli into the four categories (neither of the two pairs readily merges into one intuitive category), and so the task requires substantially more cognitive resources, resulting in slower performance. This is why it is called the Implicit Association Test: It is *implicit* because participants find it hard to anticipate which configuration would be more difficult and are usually surprised by their own results; it is an *association* test because it measures the strength of the association of the categories in each pair; and it is a *test* because it measures the participant's performance speed. To the extent that categories of interest are paired with evaluative adjectives (e.g., *good*, *bad*), implicit attitudes are inferred from the response speeds in the two parts of the test.[2]

A.   B.

Flower or Good		Insect or Bad
	Roses	

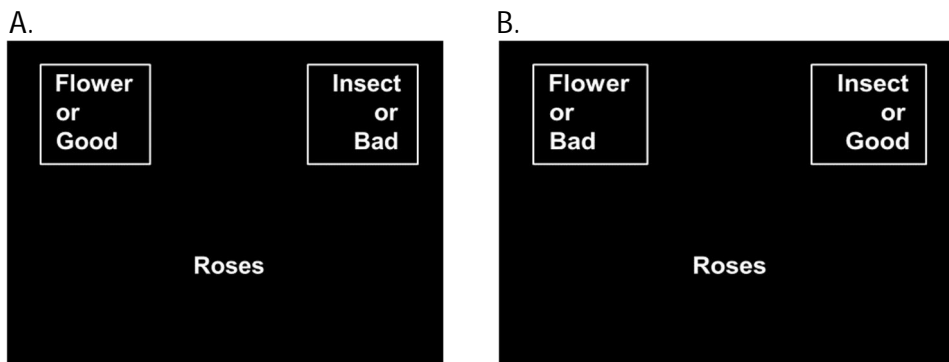| Flower or Bad		Insect or Good
	Roses	

Figure 2 An illustration of the Flower—Insect IAT

The IAT is flexible and can be easily adapted to measure implicit associations about various social objects, such as racial prejudice (e.g., White–Good, Black–Bad) and gender stereotypes (e.g., Male–Work, Female–Home). The popularity of the IAT has generated a sizable amount of literature utilizing it in various domains, thus

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[2] Readers who find this description too abstract are encouraged to try out a demonstration of the IAT first-hand at www.implicit.harvard.edu.

permitting scrutiny of its reliability and validity. The reliability of the IAT is considered the highest among all implicit measures of attitudes available, with internal consistency and split-half reliabilities amounting to $r = .79$ across 50 studies in a meta-analysis by Hofmann, Gawronski, Gschwendner, Le, and Schmitt (2005).

As for the validity of the IAT, there is still continuing debate concerning what exactly the IAT is actually measuring. Critics of the IAT question the implicit attitudes construct. In the context of racial prejudice, for example, they argue that the IAT measures shared cultural stereotypes rather than personal animus (e.g., Arkes & Tetlock, 2004). Similarly, Oswald, Mitchell, Blanton, Jaccard, and Tetlock (2013) question the IAT on the basis of overall poor prediction of relevant criterion measures. However, in their meta-analysis, both explicit and implicit measures performed almost as poorly. Additionally, this meta-analysis was criticized for including correlations that have no theoretical basis (Greenwald, Banaji, & Nosek, 2015).

Proponents of the IAT, in contrast, argue that the validity of the IAT is a "scientific certainty" (Rudman, 2008), drawing from findings in various domains including consumer references, political preferences, personality traits, sexual orientations, and close relationships (see Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Proponents also cite the IAT's known-groups validity. That is, research shows that the IAT is capable of correctly distinguishing among members of different groups in accordance with our a priori knowledge of them, such as reliably determining the participant's gender, nationality, and even affiliation to a group artificially created in the laboratory (for a review, see Lane, Banaji, Nosek, & Greenwald, 2007). The present study constitutes the first contribution of the L2 field to the debate over the validity of the IAT.

5. Method

5.1. Participants

A total of 365 Arabic L1 speakers qualified for the final analysis. Data were collected from eight more participants who were excluded for having more than 10% latencies faster than 300 ms in the implicit test, which is indicative of random responding. Three more participants were excluded because their L1 was Kurdish and not Arabic, though they passed as native speakers of Arabic. The sample was restricted to Arabs because the scales related to L1 group affiliation (see Section 5.2.2.) were worded to specifically address Arab identity and Arabic as L1. The qualifying participants (male = 257, female = 108) were studying English at various British universities and language institutes when they volunteered to take part in the study. They came from various Arab countries, including Saudi Arabia (33.2%), Libya (29.3%), and Iraq (22.5%), and had lived in an English-speaking country for

a minimum of half a month and a maximum of 96 months (M = 22.43, SD = 20.3). Different age groups were also represented in the sample (11% 17–20 years old, 25.5% 20–25, 23.3% 26–30, 16.4% 31–35, 14.8% 36–40, 7.9% older), with four participants having missing age data. As detailed below, length of residence and age were statistically controlled for (and this had no effect on the results).

5.2. Materials

5.2.1. Implicit test

The IAT was adapted to measure attitudes toward English speakers. As shown in Table 2, in each of the seven parts (called blocks), a left or right button on the keyboard was to be pressed in order to rapidly categorize a series of stimuli appearing in the center of a computer screen. In the first two blocks, the participants practiced categorizing words as to whether they were *Pleasant* or *Unpleasant* (conventionally called *attributes*), and then whether they were related to *Arabic* or *English* (*categories*). Then the actual test started. In the first condition, Blocks 3 and 4, *Arabic* was paired with *Pleasant* while *English* with *Unpleasant*, as shown in Figure 3. In the other condition, Blocks 6 and 7, the categories were switched so that *English* was now paired with *Pleasant*, and *Arabic* with *Unpleasant*. The participants also practiced the reversed attributes alone in Block 5. Before each block, the participants read instructions and were reminded to perform as fast as possible. The whole implicit test took around five minutes to complete. The stimuli used appear in Appendix A.

Table 2 Overview of the Implicit Association Test

| Block	Trials	Function	Response key assignment	
			Left button (E)	Right button (I)
1	20	Practice	Pleasant	Unpleasant
2	20	Practice	Arabic	English
3	20	Test 1	Pleasant or Arabic	Unpleasant or English
4	40	Test 2	Pleasant or Arabic	Unpleasant or English
5	20	Practice	Unpleasant	Pleasant
6	20	Test 1	Unpleasant or Arabic	Pleasant or English
7	40	Test 2	Unpleasant or Arabic	Pleasant or English
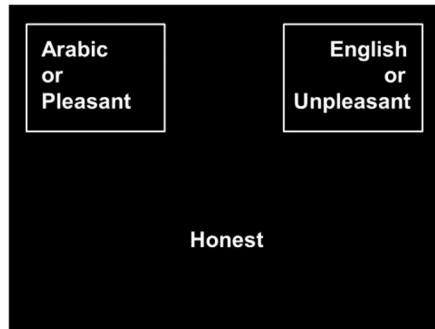
Figure 3 A trial of the IAT. The correct answer here would be the left button (E) because the stimulus *Honest* belongs to *Pleasant*. In the actual test, *Pleasant*, *Unpleasant*, and their stimuli appeared in green font, while *Arabic*, *English*, and their stimuli appeared in white.

The order of the combined tasks was not counterbalanced because counterbalancing can artificially suppress explicit–implicit correlations (Banse, Seise, & Zerbes, 2001; Gawronski, 2002) and sometimes artificially inflates them (Hofmann et al., 2005). When an incorrect response was given, a red X appeared and the participant had to correct the error, by pressing the other button, before proceeding to the next trial. The stimuli in the test blocks were alternatively drawn from the *Arabic* and *English* categories (odd-numbered trials) and from the *Pleasant* and *Unpleasant* attributes (even-numbered trials). Each stimulus was selected randomly and without replacement, and therefore all stimuli were used once before any were reused. Split-half analysis based on even-versus-odd trials showed that the IAT had very good reliability (Spearman-Brown's ρ = .83). All participants were taking the IAT for the first time. The software used was Inquisit 4 (2014).

The IAT scores were coded so that a positive score reflected implicit preference for the L2 group, and a negative score reflected implicit preference for the L1 group. The IAT is a relative measure, in that a positive score indicates preference for the L2 group but does not necessarily imply negative attitudes toward the L1 group (i.e., only more positive attitudes toward the L2 group). For this reason, instead of using the conventional terminology that describes learners as having positive versus negative attitudes toward the L2 group, they are labelled here simply as having implicit preference for the L2 group versus the L1 group, respectively.

5.2.2. Explicit measures

The participants also completed nine self-reported attitudinal and motivational scales that seemed particularly relevant when drawing comparisons between explicit and implicit dispositions:

1. Attitudes toward English-Speaking People (3 items, Cronbach's α = .85). Example item: "I wish I could have many more English friends."
2. Attitudes toward Learning English (4 items, α = .74). Example item: "Learning English is very interesting."
3. The Ideal L2 Self (4 items, α = .78). Example item: "I can imagine myself mastering English one day."
4. The Ought-to L2 Self (3 items, α = .65). Example item: "I must study English because it will earn me respect in the society."

A higher score in each of these four scales, adapted from Taguchi et al. (2009), indicated more positive attitudes. Three other scales measured the strength of affiliation to one's own group and the desire to preserve and spread its values:

5. Fear of Assimilation (5 items, α = .78), adapted from Taguchi et al. (2009). Example item: "I think that the interest in the West has a negative influence on the Arab culture."
6. Ethnocentrism (5 items, α = .74), adapted from Neuliep and McCroskey (1997). Example item: "I find it difficult to work together with people who have different customs."
7. Religious Attitudes (4 items, α = .71), developed for this study. Example item: "The idea of sharing my Islamic faith with my non-Muslim friends is always present in my mind."

A higher score in each of these three scales reflected stronger L1 group affiliation. The above seven scales all involved a 7-point Likert response format ranging from *strongly agree* to *strongly disagree*. Finally, the instrument also included two semantic differential scales developed for this study:

8. Attitudes toward the English (10 bipolar adjective scales, α = .74).
9. Attitudes toward Arabs (10 bipolar adjective scales, α = .84).

The ten adjectives used in these two scales were identical to each other, and to the stimuli used for the *Pleasant* and *Unpleasant* attributes of the IAT (though *clean* and *dirty* were dropped from the semantic differential scales; see Appendix A for the complete list). Semantic differential scales were used here instead of Likert scales due to the observation that a higher explicit–implicit consistency is found when implicit scores are compared with scores from semantic differential scales (Hofmann et al., 2005). Because the participants were residing in the UK, both explicit and implicit measures addressed British speakers of English specifically. All materials in the explicit and implicit measures were also translated into Arabic to avoid language interference.

5.3. Procedure

During a one-to-one meeting with the researcher, each participant responded to items randomly drawn in a fixed order from the seven Likert scales, to the Arab semantic differential scale, to the English semantic differential scale, to the implicit test, to demographic questions, and to the Religious Attitudes scale, in this sequence—all on a computer. The explicit and implicit parts were not counterbalanced because previous research has documented little order effect (see Lane et al., 2007). The procedure followed in this study was endorsed by the ethics committee at the researcher's institution.

5.4. Data analysis

For the implicit test, the analysis closely followed the improved scoring algorithm, called the *D* Measure, recommended by Greenwald, Nosek, and Banaji (2003). The four test blocks were included in the analysis, and the latency of each incorrect response was replaced with the block mean plus 600 ms error penalty. The analysis differed from the recommended algorithm in two ways, however. First, the 10,000 ms latency threshold used to determine and exclude extreme responses, which was selected "somewhat arbitrarily" (Greenwald et al., 2003, p. 201), was replaced with the more stringent threshold of 5,000 ms. Despite the stringency of this new procedure, virtually all participants had less than 10% latencies that were slower than 5,000 ms, thus no participant had to be excluded because of it. Second, the standard IAT score ranges from –2 to +2 (Nosek & Sriram, 2007), with conventional break points of >.15, >.35, and >.65 signifying slight, moderate, and strong implicit preference, respectively. The IAT scores were multiplied by 1.5 here so that the new scale ranged from –3 to +3. The break points therefore became .20, .50, and 1.0 after rounding. In addition to its intuitive appeal, this rescaling made the IAT scores directly comparable to scores derived from the explicit measures.

For the explicit measures, all items were centered on zero, so that they also ranged from –3 to +3. Following Greenwald et al. (2003), a relative explicit measure was obtained from the two semantic differential scales using a formula adapted from the *D* Measure in order to facilitate comparison with the implicit scores:

$$\frac{En - Ar}{SD_{inclusive}} \times 1.5,$$

where *En* is Attitudes toward the English, *Ar* is Attitudes toward Arabs, and $SD_{inclusive}$ is their combined standard deviation. The resulting score, called the Explicit *D*

Measure here, ranged from almost –3 to +3 (from –2.92 to +2.92 to be exact) and correlated very strongly with the mean of these two semantic differential scales (r = .96, p < .001).

6. Results

6.1. Descriptive statistics

Table 3 presents the descriptive statistics of the variables and their inter-correlations. The Explicit D Measure had a neutral mean but a relatively higher standard deviation—indicating wide disagreement among the participants—while the Implicit D Measure suggests that the overall sample was actually moderately inclined more toward their L1 group. The newly developed Religious Attitudes scale correlated moderately to strongly with Ethnocentrism and Fear of Assimilation, suggesting that it also reflects an aspect of L1 group affiliation.

The table also shows that the participants expressed generally positive explicit attitudes toward English-speaking people and toward learning English and had high ideal L2 selves. This was to be expected given that the sample was made up of individuals who chose to go to the UK to study English. This positive slant would make the case more interesting if subsequent analyses reveal that some participants have an influential L1 implicit preference operating beneath this positive surface.

Table 3 Means, standard deviations, and zero-order correlations for the overall sample (N = 365). All scales are centered on zero and range from -3 to +3

	M	SD	1	2	3	4	5	6	7	8	9	10
1. Attitudes to English-speaking People	1.59	1.05	—									
2. Attitudes to Language Learning	1.77	0.84	.41***	—								
3. Ideal L2 Self	1.95	0.77	.17**	.17***	—							
4. Ought-to L2 Self	0.77	1.27	.30***	.32***	.15**	—						
5. Fear of Assimilation	0.00	1.29	–.14**	–.06	–.07	.14**	—					
6. Ethnocentrism	–0.65	1.29	–.10†	.13*	–.03	.19***	.53***	—				
7. Religious Attitudes	1.17	1.40	–.02	.12*	.04	.01	.34***	.48***	—			
8. Attitudes to Arabs (SDS)	0.73	0.90	.05	.04	.12*	.03	.11*	.27***	.29***	—		
9. Attitudes to the English (SDS)	0.77	0.76	.36***	.20***	–.03	.19***	–.20***	–.11*	–.10†	.12*	—	
10. Explicit D Measure	0.01	1.11	.21***	.13*	–.10†	.09	–.22***	–.30***	–.27***	–.70***	.56***	—
11. Implicit D Measure	–0.78	0.61	.02	.00	–.01	–.03	–.24***	–.16**	–.18***	–.11*	.02	.07

Note. SDS = sematic differential scale.
*** p ≤ .001, ** p ≤ .01, * p ≤ .05, † p < .10.

The correlations in Table 3 show that the Explicit and Implicit D Measures did not correlate with each other. However, they did behave similarly in correlating negatively with all three L1 group affiliation scales. There were no significant

differences in how strongly they correlated with these three scales (the strong correlations between the Explicit *D* Measure and the two semantic differential scales were merely an artifact of being derived from them). Finally, in line with previous research, females outperformed males both in the implicit test, $t(363) = 1.91$, $p = .057$, $d = 0.22$, and in the Ideal L2 Self, $t = 4.93$, $p < .001$, $d = 0.57$.

6.2. RQ 1: Openness to the L2 group

This question is concerned with whether participants with explicit–implicit congruence (i.e., Type 1 in Table 1) would exhibit more openness to the L2 group than would incongruent participants (Type 4 in Table 1). Because both of these types share positive attitudes toward L2 speakers at the explicit level, this part of the analysis included only participants who obtained a score higher than the neutral zero (i.e., positive) in Attitudes toward English-speaking People. This is the first step. The two types differ in their implicit attitudes, hence the participants selected in the first step were then subdivided based on their Implicit *D* Measure scores into those in the upper and lower quartiles (i.e., excluding middle-range participants). As a result, this two-step selection procedure produced two subgroups with contrasting implicit attitudes but commonly shared positive explicit attitudes.

A *t*-test demonstrated that participants who exhibited explicit–implicit congruence also exhibited significantly more positivity in Attitudes toward English-speaking People ($M = 2.05$, $SD = 0.75$, $n = 78$) than the ones with explicit–implicit incongruence ($M = 1.81$, $SD = 0.77$, $n = 84$), $t(160) = 1.99$, $p = .048$, $d = 0.32$. These results lend support to the view that explicit–implicit congruence predicts more openness to the L2 group. Table 4 contains a summary of the differences in the other group-related scales. All results are also consistent with this view.

Table 4 Differences between participants with explicit–implicit congruence ($n = 78$) and incongruence ($n = 84$)

Scale	Group	M	SD	t	d
Fear of Assimilation	Congruent	−0.42	1.27	3.35***	0.53
	Incongruent	0.28	1.36		
Ethnocentrism	Congruent	−0.96	1.27	2.49**	0.39
	Incongruent	−0.45	1.34		
Religious Attitudes	Congruent	0.82	1.44	3.11**	0.49
	Incongruent	1.47	1.22		
Attitudes toward Arabs	Congruent	0.50	0.89	2.48**	0.40
	Incongruent	0.85	0.86		

Note. Bonferroni correction have been implemented. Adding length of residence in an English-speaking country and age as covariates does not influence these results.
** $p ≤ .01$, *** $p = .001$.

A two-step log-likelihood cluster analysis based on these five scales readily yielded two clusters with a ratio of 1.05. A *t*-test showed that the cluster showing more explicit openness to the L2 group also scored significantly higher in the implicit test, $t(363) = 3.60$, $p < .001$, $d = 0.38$. This suggests that implicit attitudes are associated with openness to the L2 group for the sample overall. Further analyses showed that this effect is markedly stronger within the male subsample, $t(250) = 3.27$, $p = .001$, $d = 0.41$; but not statistically significant for the female subsample, $t(106) = 1.49$, $p = .14$, $d = 0.29$. These results suggest that implicit attitudes are especially relevant for male language learners.

6.3. RQ 2: Personality coherence

This question compared the correlation coefficients for learners with implicit preference for the L1 versus L2 groups. An analysis was conducted based on a median-split of the Implicit *D* Measure scores. Table 5 presents the results for the two genders. Typically, researchers examine the first column (i.e., r_{all}), which pools all participants regardless of their implicit attitudes. The next two columns separate those with a low implicit score showing preference for the L1 group (the $r_{L1-pref}$ column) from those with a high implicit score showing preference for the L2 group (the $r_{L2-pref}$ column). The crucial part is the last column. It examines whether the correlation coefficients in the $r_{L1-pref}$ and $r_{L2-pref}$ columns differ significantly. (That is, two correlation coefficients might be different [e.g., .20 vs. .22] but the *magnitude* of this difference may not be large enough to warrant statistical significance.) This column reports Fisher's *r*-to-*z* transformation, which is a standard approach to comparing correlation coefficients (Kenny, 1987, p. 275). Dörnyei and Chan (2013) for example have used it to compare correlation pairs related to the motivation to learn two different languages.

Table 5 shows a total of 17 instances in which pairs of correlation coefficients differed significantly between the two subgroups (the full correlation tables are available in Appendix B). As mentioned above, the r_{all} column—which does not take implicit attitudes into account—is the one typically examined by researchers. However, when the participants were separated based on their implicit attitudes, the correlations of the L1 preference participants dropped to non-significance in 14 instances, whereas the correlations of the L2 preference participants became even stronger. For example, for females, Attitudes toward L2 Speakers and Attitudes toward L2 Learning appeared moderately correlated for the overall sample, which is the expected result from the literature as reviewed above. However, the next two columns show that this pattern actually holds only when implicit attitudes toward the L2 group are favorable. This suggests that pooling these two different groups can be misleading.

Table 5 Correlations for males and females comparing the overall sample, those with L1 and L2 implicit preference, and the difference between the latter two groups

	Scales	r_{all} (n = 257)	$r_{L1-pref}$ (n = 128)	$r_{L2-pref}$ (n = 129)	z
Male	Explicit *D* Measure Implicit *D* Measure	.14*	−.08	.21*	2.32*
	Explicit *D* Measure Attitudes to L2 Speakers	.18**	.03	.33***	2.48*
	Explicit *D* Measure Attitudes to L2 Learning	.13*	−.04	.29***	2.68**
	Attitudes to L2 Learning Attitudes to the English (SDS)	.21***	.09	.32***	1.91†
	Attitudes to L2 Learning Fear of Assimilation	−.08	.08	−.23**	2.49**
	Attitudes to L2 Speakers Ideal L2 Self	.31***	.04	.32***	2.31*
	Implicit *D* Measure Fear of Assimilation	−.27***	−.11	−.34***	3.68***
	Implicit *D* Measure Ethnocentrism	−.19**	−.01	−.22**	1.69†
	Implicit *D* Measure Religious Attitudes	−.21***	−.05	−.29**	1.97*
	Implicit *D* Measure Attitudes to Arabs	−.12*	.05	−.19*	1.92*
	Attitudes to L2 Speakers Fear of Assimilation	−.13*	−.06	−.27**	1.72†
	Attitudes to L2 Speakers Attitudes to Arabs (SDS)	.03	.18*	−.10	2.24*
	Scales	r_{all} (n = 108)	$r_{L1-pref}$ (n = 54)	$r_{L2-pref}$ (n = 54)	z
Female	Attitudes to L2 Speakers Attitudes to L2 Learning	.34***	.05	.61***	3.33***
	Implicit *D* Measure Ideal L2 Self	−.02	−.08	.29*	1.91†
	Explicit *D* Measure Ethnocentrism	−.12	.08	−.29*	1.91†
	Attitudes to L2 Learning Implicit *D* Measure	−.09	−.32*	.11	2.23*
	Attitudes to the English—SDS Ethnocentrism	.06	.27*	−.18	2.32*

Note. All hypotheses are two-tailed. SDS = semantic differential scale. † $p < .10$, * $p \le .05$, ** $p \le .01$, *** $p \le .001$.

In the only three instances in which this pattern was reversed, the correlations that emerged for those with L1 preference were theoretically somewhat unexpected. It is not clear why the women had a *negative* correlation between

L2 learning attitudes and implicit attitudes toward L2 speakers, or why the more they rated the English favorably the more they were also ethnocentric. Also, the men tended to rate the two groups similarly as if they did not see much difference between them. These results suggest that learners with lower implicit attitudes do not seem to follow theoretically expected patterns. Future research is needed to shed more light on the motivation of this group of learners.

Again, this effect is more marked for males than females, as fewer significant differences emerged from the female subsample. This pattern supports the results related to RQ 1 showing that implicit attitudes play a larger role for males. Overall, therefore, the results demonstrate that pooling learners without regard to their level of implicit attitudes carries the danger of masking salient internal differences that may in turn suppress the overall correlation coefficient.[3]

6.4. RQ 3: Moderating the L2 MSS

This question examined whether implicit attitudes moderate the relationship between (explicit) attitudes toward L2 speakers and the ideal L2 self, and between the ideal L2 self and attitudes toward learning English. A multi-group structural equation modeling (SEM) analysis was conducted using Amos 22 (Arbuckle, 2013). The SEM analysis followed the recommended two-step approach of examining the measurement model before proceeding to the structural model (for details, see Appendix C).

The results for the overall sample, displayed in Figure 4 above the arrows and in Table 6, show that both paths are statistically significant. Again, these are the typical results researchers obtain when they do not take implicit attitudes into account. However, when implicit attitudes were taken into account, a different picture emerged. Learners with an L2 preference outperformed their L1 preference counterparts in the path from Attitudes toward English-speaking People to the Ideal L2 Self ($z = 1.88$, $p < .10$), while the opposite pattern emerged in the other path ($z = 2.48$, $p < .05$).

These results suggest that learners resort to the L2 group to develop their ideal L2 selves only when their implicit attitudes toward that group are favorable. At the same time, these learners—because of their favorable attitudes at the implicit level—may not need to consciously resort to their ideal L2 selves to remain motivated; their motivation may be maintained spontaneously. This pattern implies that a conscious ideal L2 self is more relevant to learners with lower

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[3] The Bonferroni correction was not implemented in this part of the analysis following the convention in the field. Language motivation researchers do not correct for multiple comparisons when they use correlations (like those in Table 3), and the present analysis is intended to show what the results might look like when implicit attitudes are taken into account.

implicit attitudes toward the L2 group, and that because of their lower implicit attitudes these learners might derive their ideals from sources other than the L2 group to sustain their motivation. Thus, implicit attitudes seem to reveal a more nuanced picture of language motivation, showing very different motivational dynamics underlying these two types of learners.
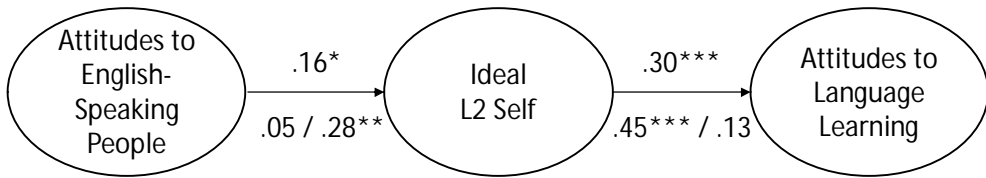

Figure 4 Standardized coefficients of final model for all participants (above the arrows) and for those who had L1 vs. L2 implicit preference (under the arrows). Indicators and error terms were deleted for simplicity. The structural model had an adequate fit, $\chi^2(75) = 199.701$, $p < .001$, $\chi^2/df = 2.663$, GFI = .943, CFI = .945, RMSEA = .048, PCLOSE = .660.
*** $p < .001$, ** $p < .01$, * $p < .05$.

Table 6 Standardized and unstandardized coefficients, standard errors, and critical ratios in the final model for the overall sample, and for participants with L1 vs. L2 implicit preference

Path	Group	β	B	SE	CR
Attitudes toward L2 People → Ideal L2 Self	Overall	.16	0.13	.05	2.51*
	L1-pref	.05	0.04	.07	0.51
	L2-pref	.28	0.23	.08	3.09**
Ideal L2 Self → Attitude toward L2 Learning	Overall	.30	0.40	.09	4.48***
	L1-pref	.45	0.62	.14	4.34***
	L2-pref	.13	0.17	.12	1.45

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

7. Discussion

Conventional L2 motivation theories tend to portray language learners as rational agents, varying along one (conscious) dimension: a continuum from high to low motivation. This is evident both in theoretical discussions and in actual empirical investigations where self-report questionnaires and interviews are predominant. The present paper has presented the first study in the L2 field using the IAT to examine language learners' implicit attitudes. The results demonstrate that another (unconscious) dimension has important implications for language learning motivation. The implicit attitudes construct may therefore have the potential to move the field forward toward interesting directions.

Implicit attitudes also appeared more relevant to males than to females. This supports previous research showing that females tend to exhibit more positivity toward languages (vs. math and science) both explicitly and implicitly, and consequently they may have less reason to develop explicit–implicit incongruence. Implicit attitudes may therefore be a valuable pathway for a better understanding of gender differences in language learning. The present study also offers support for the utility of religious attitudes for Arab learners as a further indicator of openness to the L2 group. It is still unclear to what extent this would be useful in societies in which religion is not a salient aspect.

That implicit attitudes correlated negatively with L1 group affiliation invites speculation on the nature of implicit attitudes. Originally, fear of assimilation was investigated primarily in the Canadian context, where French speakers were at risk of being assimilated into the dominant Anglophone culture (e.g., Clément, 1980). Today, with the unprecedented worldwide spread of the English language, fear of assimilation may no longer be confined to minorities living in the shadows of another dominant group. Many learners around the world feel that Global English is a form of Westernization invading their cultural distinctiveness (see Dörnyei, Csizér, & Németh, 2006, for an in-depth analysis), especially if we remember that the basis of fear of assimilation is the threat to perceived ethnolinguistic vitality (i.e., language status, demography, and institutional support; see Giles, Bourhis, & Taylor, 1977). The ensuing fear of assimilation need not be explicit, however, considering the undeniable advantages of English proficiency for one's future career. A learner faced with this situation may be bound to experience ambivalent feelings reflecting an explicit–implicit conflict. Further research is needed to scrutinize these hypotheses.

8. Limitations

One potential limitation of this study is that the sample contains a mixture of different ages and educational levels. In fact, because of this diversity, a standardized measure of L2 achievement was not feasible. Therefore, little can be said about the extent to which implicit attitudes are relevant to actual classroom learning. In addition, the female sample was smaller, which limits the generalizability of the results. Another limitation is the exclusive reliance on the IAT. Since no measure is perfect, utilizing other measures of implicit attitudes in future research would be more informative. Nosek, Hawkins, and Frazier (2011), for example, review 20 different implicit measures.

In a first attempt to address some of these limitations, a follow-up study by Al-Hoorie (in press) involved undergraduate language learners from one institution, and so a measure of L2 achievement could be obtained. These participants

also had very similar ages and most had never visited an English-speaking country. They performed the Single-target Implicit Association Test (Wigboldus, Holland, & van Knippenberg, 2005), and their results showed that implicit attitudes were indeed able to predict L2 achievement. Moreover, implicit attitudes still predicted achievement after controlling for the other explicit variables in the study (e.g., the ideal L2 self, attitudes toward the learning situation, intended effort), suggesting that the effect of implicit attitudes is not mediated by those variables. Additionally, this effect could not be explained either by social desirability biases or by other cognitive confounds. These findings serve to reinforce the relevance of implicit attitudes to language learning.

9. Conclusion

This paper has argued that the implicit side of attitudes and motivation may constitute a more important component in the overall understanding of language learning motivation than is currently acknowledged in mainstream theories. Focusing entirely on explicit attitudes and motivation in empirical studies could mask the potential impact of any conflicting implicit attitudes. The findings of this study offer evidence that this impact can in some subgroups change the results substantially, which in turn suggests that adding an implicit dimension to our overall understanding of motivation may be a fruitful future direction.

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APPENDIX A

Implicit test stimuli

Pleasant: fair, polite, cheerful, kind, hardworking, beautiful, knowledgeable, honest, optimistic, clean

Unpleasant: unfair, impolite, cheerless, mean, lazy, ugly, ignorant, dishonest, pessimistic, dirty

English: George, Elizabeth, London, Britain, Newton, Robin Hood, Shakespeare, Oxford University, Pound Sterling, BBC

Arabic: Mohammad, Fatimah, Mecca, Jordan, Ibn Khaldun, Hatim al-Tai, Al-Mutanabbi, Cairo University, Kuwaiti Dinar, Aljazeera

APPENDIX B

Correlation tables

Table B1 Zero-order correlations for the male (above the diagonal, n = 257) and female (below the diagonal, n = 108) subsamples

	1	2	3	4	5	6	7	8	9	10	11
1. Attitudes to English-speaking People	—	.45***	.18**	.31***	–.17**	–.13*	–.08	.03	.30***	.18**	.08
2. Attitudes to Language Learning	.34***	—	.21***	.34***	–.08	.09	.09	.06	.21***	.13*	.03
3. Ideal L2 Self	.18†	.10	—	.17**	–.07	.06	.08	.15*	.00	–.09	–.05
4. Ought-to L2 Self	.27**	.27**	.09	—	.18**	.19**	.02	.03	.24***	.13*	–.09
5. Fear of Assimilation	–.02	–.02	–.08	.04	—	.55***	.35***	.18**	–.24***	–.31***	–.27***
6. Ethnocentrism	–.04	.22*	–.18†	.21*	.49***	—	.52***	.32***	–.17**	–.38***	–.19**
7. Religious Attitudes	.13	.16†	.00	–.02	.30**	.38***	—	.32***	–.12*	–.31***	–.21***
8. Attitudes to Arabs (SDS)	.11	–.01	.02	.02	–.04	.18†	.24**	—	.07	–.70***	–.12*
9. Attitudes to the English (SDS)	.52***	.18†	–.09	.08	–.09	.06	–.04	.23*	—	.59***	.10
10. Explicit D Measure	.28**	.16	–.05	.02	.00	–.12	–.19*	–.70***	.49***	—	.14*
11. Implicit D Measure	–.11	–.09	–.02	.08	–.16†	–.06	–.10	–.10	–.16†	–.05	—

Note. SDS = semantic differential scale.
*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, † $p < .10$.

Table B2 Zero-order correlations for the male participants who had L1 (below the diagonal, n = 128) and L2 (above the diagonal, n = 129) implicit preference

	1	2	3	4	5	6	7	8	9	10	11
1. Attitudes to English-speaking People	—	.50***	.32***	.39***	–.27**	–.16†	–.20*	–.10	.36***	.33***	.09
2. Attitudes to Language Learning	.40***	—	.23**	.34***	–.23**	.11	.05	–.02	.32***	.29***	.03
3. Ideal L2 Self	.04	.19*	—	.20*	–.10	–.02	–.02	.14	–.04	–.10	–.01
4. Ought-to L2 Self	.25**	.35***	.14	—	.12	.15†	–.01	–.01	.26**	.20*	–.07
5. Fear of Assimilation	–.06	.08	–.06	.22**	—	.51***	.39***	.17*	–.22**	–.30***	–.34***
6. Ethnocentrism	–.08	.09	.13	.20*	.57***	—	.55***	.32***	–.11	–.31***	–.22**
7. Religious Attitudes	.08	.16†	.18*	.05	.28***	.47***	—	.35***	–.13	–.33***	–.29***
8. Attitudes to Arabs (SDS)	.18*	.14	.14	.05	.16†	.31***	.27**	—	.00	–.68***	–.19*
9. Attitudes to the English (SDS)	.23**	.09	.05	.23**	–.25**	–.22**	–.11	.16†	—	.66***	.15†
10. Explicit D Measure	.03	–.04	–.07	.08	–.29***	–.42***	–.26**	–.71***	.52***	—	.21*
11. Implicit D Measure	–.03	–.07	.01	–.03	–.11	–.01	–.05	.05	–.01	–.08	—

Note. SDS = semantic differential scale.
*** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$, † $p < .10$.

Table B3 Zero-order correlations for the female participants who had L1 (below the diagonal, *n* = 54) and L2 (above the diagonal, *n* = 54) implicit preference

	1	2	3	4	5	6	7	8	9	10	11
1. Attitudes to English-speaking People	—	.61***	.14	.37**	.00	–.06	.16	.06	.61***	.36**	–.01
2. Attitudes to Language Learning	.05	—	.07	.21	.05	.22	.21	.00	.22	.16	.11
3. Ideal L2 Self	.20	.12	—	.17	–.09	–.20	–.17	–.05	–.04	.08	.29*
4. Ought-to L2 Self	.14	.32*	.00	—	.12	.20	–.03	–.02	.12	.08	.15
5. Fear of Assimilation	–.10	–.13	–.13	–.08	—	.54***	.24†	.05	–.15	–.09	–.08
6. Ethnocentrism	–.02	.22	–.17	.22	.34***	—	.39**	.22	–.18	–.29*	.09
7. Religious Attitudes	.08	.12	.14	–.02	.37**	.36**	—	.37**	.02	–.25†	.02
8. Attitudes to Arabs (SDS)	.18	–.02	.09	.07	–.22	.12	.09	—	.16	–.76***	–.07
9. Attitudes to the English (SDS)	.41**	.14	–.16	.04	–.03	.27*	–.11	.30*	—	.47***	–.19
10. Explicit *D* Measure	.16	.16	–.21	–.06	.15	.08	–.13	–.63***	.53***	—	–.04
11. Implicit *D* Measure	–.10	–.32*	–.08	.23†	–.07	.06	–.08	–.03	–.15	–.18	—

Note. SDS = semantic differential scale.
*** *p* ≤ .001, ** *p* ≤ .01, * *p* ≤ .05, † *p* < .10.

APPENDIX C

SEM measurement and structural models

The measurement model is a confirmatory factor analysis aiming to establish construct validity, and so both convergent and discriminant validity had to be examined. To examine convergent validity, i.e., so that the indicators satisfactorily represent their latent constructs, three aspects were investigated. First, the rule of thumb for the construct reliability is to be .70 or higher, which was satisfied for the three constructs as shown in Table C1. Second, the average variance extracted (AVE), as the rule of thumb, should be .50 or higher. Attitudes toward English-speaking People satisfied this recommendation, but each of the Ideal L2 Self and Attitudes toward Language Learning had to have one item dropped. This improved their AVE to a satisfactory level (see Table C1). A final rule of thumb suggests that the standardized factor loadings of each indicator variable should be .50 or higher. All factor loadings were statistically significant and higher than this threshold except for one indicator of Attitudes toward Language Learning that was just under this threshold (.46). The overall trend, therefore, suggested acceptable convergent validity. To examine discriminant validity, i.e., to make sure that the constructs are sufficiently distinct from each other, the recommended measure is that the AVE values should be greater than their respective inter-construct correlations squared. This was also satisfied, as shown in Table C1. Finally, most of the standardized residuals did not exceed the recommended threshold of ±2.0, suggesting that the observed covariance terms fitted the estimated covariance terms. The fit of the measurement model was also acceptable, $\chi^2(175) = 391.517$, $p < .001$, $\chi^2/df = 2.237$, GFI = .928, CFI = .937, RMSEA = .034, PCLOSE = 1.00. These results suggested that the measurement model was satisfactory and that it was safe to proceed to the structural model.

Table C1 Reliability and validity of the constructs in the measurement model and their inter-construct correlations

	CR	AVE	1	2	3
1. Attitudes to Language Learning	.741	.503	.709		
2. Ideal L2 Self	.745	.494	.356	.703	
3. Attitudes to English-speaking People	.853	.662	.406	.165	.813

Note. CR = construct reliability, AVE = average variance extracted. Values in the diagonal are the square roots of their respective AVE.

For the structural model, the measurement invariance assumption was satisfied, indicating that the groups did not substantially differ in terms of how they understood and responded to the various items. The residuals of Attitudes toward English-speaking People and Attitudes toward Language Learning correlated with each other, possibly due to their shared underlying theme related to aspects of the L2 culture. None of the standardized residuals exceeded ±2.5, suggesting a very good fit between the observed and estimated covariance terms. The structural model also had an adequate fit, $\chi^2(75) = 199.701$, $p < .001$, $\chi^2/df = 2.663$, GFI = .943, CFI = .945, RMSEA = .048, PCLOSE = .660. There were no missing data to handle in this part of the analysis because the computer program reminded the participant if s/he left an item unanswered.