

The Influence of Implicit Norms on Cognition and Behaviour

by

Emiko Yoshida

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Emiko Yoshida

## Abstract

Recent development of implicit measures has enabled researchers to investigate the relation between implicit attitudes and automatic behaviours. Among these measures, the implicit association test (IAT: Greenwald, McGhee Schwartz, 1998) is one of the most widely used measures of implicit attitudes. However, recently, Olson and Fazio (2004) demonstrated that the IAT is contaminated by “extrapersonal associations” and suggested that the personalized version of the IAT is less influenced by these associations. In this paper, we demonstrated that the extrapersonal associations reflect cultural norms and predict meaningful behaviour. In Study 1, we found that the traditional IAT is predicted by both the personalized IAT and our cultural norm IAT. In Study 2, we found the cross-cultural differences in the implicit cultural norms. Finally, in Study 3, we demonstrated that the personalized IAT and normative IAT both predict behaviours among European-Canadians and Asian-Canadians. Thus, our studies provide evidence of predictive validity for the cultural norm IAT.

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## The Influence of Implicit Norms on Cognition and Behaviour

*The social condition, the religion, and the customs of the first immigrants undoubtedly exercised an immense influence on the destiny of their new country. Nevertheless, they could not found a state of things originating solely in themselves: no man can entirely shake off the influence of the past; and the settlers, intentionally or not, mingled habits and notions derived from their education and the traditions of their country with those habits and notions that were exclusively their own. . . The picture of American society has, if I may so speak, a surface covering of democracy, beneath which the old aristocratic colors sometimes peep out. de Tocqueville (1835, pp. 34-36)*

In this quote de Tocqueville makes an interesting claim. He suggests that although the Puritans who settled the Northeastern U.S. intentionally tried to form their own government and institutions that were distinct from the British society they fled, they were nevertheless influenced by their exposure to British culture and this exposure shaped their thoughts and actions. But how does exposure to culture shape our thoughts and actions? Is there an influence of culture that resides outside of our awareness? If so, how would we measure such influence? This paper will attempt to begin to answer these questions.

Culture can shape our thoughts and actions through the schemas it provides. For example, Nisbett and his colleagues have shown that people from Asian cultures develop schemas that facilitate the processing of objects in relation to the background, and that these schemas facilitate holistic ways of thinking (Nisbett et al., 2001). Therefore, individuals in these cultures tend to pay attention to background (Masuda & Nisbett, 2001) and relationships (Chiu, 1972), and attribute social events externally (Morris & Peng, 1994).

Moscovici (2001) has made a similar argument that social representations form a framework for society to function. He argues that, “the representation is a notion



conceived to explain what, if anything, binds people together in a group, a society, and makes them act together. In order to bind themselves, create institutions, and follow common rules, people need a system of beliefs, common representations which are proper to their culture” (2001, p. 21). These networks of common knowledge or cultural schemas become easily accessible and activated by environmental cues (Markus & Plaut, 2001). Furthermore, members of society develop cognitive styles that are appropriate in their culture in order to understand and interpret their social realities (Philogene & Deaux, 2001).

Social representations also guide and regulate people’s decisions (Philogene & Deaux, 2001) and behaviours by providing expectations and social rules. In this way, they function as cultural norms (Cialdini & Trost, 1998). When social representations create expectations they provide what Cialdini, Reno and Kallgren (1990) call descriptive norms or a sense of what most people in society do or believe. In contrast, when social representations specify social rules they convey what Cialdini, et al. (1990) call injunctive norms or the sense of what people should do or believe.

In this paper, we will not try to distinguish between cultural schemas, social representations, and cultural norms. Rather, we will treat these related constructs as pointing to the same underlying variable and attempt to develop a new measure that captures this variable and demonstrates its utility in predicting behaviour. In particular, we aim to develop a measure of what we will call implicit cultural norms that is represented outside of awareness. More specifically, we propose that people will not be aware of how their beliefs or behaviours are influenced by implicit cultural norms, but their beliefs or behaviours will not necessarily be outside of awareness or beyond

people's control.

There are good reasons to believe that culture can influence social representations and cultural norms outside of awareness. First, sometimes people are influenced by social norms without explicit sanctions (Cialdini, Reno & Kallgren, 1990; Allison, 1992). For example, Crandall (1988) showed that as the sorority members become cohesive, their level of binge eating became more similar to their friends'. Moreover, popularity and binge eating were related such that those whose binge eating level deviated from the norms were less likely to be popular. One explanation of this result is that the women in the sorority were able to pick up on subtle cues about eating displayed by their sorority sisters and these subtle cues shaped their eating.

Consistent with this interpretation, Chartrand and Bargh (1999) have demonstrated that people who were interacting with a confederate tended to adopt similar behavioural mannerisms as the confederate. Specifically, those who were interacting with a confederate who shook his or her foot were more likely to shake their feet; those who were interacting with a confederate who rubbed his or her face were more likely to rub their faces. However, debriefing revealed that participants were not aware of the influence of the confederate's behaviours.

Second, theorizing on implicit processes (Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Bargh, 1994; Greenwald & Banaji, 1995) suggests that when people are repeatedly exposed to two stimuli that are paired with one another they will develop an implicit association between these constructs. Following this reasoning, if specific beliefs or behaviours are consistently paired with social sanctions—even if these sanctions are not explicit—then people should develop an implicit association between social approvals

and such beliefs or behaviours. This sort of association is what we are describing as an implicit cultural norm.

There have been a few attempts to measure constructs related to implicit cultural norms (Lahlou, 2001; Silvana de Rosa, 2001); however, these attempts have largely been unsuccessful due to difficulties in measuring implicit constructs. In the present research we adapt the Implicit Association Test (IAT) in an attempt to overcome these difficulties.

### Implicit Association Test

The implicit association test (IAT: Greenwald, McGhee Schwartz, 1998) is one of the most widely used implicit measures with established validity and reliability in many studies (e.g., Egloff & Schmukle, 2002; McConnell & Liabold, 2001). The IAT measures the strength of association between target objects (e.g., flower or insect) and evaluative attributes (e.g., pleasant or unpleasant) by having participants classify stimulus items to category labels. In the critical blocks, participants categorize exemplars of evaluative attributes (e.g., sunshine, party, or disaster) and target items (e.g., photos of flowers or insects) simultaneously. If participants have faster response latencies when flowers and pleasant items share the same response than when flowers and unpleasant items share the same response, then it is inferred that they have positive implicit attitudes towards flowers.

Recently, Olson and Fazio (2004) demonstrated that the traditional IAT is contaminated by “extrapersonal associations.” According to Olson and Fazio (2004), the traditional IAT is influenced not only by personal associations, but also cultural associations that people have acquired through socialization. To separate the personal associations from extrapersonal associations, Olson and Fazio (2004) modified two

features of the traditional IAT. First, based on the finding that the IAT is driven by category labels, rather than exemplars (De Houwer, 2001), they changed the category labels for evaluative objects from “pleasant” and “unpleasant” to “I like” and “I don’t like.” Second, they removed the error feedback because the presence of the error message indicates that there is a “correct” answer. They found that the personalized version of the IAT was correlated with explicit measures more strongly and predicted behaviours better than the traditional IAT.

### Measuring Implicit Cultural Norms with the IAT

We propose that “extrapersonal associations” may in part reflect implicit cultural norms. We hypothesize that cultural experiences build associations of cultural ideals and realities, and “extrapersonal associations” contain these cultural associations. To test this hypothesis, we created IATs that measure cultural norms by following Olson and Fazio’s methodologies. More specifically, we changed the category labels from “pleasant” and “unpleasant” to “most people like” and “most people don’t like” (descriptive norms in a belief domain), “people should like” and “people shouldn’t like” (injunctive norms in a belief domain) and “people approve of” and “people disapprove of” (injunctive norms in a behavioural domain).

In our first series of studies, we establish the validity of the cultural norm IAT by examining the personalized IAT, cultural norm IAT and traditional IAT simultaneously. We examine the domain of flowers vs. insects (Study 1a) and apples vs. candy bars (Study 1b) because these domains are often used in IAT research (e.g., Olson & Fazio, 2004; Kapinski & Hilton, 2001; Greenwald et al., 1998).

The second study addresses the question of whether people from different cultures

exhibit different implicit cultural norms. Finally, in the third study we investigate how the personalized IAT and cultural norm IATs predict behaviour.

Study 1a: Validating implicit measures of cultural norms in the domain of flowers and insects

### *Method*

#### *Participants*

Seventy-three undergraduate students (28 men and 45 women) participated in the experiment for credit towards their introductory psychology course. All participants were native speakers of English.

#### *Materials*

*The traditional IAT.* Following the methodology of Greenwald et al. (1998), the IAT had five blocks in total. We used five photos of flowers (carnation, daisy, lily, rose and tulip) and insects (ant, cockroach, maggot, fly and yellow jacket) for stimulus items (Greenwald et al., 1998; Karpinski & Hilton, 2001). The first block was a practice trial for pleasant and unpleasant items, and participants classified pleasant (e.g., friend, party, gift) and unpleasant stimulus items (e.g., disaster, evil, death) to the category labels “pleasant” and “unpleasant.” The second block and fourth block were practice trials for flower and insect items in which participants categorized photos of flowers and insects to the labels “flower” and “insect” by pressing the response keys. The third block was an incompatible critical block in which flowers and unpleasant items share the same response key and insects and pleasant items share the same response key. The fifth block was a compatible critical block, and flowers and pleasant items shared the same response key and insects and unpleasant items shared the same response key.

*The personalized IAT.* The personalized IAT was the same as the traditional IAT except that participants were asked to distinguish between “things you might like or dislike” using the category labels “I like” and “I don’t like” (Olson & Fazio, 2004).

*The cultural norm IAT.* The cultural norm IAT was also similar to the traditional IAT except participants were asked to distinguish between things most people like or dislike using the category labels “most people like” and “most people don’t like.” Specifically, we changed the instructions to say, “the following screens will ask you to distinguish between things most people like or dislike. The words most people like refer to what people in North America actually like, not what they should like.”

We also removed error messages from all three types of IATs because labelling responses as errors on the personalized IAT seemed inappropriate (for example, someone—perhaps Oscar the grouch—might actually like garbage) and we wanted to keep the format the same for all three measures. Thus, the three IATs were identical except for the category labels and instructions.

### *Procedure*

Participants were invited to the lab in groups of up to four at a time. They practiced the traditional flower-insect IAT to become familiar with completing an IAT. Starting one week after the lab session, participants completed the traditional, personal and cultural norm IATs with each version spaced from 0 to 28 days apart. The average days between IATs are 7.93 days. The order of the IATs was counterbalanced.

### *Results*

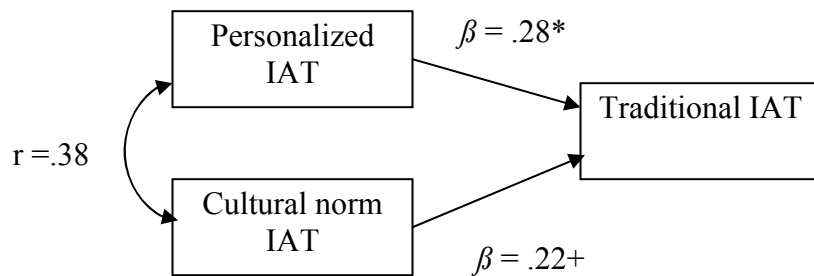
Following Jordan, Spencer, and Zanna (2005), response latencies that were slower than 3,000 ms were recorded as 3,000 ms and responses that were faster than 300 ms

were recorded as 300 ms. The scores were obtained by subtracting the average response latencies of the third block from those of the fifth block. Higher scores indicated relatively more positive evaluations of flowers than insects. We found no differences for the number of days between IAT administrations so we did not analyze for this variable. We analyzed data using a 3 (IAT type: personalized, cultural norm, traditional) x 2 (gender) mixed model ANOVA, with IAT type as a within-participants factor and gender as a between-participants factor. Neither the main effect for IAT type nor the main effect for gender was significant,  $F_{s(2, 132)} < 1$ . However, there was a significant interaction between IAT type and gender,  $F_{(2, 132)} = 3.99, p = 0.02$ . Follow up analyses indicated that there was a marginal gender difference on the personalized IAT, ( $\underline{M}_{(males)} = 164.5, \underline{M}_{(females)} = 229.4; F_{(1, 69)} = 3.34, p = .07$ ), but no gender differences on the traditional IAT ( $\underline{M}_{(males)} = 205.7, \underline{M}_{(females)} = 174.7$ ) or cultural norm IAT ( $\underline{M}_{(males)} = 226.7, \underline{M}_{(females)} = 187.9$ ), both  $F_s < 1$ . On the personalized IAT, women showed a tendency to have a stronger personal preference for flowers than insects.

We also examined the relations among the traditional, personalized, and cultural norm IATs. Consistent with our hypothesis, the personalized IAT and cultural norm IAT were significantly correlated with the traditional IAT,  $r = .38, p < .01, r = .34, p < .01$ , respectively. Moreover, we also found that the personalized IAT and cultural norm IAT were significantly correlated,  $r = .41, p < .01$ . To investigate the unique contributions of the personalized IAT and cultural norm IAT on the traditional IAT, we conducted a multiple regression analysis in which the personalized IAT and cultural norm IAT were entered together as predictor variables. As Figure 1 shows, the personalized IAT accounted for significant variance and cultural norm IAT accounted for marginally

significant variance in the traditional IAT,  $\beta = .28$ ,  $t_{(68)} = 2.36$   $p = .02$ ,  $\beta = .22$ ,  $t_{(68)} = 1.86$   $p = .07$ , respectively.

Figure 1. The personalized IAT and cultural norm IAT predict the standard IAT in the domain of flowers vs. insects



+  $p < .10$

\*  $p < .05$

### *Discussion*

In Study 1a, we found that personalized IAT and cultural norm IAT have a moderate correlation and independently predict the traditional IAT. Thus, they appear to be unique constructs. Interestingly, on the personalized IAT female participants showed stronger preferences for flowers over insects than male participants. No such preference was found on the traditional or cultural norm IAT. One might expect that given predominant gender roles in society women might have more positive implicit attitudes toward flowers (and perhaps more negative implicit attitudes toward insects) than men. The results on the personalized IAT were consistent with this expectation. In contrast,



when considering cultural norms (presumably influenced by the views of both men and women) one might not expect a gender difference. Although not definitive, this finding is consistent with our reasoning about personalized vs. cultural norms IATs.

One limitation in Study 1a, however, was that in the domain of flower vs. insects, almost all participants showed an implicit preference for flowers over insects and these preferences are consistent with what most people like (i.e., descriptive norms). In Study 1b, we investigated people's implicit attitudes and cultural norms towards apples and candy bars. Culturally, apples are considered healthier and more desirable than candy bars. However, people's preferences are not always consistent with cultural norms. Therefore, we sought to replicate the results of Study 1a in a domain in which personal and collective preferences are less clear.

Study 1b: Validating implicit measures of cultural norms in the domain of apples and  
candy bars

### *Method*

#### *Participants*

The same 73 participants that completed Study 1a completed Study 1b.

#### *Materials*

We used the same traditional IAT, personalized IAT and cultural norm IAT as in the Study 1a except for stimulus items and category labels. More specifically, participants categorized photos of apples and candy bars and category labels “apple” and “candy bar.” The IAT was coded so that higher scores indicate more positive evaluations towards apples than candy bars.

#### *Procedure*

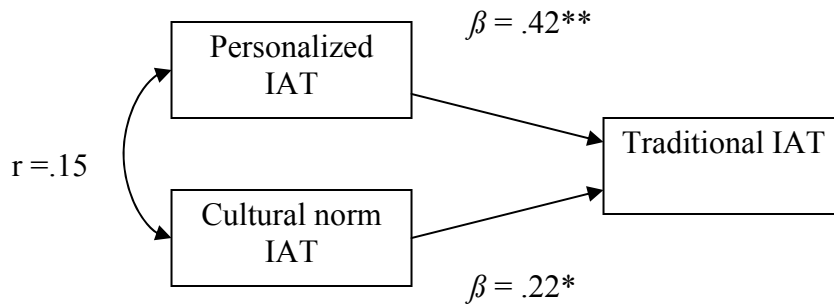
The procedure of Study 1b was the same as in Study 1a.

### *Results*

We used the same algorithm to calculate IAT scores as in Study 1a. We conducted a 3 (IAT type: traditional, personalized, cultural norm) x 2 (gender) ANOVA, with repeated measures on the first factor. No significant main effects for IAT type or gender and no interaction between IAT type and gender emerged,  $F_{S(2, 126)} < 1$  ( $M = -27.0$ ,  $SD = 179.7$  for the traditional IAT,  $M = -21.7$ ,  $SD = 130.1$  for the personalized IAT,  $M = -23.1$ ,  $SD = 133.3$  for the cultural norm IAT).

Replicating Study 1a, the personalized IAT and cultural norm IAT were significantly correlated with the traditional IAT,  $r = .45, p < .01$ ,  $r = .28, p < .05$ , respectively. Moreover, the personalized IAT and normative IAT were not correlated with each other,  $r = .15 ns$ . As Figure 2 shows, multiple regression analysis provided stronger evidence of unique influence of the personalized and cultural norm IAT on the traditional IAT,  $\beta = .42, t_{(65)} = 3.81, p < .01$ ,  $\beta = .22, t_{(65)} = 1.99, p = .05$ , respectively.

Figure 2. The personalized IAT and cultural norm IAT predict the standard IAT in the domain of apples vs. candy bars



\*  $p < .05$

\*\* $p < .01$

### *Discussion*

Replicating Study 1a, Study 1b provided evidence that the traditional IAT seemed to be influenced by both implicit attitudes and cultural norms. Moreover, there was dissociation between implicit attitudes and implicit norms towards apples vs. candy bars, suggesting that people's implicit attitudes and perceived implicit norms are not consistent with each other in this domain.<sup>1</sup> Taken together, Study 1a and Study 1b demonstrated that implicit attitudes and implicit cultural norms appeared to be unique constructs. In Studies 2 and Study 3, we will examine validity of cultural norm IAT.

### Study 2

In Study 2, we tested the hypothesis that people from different cultures will have different implicit norms towards the elderly. According to Sung (2001), traditional East

Asian cultures have been influenced by Confucian values, which emphasize obedience and respect for parents and the elderly. In contrast, negative attitudes or prejudices against the elderly are prevalent in Western cultures (Nelson, 2005). Therefore, in East Asian cultures, there are more positive descriptive cultural norms towards the elderly and stronger injunctive cultural norms to respect the elderly than in Western cultures.

When people are exposed to a new culture, at varying rates and to varying degrees, they will take on the new cultural values and cultural norms. Following Wilson, Lindsey and Schooler's (2001) dual attitude model, we expect that this acculturation processes will be faster at the explicit level than at the implicit level because changes in implicit processes will occur through the accumulation of experience whereas changes in explicit processes can occur through conscious deliberative decisions to take on new cultural roles. Based on this reasoning, we expected that Asian-Canadians will retain their traditional cultural values at the implicit level and will exhibit less negative implicit views towards the elderly. In contrast, at the explicit level, Asian-Canadians will adopt Western cultural values; therefore, there will be no cross-cultural differences in explicit attitudes or cultural norms.

### *Method*

#### *Participants*

Eighty-six European-Canadian (24 men and 62 women) and 115 Asian-Canadian (51 from Hong Kong, 50 from China, 7 from Taiwan, 2 from South Korea, 2 from Malaysia, 1 from North Korea, 1 from Vietnam and 1 who did not provide information on her country of origin) (44 men and 71 women) undergraduate students from the University of Waterloo participated in this study for course credit or an \$8.00 payment.

## *Materials*

*Acculturation measures.* To measure the level of acculturation for Asian-Canadian participants, we asked them to indicate the strength of identification with Asian culture and Canadian culture on an 11-point Likert scale ranging from 0 (not at all) to 10 (very much). We also assessed the length of time they have spent in Canada.<sup>2</sup>

*Explicit attitudes towards younger and older people.* Participants were asked to indicate their attitudes towards younger and older people on 7-point semantic differential scales: favourable – unfavourable, positive – negative, like – dislike, and desirable – undesirable (Appendix A).

*Explicit descriptive cultural norms about younger and older people.* To measure descriptive norms towards younger and older people, we asked participants to indicate most people's overall opinions or evaluations of younger people or older people on the same semantic differential scales as attitudes measures. The instructions specified the reference group as most people in the participants' culture (Appendix B).

*Explicit injunctive cultural norms about younger and older people.* Participants were asked to indicate the extent to which they agree or disagree with the statements, “Most people who are important to me think I should respect older people (younger people)” and “Most people who are important to me think that I should take care of older people (younger people),” on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Appendix C).

*Implicit attitudes towards younger and older people.* We used the same personalized IAT as in Study 1 except for the category labels and stimulus items. To capture participants' implicit values towards younger and older people, we used the

personalized IAT with category labels, “I believe in” and “I don’t believe in.” We chose ideological exemplars, such as sadness, hate, dishonesty, oppression, injustice, happiness, love, freedom, justice and honesty. The other category labels were “young” and “old” and participants were asked to categorize photos of younger men and women and older men and women. All the pictures were of European-Canadians.

*Implicit descriptive cultural norms about younger and older people.* The descriptive cultural norm IAT was the same as the personalized IAT except the category labels “I believe in” and “I don’t believe in” were replaced with the category labels “most people believe in,” and “most people don’t believe in.”

*Implicit injunctive cultural norms about younger and older people.* The injunctive cultural norm IAT was the same as the descriptive cultural norm IAT except the category labels, “most people believe in,” and “most people don’t believe in” were replaced with the category labels “people should believe in” and “people shouldn’t believe in.”

### *Procedure*

Participants completed the personalized IAT, the descriptive cultural norm IAT and the injunctive cultural norm IAT and corresponding explicit measures over the internet. Each IAT was separated from three days to 26 days apart (with an average of 6.39 days apart) to reduce carryover effects. The order of the set of measures was counterbalanced.

### *Results and Discussion*

*Acculturation measures.* Among Asian-Canadians, the mean length of time spent in Canada was 8.65 years ( $SD = 5.05$ ). The mean strength of identification with Canadian

cultural was 7.28 ( $SD = 1.84$ ). The length of time spent in Canada and Canadian identity were marginally correlated with each other,  $r = .16, p = .10$ .

*Mean cross-cultural differences at the implicit level.* We used the same algorithm to calculate IAT scores as in Study 1. Higher scores on the IATs indicate more positive implicit evaluations towards older people than younger people. To reduce the influence of outliers, we excluded IAT scores that were three standard deviations away from the means for European-Canadians and Asian-Canadians separately.<sup>3</sup> Because there were no differences for the number of days between IAT administrations, we did not analyze for this variable. To test our hypothesis regarding the implicit attitudes and cultural norms towards the elderly, we conducted a 3 (IAT type: personalized, descriptive norm, injunctive norm) x 2 (cultural group: European-Canadians vs. Asian-Canadians) mixed model ANOVA, with IAT type as a within-participants factor and cultural group as a between-participants factor. There was a significant main effect for IAT type,  $F_{(2, 153)} = 5.58, p < .01$ , and a significant main effect for cultural group,  $F_{(1, 154)} = 3.92, p = .05$ . These main effects were qualified by the interaction between IAT type and cultural group,  $F_{(2, 153)} = 4.51, p = .01$ . Follow up analyses revealed that European-Canadian had more negative implicit attitudes towards the older people ( $M = -184.5, SD = 247.0$ ) than Asian-Canadians ( $M = -89.2, SD = 198.4; F_{(1, 175)} = 8.06, p < .01$ ). However, there were no cultural differences in implicit descriptive cultural norms ( $M_{(\text{European-Canadians})} = -104.7, SD_{(\text{European-Canadians})} = 134.3, M_{(\text{Asian-Canadians})} = -80.1, SD_{(\text{Asian-Canadians})} = 184.4$ ) or implicit injunctive cultural norms ( $M_{(\text{European-Canadians})} = -109.5, SD_{(\text{European-Canadians})} = 311.7, M_{(\text{Asian-Canadians})} = -96.1, SD_{(\text{Asian-Canadians})} = 180.2$ ), both  $F$ s  $< 1$ .

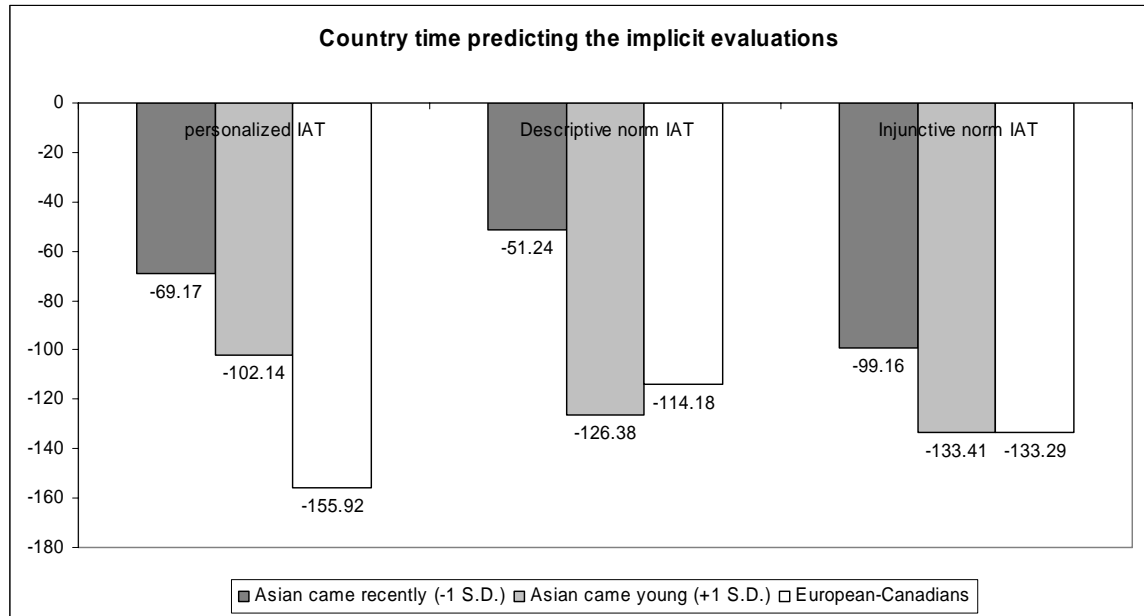
*Acculturation and Implicit Descriptive and Injunctive Cultural Norms.* Although we had predicted that European-Canadians and Asian-Canadians would differ on implicit cultural norms—both descriptive and injunctive—and did not find this pattern of data, we reasoned that the difference between European-Canadians and Asian-Canadians would be greatest when Asian-Canadians first moved to Canada and diminish the longer they stay. That is, as Asian-Canadians become acculturated to Canadian culture they would show smaller difference in implicit norms.

To test this reasoning, we conducted a regression analysis in which identification with Canadian culture, identification with Asian culture, the interaction of these two variables, and length of time spent in Canada predicted implicit descriptive cultural norms, and found that the length of time in Canada was the only predictor of implicit descriptive cultural norms,  $\beta = -.20$ ,  $t_{(98)} = -1.93$ ,  $p = .05$ , all other  $\beta$ s  $< -.09$ ,  $t_{S(98)} < 1$ .

Similarly, when identification with Canadian culture, identification with Asian culture, the interaction of these two variables, and length of time spent in Canada predicted implicit injunctive cultural norms, length of time in Canada was the only significant predictor of implicit injunctive cultural norms,  $\beta = -.26$ ,  $t_{(98)} = -2.62$ ,  $p < .01$ , all other  $\beta$ s  $< .14$ ,  $t_{S(98)} < 1.4$ ,  $ps > .16$ . As can be seen in Figure 3, the longer Asian-Canadians spend in Canada, the more negative their implicit descriptive and injunctive norms became, whereas identification with Canadian culture has no relation to implicit descriptive and injunctive norms.



Figure 3. The length of time in country of origin predicts the personalized IAT, descriptive cultural norm IAT and injunctive cultural norm IAT.

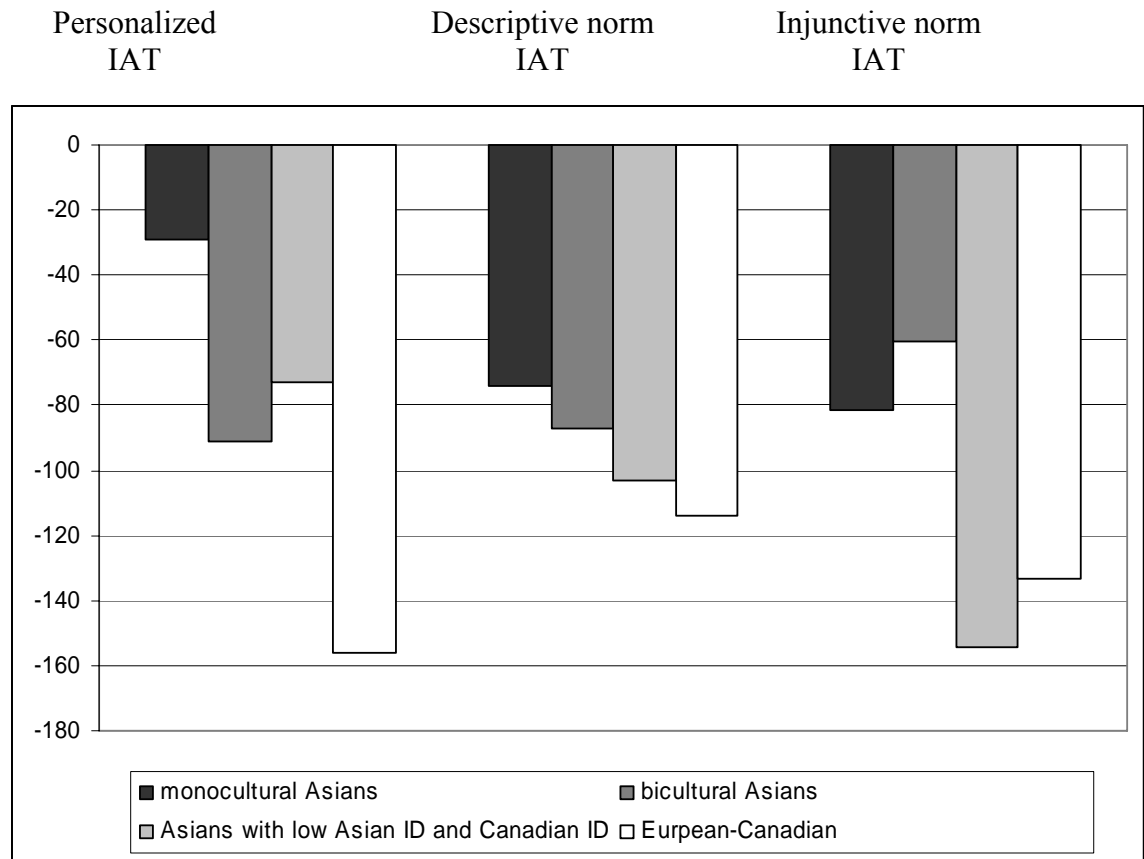


*Acculturation and Implicit Attitudes.* We also examined implicit attitudes to see if they showed the same pattern of relation between the acculturation variables as implicit norms. When identification with Canadian culture, identification with Asian culture, the interaction of these two variables, and length of time spent in Canada predicted implicit injunctive cultural norms, there was a marginally significant main effect of the length of time spent in Canada,  $\beta = -.19$ ,  $t_{(98)} = -1.89$ ,  $p = .07$ . The interaction between identification with Canadian culture and identification with Asian culture significantly predicted implicit attitudes,  $\beta = -.25$ ,  $t_{(98)} = -2.53$ ,  $p = .01$ .

As illustrated in Figure 4, among Asian-Canadians with high (+1SD) identification with Asian culture, those who had low (-1SD) identification with Canadian culture showed significantly more positive implicit attitudes towards the elderly (i.e., monocultural Asians) ( $M_{pred} = -28.80$ ) than those with high (+1SD) identification with

Asian Culture and high (+1SD) identification with Canadian culture (i.e., bicultural Asians) ( $M_{pred} = -91.36$ ), ( $\beta = -.30$ ,  $t_{(98)} = -2.52$ ,  $p = .01$ ) and marginally significantly more positive implicit attitudes towards the elderly than those with low (-1SD) identification with Canadian and low (-1SD) identification with Asian culture ( $M_{pred} = -72.64$ ) ( $\beta = .25$ ,  $t_{(98)} = 1.83$ ,  $p = .07$ ). No other predicted means were significantly different from one another ( $\beta s < -.23$ ,  $t s < -1.73$ ,  $p s > .09$ ).

Figure 4. The identification with Canadian culture and Asian culture predicts the personalized IAT, descriptive cultural norm IAT and injunctive cultural norm IAT



Note that length of time in Canada was not a significant predictor of implicit attitudes, but was a significant predictor of implicit norms (both descriptive and

injunctive). In contrast, the interaction between identification with Asian culture and identification with Canadian culture was a significant predictor of implicit attitudes, but was not a significant predictor of implicit norms (see Figure 4). Thus, implicit attitudes and norms are differentially predicted by measures of acculturation.

*Explicit Attitudes and Norms.* We combined the questions about explicit attitudes toward the elderly (Cronbach's alpha = .88 for younger people, Cronbach's alpha = .90 for older people), explicit descriptive norms (Cronbach's alpha = .80 for younger people, Cronbach's alpha = .89 for older people), and explicit injunctive norms (Cronbach's alpha = .73 for younger people, Cronbach's alpha = .93 for older people) each into a single index. Then, we subtracted the combined measure for younger people from that of older people—as was done in the IAT measures of these constructs; therefore, higher values indicate more positive evaluations towards older people than towards younger people.

We conducted a 3 (type of measure: personalized, descriptive norm, injunctive norm) x 2 (cultural group: European-Canadians vs. Asian-Canadians) mixed model ANOVA on these measures. The main effect for type of measure was the only significant effect,  $F_{(2, 119)} = 73.68, p < .001$ . Participants were more likely to express more positive injunctive cultural norms than their personal attitudes,  $M = 1.34, SD = 1.25$ , versus  $M = -.54, SD = 1.04$ , respectively,  $F_{(1, 120)} = 128.14, p < .001$ . Similarly, participants showed more positive explicit injunctive norms of respecting the elderly than explicit descriptive norms,  $M = 1.34, SD = 1.25$ , versus  $M = -.73, SD = 1.20$ , respectively,  $F_{(1, 120)} = 141.64, p < .001$ . Finally, participants reported that their personal attitudes towards the elderly were more positive than descriptive cultural norms,  $M = -.54, SD = 1.04$ , versus  $M = -.73, SD =$

1.20, respectively,  $F_{(1, 120)} = 3.91, p = .05$ . Thus, although people generally had more positive injunctive cultural norms than personal attitudes, which in turn were more positive than descriptive cultural norms, there were no differences between European-Canadians and Asian-Canadians in these measures.

We also examined whether among Asian-Canadians our acculturation variables had a similar relation to explicit attitudes and norms about the elderly as they had to our implicit measures of attitudes and norms about the elderly by conducting regression analyses in which identification with Canadian culture, identification with Asian culture, the interaction of these two variables, and length of time spent in Canada predicted explicit attitudes, explicit descriptive norms, and explicit injunctive norms. None of these acculturation variables were significant predictors of explicit attitudes or explicit descriptive norms about the elderly ( $\beta s < -.15, t s < -1.58 p s > .12$ ). When examining explicit injunctive norms, there was only a marginally significant main effect of identification with Canadian culture,  $\beta = .20, t_{(98)} = 1.77, p = .08$ , such that participants with higher identification with Canadian culture had more positive injunctive norms toward the elderly. The other measures of acculturation did not predict explicit injunctive norms ( $\beta s < -.18, t s < -1.50 p s > .13$ ). Thus, it seems that the measures of acculturation had no relation or only a very weak relation to explicit attitudes and norms.

We also found no correlation between implicit and explicit personal attitudes toward the elderly,  $r = .04 ns$ , or implicit and explicit descriptive norms towards the elderly,  $r = .11 ns$ , and only a weak negative correlation between implicit and explicit injunctive norms,  $r = -.14, p = .09$ . This general lack of correlation between implicit and explicit measures combined with the evidence that they are differentially predicted by

culture and acculturation suggests that implicit attitudes and norms are not only distinct from each other they are also distinct from their explicit counterparts.

### Study 3

Our studies thus far provided evidence that implicit attitudes and cultural norms are two distinct constructs. In Study 3, we aim to demonstrate that implicit attitudes and cultural norms differentially predict behaviours for Asian-Canadians and European-Canadians. According to the theory of reasoned action (Fishbein & Ajzen, 1974), behaviour and behavioural intentions are predicted by both attitudes and subjective norms. Subjective norms are defined as perceived approval or disapproval from important others for engaging in particular behaviours (Fishbein & Ajzen, 1974). It thus seems that subjective norms are similar to injunctive norms.

Research on the theory of reasoned action and interdependent self-construal has demonstrated that attitudes are a better predictor of behavioural intentions than subjective norms for people who have less interdependent self-construals, whereas subjective norms are a better predictor of behavioural intentions than attitudes for people with more interdependent self-construals (Trafimow & Finlay, 1996).

These findings suggest that culture may affect the relative importance of attitudes vs. cultural norms in predicting behaviour. Specifically, for people from more independent cultures, attitudes may be a better predictor of behaviour than norms, whereas for people from more interdependent cultures, cultural norms may be a better predictor of behaviour than attitudes. Given this reasoning, we hypothesized that attitudes will have a stronger influence on behaviour among European-Canadians than Asian-

Canadians, whereas cultural norms will have a stronger influence on behaviour among Asian-Canadians than European-Canadians.

Moreover, we predicted that this pattern will appear at the implicit level when one's cognitive resources are limited. According to Fazio's (Schuette & Fazio, 1995; Fazio & Towles-Schwein, 1999) MODE model, when people do not have motivation or opportunity to control their behaviour, implicit processes will have primary control over behaviour.

In this experiment, we examined European-Canadians and Asian-Canadians' eating behaviour when they have limited cognitive resources to control their behaviour. One of the ways to limit people's capacity for self-regulation is through ego-depletion. The strength model of self-regulation (Muraven, Tice & Baumeister, 1998) argues that ability for self-regulation draws on limited resources and will become fatigued in a similar way as a muscle.

Consistent with this reasoning, Hofmann, Rauch and Gawronski (in press) found that when Europeans were ego-depleted by an emotion suppression task, implicit attitudes predicted the amount of candy that participants consumed. In contrast, when cognitive resource for self-control was high, their explicit dietary restraint standards predicted the behaviours. We hypothesized that under ego-depletion, implicit attitudes will predict behaviour more strongly for European-Canadians than Asian-Canadians, and implicit cultural norms will predict behaviours more strongly among Asian-Canadians than European-Canadians.

### *Method*

#### *Participants*

Thirty-five European-Canadian and 41 Asian-Canadian undergraduate students (30 men and 49 women) from the University of Waterloo participated in the study for course credit or an \$8.00 payment. The Asian-Canadians were born in East Asian countries (e.g., China, Hong Kong, Taiwan). In addition, at the beginning of the term potential participants filled out a cultural background questionnaire at a mass testing session that included questions about cultural identity. Specifically, we asked how much participants identify with their culture of origin and how much they identify with Canadian culture on an 11-point Likert scale ranging from 0 (not at all) to 10 (very much). We recruited Asian-Canadians whose identification with Asian cultures was 8 or above<sup>4</sup> and whose identification with Canadian culture was 6 or below.

Among Asian-Canadian participants, the mean strength of identification with Asian culture was 8.79 ( $SD = 1.01$ ), the mean strength of identification with Canadian culture was 4.03 ( $SD = 1.06$ ) and the mean length of time spent in Canada was 6.63 ( $SD = 4.3$ ) years.

### *Materials*

*Explicit attitudes towards chips and vegetables.* Participants were asked to indicate their attitudes towards chips and vegetables on 7-point semantic differential scales: favourable - unfavourable, positive - negative, like - dislike, healthy - unhealthy, good for you - bad for you, tastes good - tastes bad, and tasty - bland. They were asked to indicate the position that best describes their overall evaluation of potato chips and vegetables. They also indicated their agreement or disagreement to the statements, "I like eating chips," and "I like eating vegetables," on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Appendix D).

*Explicit perceived norms about chips and vegetables.* Participants were asked to indicate the extent to which they agree or disagree with the statements, “Most people who are important to me think I should eat vegetables,” and “Most people who are important to me think I should eat chips,” “Most people approve of eating vegetables,” and “Most people approve of eating chips,” on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Appendix E).

*Implicit attitudes towards chips and vegetables.* To measure participants’ implicit attitudes towards chips and vegetables, we used the same personalized IAT as in Study 1 except for the category labels and stimulus items. The new category labels were “vegetables” and “chips” and we used photos of chips (Humpty Dumpty Ripples, Lay’s, Munchos, ruffles, and Humpty Dumpty regular) and vegetables (carrots, green peppers, broccoli, celery, and cauliflower) as exemplars of this category.

*The cultural norms about chips and vegetables.* We measured participants’ implicit cultural norms about chips and vegetables using the cultural norm IAT. The exemplars were behaviours about which we reasoned almost all people would approve or disapprove, (i.e., cheating, abusing, murdering, exercising, helping and sharing). The category labels were “people approve of” and “people disapprove of.” We used the same stimulus items and category labels for chips and vegetables as in the personalized IAT.

### *Procedure*

Participants completed either the personalized IAT or the cultural norm IAT and corresponding explicit measures over the internet. Between 0 and 13 days later they completed the other set of measures. The average days between the IATs are 6.16 days. The order of which set of measures they completed first was determined randomly. Once



participants completed the IATs and online explicit measures, they were individually invited to the lab.

In the lab session, the participants were asked to type meaningless letters, numbers, and symbols on a computer “to investigate the relationship between hand strength and typing speed.” After the bogus typing task, participants were asked to squeeze a (gender-appropriate) handgrip as long as they could. The experimenter timed until participants became too tired to squeeze the handgrip. They squeezed the handgrip four times, twice for each hand. The handgrip exercise should have caused ego-depletion among the participants (Muraven, Tice & Baumeister, 1998).

Immediately after the handgrip exercise, participants were brought to an adjacent room for supposedly unrelated “marketing research.” They were asked to evaluate three new dips and were provided with chips and vegetables to allow them to taste the dips. The amount of chips and vegetables that participants consumed in the lab was measured by weighing the chips and vegetables before and after participants tested the dips. Participants were thanked and fully debriefed.

### *Results*

We measured the amount of chips and vegetables eaten by calculating the proportion of chips or vegetables consumed in relation to the amount of chips or vegetables that were available to be consumed. Specifically, we divided the weight of chips or vegetables that participants consumed by the initial weight of chips or vegetables before the experiment session. We calculated this proportion measure because it allowed chips and vegetables to be on a similar metric. We then subtracted the proportion of chips that were eaten from the proportion of vegetables that were eaten. Therefore, higher

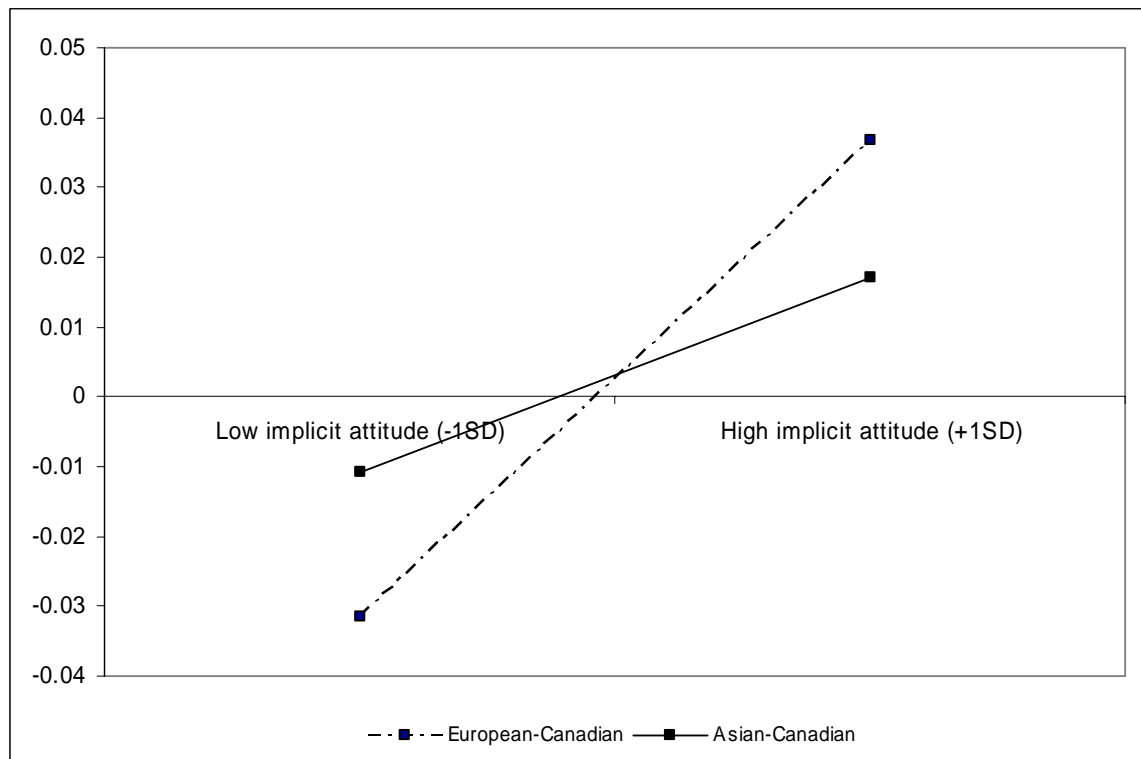
values indicate that participants consumed more vegetables than chips.

*Implicit measures.* We used the same algorithm to calculate IAT scores as in Study 1. Higher scores on the IATs indicate more positive implicit attitudes or cultural norms towards vegetables than chips. There were no differences for the number of days between IATs, so we did not analyze for this variable. Our measures of implicit attitudes and implicit cultural norms were modestly correlated  $r = .21, p = .08$ . To test our hypothesis regarding cross-cultural difference in the influence of implicit attitudes and cultural norms on behaviour, we conducted a hierarchical multiple regression analysis. First, we centered predictor variables and created interaction terms (Aiken & West, 1991). Then, we entered culture of origin (dummy coded as European-Canadians = 0, Asian-Canadians = 1), the personalized IAT and cultural norm IAT as predictor variables in the first step and all combinations of two-way interaction terms in the second step and a three-way interaction in the third step. The results showed a significant main effect for implicit attitudes ( $\beta = .78, t_{(66)} = 4.00, p < .001$ ); a significant main effect for implicit cultural norms ( $\beta = -.31, t_{(66)} = -2.00, p = .05$ ); a significant two-way interaction between culture of origin and implicit attitudes ( $\beta = .40, t_{(66)} = 2.05, p < .05$ ), and a significant two-way interaction between culture of origin and implicit cultural norms ( $\beta = .42, t_{(66)} = 2.70, p < .01$ ). No other main effects or interactions were significant,  $\beta_s < -.12, t_s < -.711, p_s > .48$ .

*The influence of implicit attitudes on eating behaviour.* As shown in Figure 5, the implicit attitudes tended to predict behaviour for both European-Canadians and Asian-Canadians. Follow up analyses, however, revealed implicit attitudes were only a significant predictor for European-Canadians, and not for Asian-Canadians, simple slopes

$t_{(66)} = 4.00, p < .001$ , and  $t_{(66)} = 1.51, ns$ , respectively.<sup>5</sup>

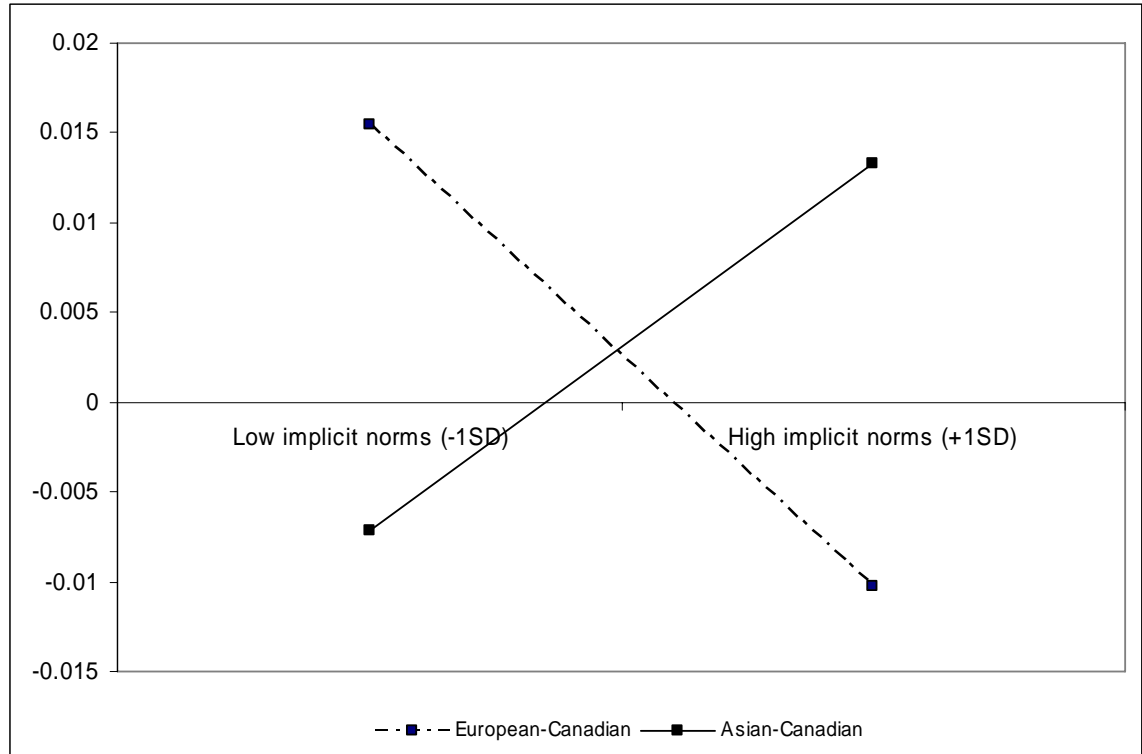
Figure 5. Proportion of chips and vegetables consumed as a function of implicit attitudes among European-Canadians and Asian-Canadians, controlling for implicit cultural norms.



*The influence of implicit cultural norms on eating behaviour.* As shown in Figure 6, implicit cultural norms predicted behaviour in opposite ways for Asian-Canadians and European-Canadians. Among Asian-Canadians, the stronger their implicit cultural norms for eating vegetables were, the more vegetables relative to chips they tended to eat,  $t_{(66)} = 1.85, p = .07$ . In contrast, for European-Canadians, the stronger their implicit norms for eating vegetables were, the less vegetables relative to chips they tended to eat,  $t_{(66)} = 1.98, p < .05$ .<sup>6</sup> This somewhat surprising finding suggests that European-Canadians may be

rebellious against their implicit cultural norms, but should be interpreted with caution given that it was not predicted and has not yet been replicated.

Figure 6. Proportion of chips and vegetables consumed as a function of implicit norms among European-Canadians and Asian-Canadians, controlling for implicit attitudes.



*Explicit measures.* We combined the items measuring explicit attitudes towards chips and vegetables into scales for each type of food with reasonable reliability (Cronbach's alpha = .83 for chips, Cronbach's alpha = .92 for vegetables). Then, we subtracted explicit attitudes towards chips from explicit attitudes towards vegetables, such that higher values indicated more positive explicit attitudes towards vegetables than chips. Similarly, we combined explicit measures for perceived norms towards chips and vegetables<sup>7</sup>. Then, we subtracted explicit cultural norms for chips from explicit cultural norms for vegetables, such that higher values indicated more positive explicit cultural

norms towards vegetables than chips.

We did not expect that explicit attitudes or perceived norms would predict behaviour because all participants had limited cognitive capacity to control their behavior (see, Hofmann, Rauch & Gawronski, in press; Fazio & Towles-Schwenm, 1999). We conducted a hierarchical multiple regression analysis in which we entered ethnicity (dummy coded as European-Canadian = 0, Asian-Canadians = 1), explicit attitudes and explicit norms in the first step, all combinations of two-way interactions in the second step, and a three-way interaction in the third step. To reduce multicollinearity, we centered explicit attitudes and cultural norms before creating interaction terms (Aiken & West, 1991). Consistent with our prediction, there were no significant main effects or interactions,  $\beta$ s < .25,  $t$ s < 1.58,  $p$ s > .12<sup>8</sup>.

### *Discussion*

The results of Study 3 provided evidence of predictive validity of the personalized IAT and the cultural norm IAT. We found that for European-Canadians implicit attitudes predicted behaviour, whereas implicit cultural norms predicted a rebelling against these norms. For Asian-Canadians, in contrast, implicit cultural norms tended to predict behaviour, whereas implicit attitudes were a weaker predictor of behaviour.

This pattern is consistent with the cross-cultural differences in independent and interdependent self-construals. In individualist cultures, people are concerned about expressing their own ideas and behave consistent with their intentions; therefore, they are less likely to be influenced by what other people think (Markus & Kitayama, 1994). In contrast, in collectivist cultures, collective goals and group harmony are valued; therefore, in these cultures, people are more likely to conform to cultural norms (Markus

& Kitayama, 1991; Markus & Kitayama, 1994; Triandis, 1989). Furthermore, conformity has different meanings or implications in individualist cultures and in collectivist cultures. Nonconformity is interpreted as uniqueness in individualist cultures, whereas in collectivist cultures, the same behaviour is interpreted as deviation (Kim & Markus, 1999). Therefore, in individualist cultures, conformity is not perceived as positively as in collectivist cultures. The differences in the influence of implicit cultural norms on behaviour may reflect these differences in cultural ideals and self-construals.

### General Discussion

Data from our studies suggest that we can measure implicit cultural norms using the IAT. In Studies 1a and 1b, the personalized IAT and cultural norm IAT both uniquely contributed to the variance in the traditional IAT. In Study 2, the longer Asian-Canadian spent time in Canada, the more negative implicit descriptive and injunctive norms about the elderly became, whereas their identification with Asian culture and Canadian culture predicted implicit attitudes. In Study 3, implicit attitudes predicted eating behaviours among Asian-Canadian and European-Canadians, replicating Hofmann, Rauch and Gawronski's finding (in press) that implicit attitudes predicted automatic behaviours under ego-depletion. In contrast, implicit cultural norms predicted Asian-Canadians and European-Canadian's eating behaviours in an opposite directions under ego-depletion. More specifically, Asian-Canadians who have positive implicit norms toward eating vegetables were more likely to eat vegetables when their cognitive capacities were limited, whereas European-Canadians who have positive implicit norms toward eating vegetables were less likely to eat vegetables. Together, these data suggest that implicit norms are distinct from implicit attitudes and uniquely predict behaviour.

## Does exposure to culture shape our thoughts and actions?

Our data suggest that people who are exposed to different culture norms possess different implicit norms. In Study 2, Asian-Canadians who came to Canada more recently were more likely to have positive implicit injunctive and descriptive norms towards the elderly than Asian-Canadians who have lived in Canada for a long time. Importantly, identification with Canadian culture did not predict the change in implicit norms. We reason that to change implicit norms, one needs to be exposed to cultural norms and observe how others interact with the elderly. These norms can be transmitted without explicit endorsement (Cialdini & Trost, 1998). In contrast, identification with Canadian culture and Asian culture predicted implicit attitudes towards the elderly. To the extent that Asian-Canadians included Canadian culture in their self-concept, the less positive implicit attitudes they had towards the elderly.

We also found that implicit norms have different influence on behaviours for people from different cultures (Study 3). Asian-Canadians followed cultural norms, whereas European-Canadians reacted to cultural norms by acting in opposition to them under ego-depleted mental states. In Western cultures, in which autonomy and independence is emphasized, deviation from the norms may allow people to express uniqueness (Kim & Markus, 1999; Markus & Kitayama, 1994). Thus, deviation from norms may be valued in Western societies. In contrast, in Eastern cultures, in which group harmony and interdependence are emphasized, deviation from norms can be seen as non-conformity (Kim & Markus, 1999; Markus & Kitayama, 1994). Thus, those who deviate from norms may be held in suspicion in Eastern societies. Our data are consistent with these cultural values.

### Do cultural influences remain even outside of awareness?

In Study 2, we did not find any cross-cultural difference in explicit attitudes, descriptive norms and injunctive norms towards the elderly. Both European-Canadians and Asian-Canadians equally endorsed more positive injunctive norms than personal attitudes, which were more positive than descriptive norms. However, cross-cultural differences emerged at the implicit level. These divergent findings of implicit and explicit attitudes and cultural norms suggest that explicit and implicit attitudes are distinct.

### Implication for implicit research

We are the first to demonstrate that implicit norms can be measured using the implicit association test. Olson and Fazio (2004) showed that by changing the category labels from “pleasant” and “unpleasant” to “I like” and “I don’t like,” the IAT measures implicit personalized attitudes. Following Olson and Fazio’s methodologies (2004), we showed that by changing the category labels from “pleasant” and “unpleasant” to “most people like” and “most people don’t like,” the IAT measures implicit norms.

### Future directions

Although our research shows that implicit norms can be measured and that people from different cultures possess different implicit norms, the formation of implicit norms remains to be demonstrated. How do implicit norms develop? What factors are crucial in the development of implicit norms? Future research can help answering these questions.



## Footnotes

<sup>1</sup> As expected, the correlation between the personalized IAT and cultural norm IAT in Study 1a ( $r = .38$ ) is significantly different from the one in Study 1b ( $r = .15$ ), suggesting that there is a loose connection between implicit attitudes and cultural norms in the domain of apple vs. candy bars, whereas in the domain of flowers vs. insects, implicit attitudes and cultural norms are more closely associated.

<sup>2</sup> Because we used a mass-testing questionnaire that measured the length of time in country of origin, we measured the length of time spent in Canada based on the time spent in country of origin. Most people came to Canada directly from their birth country; therefore, the length of time spent in Canada can be estimated by subtracting the length of time spent in country of origin from participants' age.

<sup>3</sup> We eliminated data for four participants on the personalized IAT and four participants on the injunctive cultural norm IAT.

<sup>4</sup> Three Asian participants indicated their ethnic identity was 7; however, inclusion or exclusion of these three participants did not influence the results. We reported results including these three participants to be conservative.

<sup>5</sup> When the cultural norm IAT was not controlled, the main effect for the personalized IAT remained significant,  $\beta = .66$ ,  $t_{(72)} = 3.46$ ,  $p = .001$ . However, the interaction between the personalized IAT and ethnicity was not significant,  $\beta = .29$ ,  $t_{(72)} = 1.55$ ,  $p = .13$ . The simple slope for European-Canadians was significant,  $\beta = .59$ ,  $t_{(72)} = 3.46$ ,  $p = .001$  but not significant for Asian-Canadians,  $\beta = .33$ ,  $t_{(72)} = 1.60$ , *ns*.

<sup>6</sup> When we did not control for the personalized IAT, the main effect for the cultural norm IAT was not significant,  $\beta = -.15$ ,  $t_{(70)} = -.92$ , *ns*. The interaction between

the cultural norm IAT and ethnicity was marginally significant,  $\beta = .32$ ,  $t_{(70)} = 1.93$ ,  $p = .058$ . Follow up analyses revealed that the simple slope was not significant for European-Canadians but marginally significant for Asian-Canadians,  $\beta = -.17$ ,  $t_{(70)} = -.97$ ,  $ns$ ,  $\beta = .27$ ,  $t_{(70)} = 1.75$ ,  $p = .08$ . For European-Canadians, their implicit attitudes and implicit cultural norms were positively related to each other, but negatively related to how many vegetables they ate. Therefore, these factors created a suppressor relation.

<sup>7</sup> The two items for perceived norms, “Most people who are important to me think I should eat vegetables / chips. (Should Norm)” and “Most people approve of eating vegetables / chips. (Approval Norm)” were not correlated with each other for vegetables, but these two items were correlated for chips,  $r = .10$ ,  $ns$ ,  $r = .23$ ,  $p = .02$ , respectively.

<sup>8</sup> When the combined explicit norm measure was replaced with Approve Norm, there were no significant main effects or interactions,  $\beta s < .26$ ,  $t s < 1.62$ ,  $p s > .11$ . When the combined measure was replaced with Should Norm, the only effect to emerge was a significant interaction between Should Norm and ethnicity,  $\beta = .39$ ,  $t_{(66)} = 2.33$ ,  $p = 0.02$ . Follow up analyses showed that a simple slope was not significant for European-Canadians, but significant for Asian-Canadians,  $t_{(66)} = 1.07$ ,  $ns$ ,  $t_{(66)} = 2.05$ ,  $p = .04$ , respectively.

Appendix A: Explicit attitudes towards younger and older people questionnaire

1) Please indicate your overall opinions or evaluations of younger people.

Unfavourable \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Favourable  
Negative \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Positive  
Dislike \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Like  
Undesirable \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Desirable

2) Please indicate your overall opinions or evaluations of older people.

Unfavourable \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Favourable  
Negative \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Positive  
Dislike \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Like  
Undesirable \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Desirable

Appendix B: Explicit descriptive cultural norms about younger and older people

- 1) Please indicate most people's overall opinions or evaluations of younger people.  
Most people refer to people in your culture.

Unfavourable \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Favourable  
Negative \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Positive  
Dislike \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Like  
Undesirable \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Desirable

- 2) Please indicate most people's overall opinions or evaluations of older people.  
Most people refer to people in your culture.

Unfavourable \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Favourable  
Negative \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Positive  
Dislike \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Like  
Undesirable \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ : \_\_\_\_ Desirable

Appendix C: Explicit injunctive cultural norms about younger and older people

Please indicate your agreement or disagreement with the following statements:

1) Most people who are important to me think I should respect older people.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

2) Most people who are important to me think I should respect younger people.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

3) Most people who are important to me think that I should take care of older people.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

4) Most people who are important to me think that I should take care of younger people.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Appendix D: Explicit attitudes towards chips and vegetables

For each word pair below, please use an “X” to indicate the position that best describes your overall evaluation of chips (e.g. potato chips)

Unfavourable	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Favourable
Negative	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Positive
Dislike	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Like
Unhealthy	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Healthy
Bad for you	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Good for you
Tastes bad	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Tastes good
Bland	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Tasty

For each word pair below, please use an “X” to indicate the position that best describes your overall evaluation of vegetables (e.g. carrot, broccoli, cauliflower etc.)

Favourable	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Unfavourable
Negative	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Positive
Dislike	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Like
Healthy	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Unhealthy
Good for you	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Bad for you
Tastes good	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Tastes bad
Bland	_____	:	_____	:	_____	:	_____	:	_____	:	_____	:	_____	Tasty

Please indicate to what extent you agree or disagree to the following statements.

1) I like eating chips

1	2	3	4	5	6	7	8	9
Strongly								Strongly
Disagree								Agree

2) I don't like eating chips

1	2	3	4	5	6	7	8	9
Strongly								Strongly
Disagree								Agree

3) I like eating vegetable

1	2	3	4	5	6	7	8	9
Strongly								Strongly
Disagree								Agree

4) I don't like eating vegetable

1	2	3	4	5	6	7	8	9
Strongly								Strongly
Disagree								Agree

Appendix E: Explicit norms about chips and vegetables

1) Most people who are important to me think I should eat vegetables.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree

2) Most people who are important to me think I should not eat vegetables.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree

3) Most people who are important to me think I should eat chips.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree

4) Most people who are important to me think I should not eat chips.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree

5) Most people approve of eating vegetables.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree

6) Most people don't approve of eating vegetables.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree

7) Most people approve of eating chips.

1	2	3	4	5	6	7	8	9
Strongly Disagree								Strongly Agree



8) Most people don't approve of eating chips.

1  
Strongly  
Disagree

2

3

4

5

6

7

8

9  
Strongly  
Agree

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