

Psychological Science

<http://pss.sagepub.com/>

Evidence for a Sensitive Period for Acculturation : Younger Immigrants Report Acculturating at a Faster Rate

Benjamin Y. Cheung, Maciej Chudek and Steven J. Heine
Psychological Science 2011 22: 147 originally published online 28 December 2010
DOI: 10.1177/0956797610394661

The online version of this article can be found at:
<http://pss.sagepub.com/content/22/2/147>

Published by:



<http://www.sagepublications.com>

On behalf of:



[Association for Psychological Science](http://www.sagepublications.com)

Additional services and information for *Psychological Science* can be found at:

Email Alerts: <http://pss.sagepub.com/cgi/alerts>

Subscriptions: <http://pss.sagepub.com/subscriptions>

Reprints: <http://www.sagepub.com/journalsReprints.nav>

Permissions: <http://www.sagepub.com/journalsPermissions.nav>

Evidence for a Sensitive Period for Acculturation: Younger Immigrants Report Acculturating at a Faster Rate

Psychological Science
 22(2) 147–152
 © The Author(s) 2011
 Reprints and permission:
sagepub.com/journalsPermissions.nav
 DOI: 10.1177/0956797610394661
<http://pss.sagepub.com>


Benjamin Y. Cheung, Maciej Chudek, and Steven J. Heine

University of British Columbia

Abstract

Though recent adult immigrants often seem less acculturated to their new society than people who immigrated as children, it is not clear whether this difference is driven by duration of exposure or exposure during a sensitive developmental period. In a study aimed at disambiguating these influences, community and student samples of Hong Kong immigrants to Vancouver, Canada, completed the Vancouver Index of Acculturation, a measure that assesses respondents' identification with their mainstream and heritage cultures. A longer duration of exposure was found to be associated with greater identification with Canadian culture only at younger ages of immigration, but not at later ages of immigration. Conversely, identification with Chinese culture was unaffected by either age of immigration or length of exposure to Canadian culture. These findings provide evidence for a sensitive period for acculturation: People are better able to identify with a host culture the longer their exposure to it, but only if this exposure occurs when they are relatively young.

Keywords

acculturation, immigration, sensitive period, culture, phenotypic plasticity

Received 7/25/10; Revision accepted 10/20/10

Acculturation is the process of cultural adaptation that people undergo upon relocating from a heritage culture to a new, host culture (for reviews, see Sam & Berry, 2006; Ward, Bochner, & Furnham, 2001). Humans have likely been crossing cultural boundaries since before *Homo sapiens* left Africa, and psychologists have investigated acculturative processes since Redfield, Linton, and Herskovits (1936) first explicated recommendations for studying the acculturation experience. Researchers from a variety of fields have investigated such questions as how moving to a new culture is associated with intergenerational conflict (e.g., Lim, Yeh, Liang, Lau, & McCabe, 2009), what the consequences of immigration are for physical health and psychological well-being (e.g., Berry & Annis, 1974), and how features of an individual's culture or personality alter his or her likelihood of experiencing acculturative difficulties (e.g., Berry, Kim, Power, Young, & Bujaki, 1989; Ward, Leong, & Low, 2004). One important question has thus far been largely neglected by acculturation researchers: Is there a developmental period within which people are especially adept at adjusting to a new culture?

There are strong theoretical grounds for suspecting the existence of a sensitive acculturation period. Evolutionary biologists, ecologists, and developmentalists emphasize the

trade-offs inherent in phenotypic plasticity (e.g., Auld, Agrawal, & Relyea, 2010; DeWitt, Sih, & Wilson, 1998; Pigliucci, 2005)—that is, the decision by an organism (or its genome) to invest valuable time, energy and resources in learning new behaviors better suited to its environment, rather than to specialize in exploiting behaviors it has already mastered. Too little developmental time invested in learning produces poorly adapted phenotypes, whereas an overexpenditure of developmental time and resources in the service of learning produces organisms that are easily outcompeted by their more rapidly specialized peers.

The optimal resolution of this trade-off depends on the costs and benefits of learning and specialization (among other variables), and individuals and species vary tremendously in when they terminate learning and turn to specialization. Many species invest in costly specialization based on in utero learning (e.g., Agrawal, Laforsch, & Tollrian, 1999), and others make the investment in specialization shortly after birth (e.g.,

Corresponding Author:

Steven J. Heine, 2136 West Mall, University of British Columbia, Department of Psychology, Vancouver, British Columbia, Canada V6T 1Z4
 E-mail: heine@psych.ubc.ca

gosling imprinting); humans have (in some domains) exceptionally plastic phenotypes and long developmental periods. Although it is plausible that the genetic adaptations that enabled humans to accumulate culture also created a system that emphasizes learning over specialization across all development periods, it seems more likely that human cultural learning is continuous with learning in other domains and other species. That is, there is likely a critical developmental juncture at which acquisition (an emphasis on learning new cultural traits, skills, and norms) transitions to specialization (an emphasis on better exploiting the traits, skills, and norms already acquired).

The question of whether there is a sensitive acculturation period is informed by evidence of sensitive periods in a broad array of domains, such as the acquisition of absolute pitch (Chin, 2003), susceptibility to the Müller-Lyer illusion (McCauley & Henrich, 2006), and the acquisition of binocular vision (Banks, Aslin, & Letson, 1975; for a review, see Werker, Maurer, & Yoshida, 2009). In particular, there is much evidence for a sensitive period for acquiring language, whose phylogenetic origins are closely linked to humans' capacity for cultural learning. The ability to acquire various aspects of language, such as phonetics, grammar, and syntax, diminishes with age (e.g., Lenneberg, 1967) in the case of both first (e.g., Mayberry, 1993) and second (e.g., Johnson & Newport, 1989) languages. Further, there is evidence that second languages are processed in distinct regions of the brain depending on the age at which the individual acquired them (e.g., Kim, Relkin, & Lee, 1997). As second-language acquisition involves the acquisition of a second cultural meaning system, a sensitive window for second-language acquisition may be suggestive of a similar sensitive window for acculturation. Does acculturation show similar evidence for a sensitive period of development, or do people acculturate at the same rate regardless of age? Research on an acculturation gap (Lim et al., 2009) provides indirect evidence for such a period, as immigrant children appear to acculturate more quickly than their parents.

A sensitive period implies that people's rates of acculturation (operationalized as the change in their identification with their new culture per year) are dependent on their age of immigration. We have found only two studies that provide initial evidence for such a sensitive acculturation period: Tsai, Ying, and Lee (2000) found that Chinese who immigrated to the United States before the age of 12 identified more strongly with American ways of life than did those who immigrated after the age of 12. Likewise, Minoura (1992) found that Japanese children who had moved to the United States before the age of 15 reported that American experiences felt more natural to them than did those who moved to the United States at an older age. However, within each of these two studies, the participants were of similar ages when they were interviewed (college age in Tsai et al. and high school age in Minoura); thus, the age of arrival and the length of time in the host culture were largely confounded, so that the findings cannot elucidate whether rates of acculturation change with age of

immigration. This is a critical point, as an alternative to the sensitive-period hypothesis is that people acculturate at a rate that is independent of their age of immigration, so that the longer one spends in a culture, the more one should have adjusted to it. To obtain clear evidence for a sensitive period, it is necessary to disentangle the age of immigration from the number of years spent in the host culture. This can be done by targeting participants of a broad range of ages who immigrated at different points in their lives and have spent varying numbers of years in the host culture.

In the study reported here, we sought to assess the evidence for a sensitive period of acculturation among Hong Kong immigrants in Vancouver, Canada. Hong Kong immigrants constitute a substantial proportion of immigrants to Vancouver—and close to 10% of the population of Greater Vancouver (Statistics Canada, 2008b). Furthermore, several waves of Hong Kong immigrants have arrived in Vancouver over recent decades, and many of the immigrating families have included people of different ages. This broad range of both age of immigration and number of years spent in Canada made this an ideal population for our study.

Method

Participants

Participants were 232¹ Hong Kong immigrants to Vancouver (141 females, 91 males), ages 18 to 60 ($M = 33.05$, $SD = 14.15$). Their age of immigration ranged from 1 to 50 ($M = 19.53$, $SD = 14.03$), and the number of years spent in Canada ranged from 2 to 39 ($M = 13.41$, $SD = 5.18$). The sample was recruited from a local organization that provides aid to Chinese immigrants (S.U.C.C.E.S.S.; $n = 171$) and from the student population of the University of British Columbia ($n = 61$). Participation was restricted to immigrants from Hong Kong who had not spent more than 2 years in a country other than Hong Kong (or China more generally), Canada, or the United States.

Materials

Because the language used during an assessment can affect people's responses (e.g., Ross, Xun, & Wilson, 2002), we created both Chinese and English versions of our materials and statistically controlled for the study version that participants received (English was coded as 1 and Chinese as 2). Participants rated their reading comprehension in Chinese and English and received the materials in whichever language they rated higher. Those who rated themselves as equally proficient in the two languages were randomly assigned study versions. The Chinese version was translated by two bilingual speakers, and disagreements were reconciled through discussion to produce the final translation (see Heine, 2008).

Acculturation was measured with the Vancouver Index of Acculturation (VIA: Ryder, Alden, & Paulhus, 2000), which

follows much of the acculturation literature (e.g., Berry et al., 1989; LaFromboise, Coleman, & Gerton, 1993) in conceptualizing acculturation as a bidimensional construct composed of orthogonal scales representing one's identification with one's heritage culture and with mainstream culture. Participants were first provided with a definition of the term "heritage culture" and were then asked to indicate their own heritage culture prior to completing the scale. The VIA has been found to be highly reliable with Chinese samples (Huynh, Howell, & Benet-Martinez, 2009). The obtained Cronbach's alphas were .87 and .85 for the mainstream and heritage scales, respectively. A sample item from the mainstream scale is "I enjoy typical North American jokes and humor," and a sample item from the heritage scale is "It is important for me to maintain or develop the practices of my heritage culture."

Results

To examine whether our participants' rate of acculturation, as measured by their mainstream score on the VIA, declined as a function of age of immigration, we analyzed the interaction between participants' number of years in Canada and their age of immigration (note that these two variables were correlated, $r = -.17, p = .01$) as a predictor of their mainstream score. Our ordinary least squares model also controlled for the following covariates: the participants' gender, their self-reported English ability, the language of the questionnaire they completed, and whether they were from the community or undergraduate sample. Note that age could not simultaneously be examined as a covariate, as it equaled the sum of years in Canada and age of

immigration, and its inclusion would produce a degenerate (i.e., not invertible) predictor matrix, which cannot be regressed. Of these covariates, only sample population had even a marginally significant influence on mainstream culture: Undergraduates reported higher mainstream identification than participants in the community sample ($b = 0.318, p = .09$). Although self-reported English ability did not significantly predict mainstream identification ($p = .15$), it did correlate substantially with age of immigration ($r = -.55, p < .001$). The details of this model are presented in Table 1.

A linear relation between age of immigration and mainstream identification was significant. With each increasing year of age of immigration, people who had been in Canada the average length of time (approximately 13.4 years) scored 0.024 points lower on mainstream identification (see the left panel in Fig. 1). This effect was qualified by a significant interaction between age of immigration and years in Canada, which revealed that with each increasing year of age of immigration, rate of increase in mainstream identification associated with time in Canada fell by 0.003 points. For individuals who immigrated before approximately age 14.5,² identification with Canadian culture increased significantly with time in Canada. For older immigrants, identification with Canadian culture did not change with time in Canada, and the relation between these two variables became nominally negative at an age of immigration of approximately 25. Though none of our participants arrived in Canada after the age of 50, linear extrapolation from our model suggested that the rate of acculturation would have become significantly negative at age 51. These relationships are visually apparent in the right panel of

Table 1. Results for Ordinary Least Squares Models Predicting Identification With Mainstream and Heritage Culture

Predictor	b (β)	σ_b (σ_β)	p
Mainstream culture ($n = 202$): adjusted $R^2 = .287$			
English rating	0.109 (0.132)	0.075 (0.093)	.147
Study version	-0.266 (-0.132)	0.175 (0.086)	.130
Sample population	0.318 (0.149)	0.185 (0.081)	.087
Gender	0.056 (0.036)	0.139 (0.067)	.689
Years in Canada	0.008 (0.078)	0.017 (0.073)	.622
Age of immigration	-0.024 (-0.350)	0.007 (0.102)	.001
Age of Immigration \times Years in Canada	-0.003 (-0.219)	0.001 (0.089)	.012
Heritage culture ($n = 207$): adjusted $R^2 < 0$			
English rating	0.088 (0.113)	0.067 (0.087)	.196
Study version	0.231 (0.116)	0.166 (0.083)	.165
Sample population	0.159 (0.070)	0.179 (0.079)	.375
Gender	-0.011 (-0.005)	0.131 (0.064)	.932
Years in Canada	0.034 (0.057)	0.028 (0.071)	.216
Age of immigration	0.014 (-0.031)	0.017 (0.096)	.424
Age of Immigration \times Years in Canada	-0.001 (-0.087)	0.001 (0.086)	.317

Note: The regression analyses controlled for the effects of English ability (6-point self-rated scale), gender (male > female), sample population (undergraduates or Vancouver community), and study version (English or Chinese); n is the effective sample size for each statistical inference after case-wise removal of missing values.

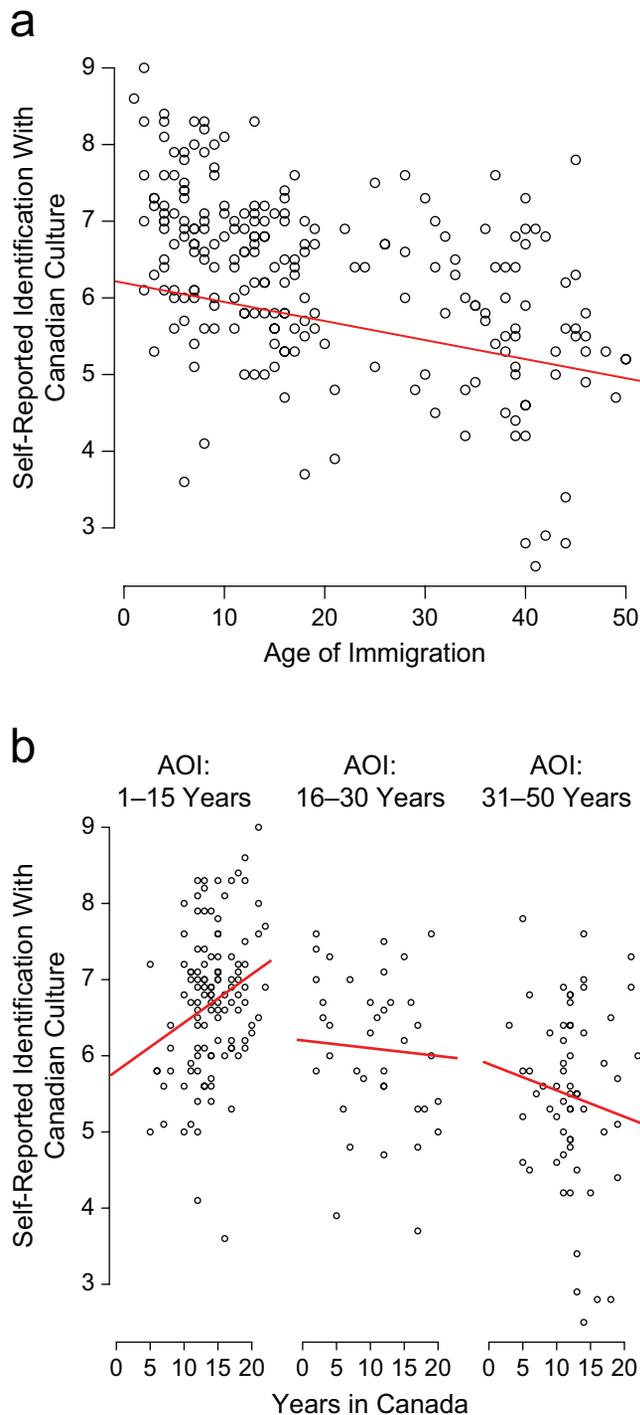


Fig. 1. Study results. The scatter plot in (a) shows individuals' self-reported identification with Canadian culture as a function of their age of immigration (AOI) to Canada. The scatter plots in (b) illustrate the interactive effect of AOI and number of years in Canada by showing self-reported identification with Canadian culture as a function of number of years in Canada (i.e., acculturation rate) separately for individuals who immigrated in three different developmental periods; visualization in 15-year increments was chosen because acculturation rate ceased to be significantly different from zero at AOI of about 14.5 years. In each graph, the solid red line represents the best ordinary least squares approximation of the relationship for the given data set, controlling for gender, English ability, sample population, and study version (English or Chinese).

Figure 1. The three-way interaction of age of immigration, years in Canada, and English ability was not significant ($p = .63$); thus, the interaction between age of immigration and years in Canada was consistent across participants regardless of their self-reported English ability at the time they participated.

A similar analysis of heritage scores yielded no significant predictors. Neither age of immigration nor number of years in Canada was related to heritage identification.

Discussion

This analysis provides initial support for a sensitive period of acculturation to mainstream Canadian culture among Hong Kong immigrants to Vancouver. The younger participants were at the time of immigration, the more rapidly they came to identify with Canada. Furthermore, mainstream identification among younger immigrants increased the longer they stayed in Canada, but the opposite pattern was found for older immigrants (although the relation was not statistically significant). Apparently, acculturation occurs most rapidly at younger ages, a pattern that provides evidence for a sensitive period of acculturation. Although these effects occurred independently of participants' self-reported English ability, it is possible that a more sensitive language measure, or a longitudinal measure of language ability in the formative months and years after arrival, would have revealed that acculturation is a function of differential mastery of more subtle nuances of language learning.

Curiously, neither the age of immigration nor the number of years spent in Canada predicted participants' identification with Chinese culture. It remains to be seen what factors influence identification with one's heritage culture (although note that Ryder et al., 2000, found that number of years and number of generations in Canada negatively predicted heritage identification). This null finding supports the claim that these two dimensions of acculturation, identification with mainstream culture and identification with heritage culture, are independent. The generalizability of our results may be limited in that our findings may be idiosyncratic to Hong Kong immigrants in Vancouver because of their relatively high concentration. Indeed, Chinese immigrants to Canada (approximately 36% of whom are from Hong Kong; Statistics Canada, 2008a) are the largest immigrant population in Greater Vancouver, and the city's Chinatown is the second largest of its kind outside of Asia (Burgess, 2005). Perhaps this concentration of Chinese immigrants, and concomitant cultural amenities, contributed to the observed pattern of results. These factors may explain why heritage identification was independent of number of years in Canada or age of immigration. This retention of heritage identity is in line with findings from linguistics suggesting that regular exposure to one's native language in childhood allows for the maintenance of nativelike performance on some language tasks (Oh, Jun, Knightly, & Au, 2003). The large Chinese community in Vancouver may serve as the cultural

analogue for regular language exposure, allowing Hong Kong immigrants to maintain their heritage identification. It will be important to assess how acculturation patterns emerge in other immigrant populations and other host cities.

One unexpected finding was that older immigrants showed a negative relationship between years spent in Canada and mainstream identification. This pattern may be due to individuals becoming increasingly frustrated by the poor fit between the cultural phenotype in which they have specialized and their new community's norms, a natural aging process whereby people generally become dissatisfied with the contemporary culture as they age, a particular cohort effect (e.g., the effects of older immigrants' experiences with the Cultural Revolution), or simply random sampling error. More generally, the cross-sectional design of this study raises the possibility that other kinds of cohort effects underlie the results: For example, individuals who immigrated at younger ages might have had different levels of income or education or different reasons for leaving Hong Kong than those who came at older ages. Longitudinal studies would be better able to address these possibilities. Also, the context of one's experiences in a host culture likely varies with age of immigration, such that individuals who arrive at a younger age participate in the culture differently (e.g., attending elementary school, engaging in more team sports) than those who arrive later, and this might partly account for our results.

This study assessed people's conscious thoughts about their identification with Canada and Hong Kong, and it is possible that their unconscious thoughts or acculturative behaviors might show a different pattern. It remains to be determined whether other aspects of acculturation follow similar trajectories. There are three potential patterns of results that might emerge from the investigation of sensitive periods for other aspects of acculturation: All cultural processes might adapt at similar rates, different processes might adapt independently at different rates, or there may be a cascading pattern in which the adaptation of one process depends on the adaptation of another. Future research would benefit by investigating a broad range of psychological measures that are known to differ across cultural groups to determine which of these three models best characterizes acculturative processes.

Acknowledgments

We are grateful for the cooperation of the immigrant association S.U.C.C.E.S.S. in helping to recruit participants.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Funding

This research was funded by a grant from the Social Sciences and Humanities Research Council of Canada (410-2008-0155) to Steven J. Heine.

Notes

1. Note that effective sample sizes for statistical inferences were smaller than 232 because some participants did not answer some questions. Effective sample sizes are reported in Table 1.
2. This is a linear extrapolation of our findings, inferred by solving for age of immigration at the critical t -distribution value, $t(0.025, 202)$, given the standard error of simple slopes for age of immigration. All statistics required to reproduce this inference are available in Table 1, except for the covariance between the coefficients for years in Canada and the interaction between age of immigration and years in Canada, which was -0.00003 .

References

- Agrawal, A.A., Laforsch, C., & Tollrian, R. (1999). Transgenerational induction of defences in animals and plants. *Nature*, *401*, 60–63.
- Auld, J.R., Agrawal, A.A., & Relyea, R.A. (2010). Re-evaluating the costs and limits of adaptive phenotypic plasticity. *Proceedings of the Royal Society B: Biological Sciences*, *277*, 503–511.
- Banks, M.S., Aslin, R.N., & Letson, R.D. (1975). Sensitive period for the development of human binocular vision. *Science*, *190*, 675–677.
- Berry, J.W., & Annis, R.C. (1974). Acculturation stress: The role of ecology, culture, and differentiation. *Journal of Cross-Cultural Psychology*, *5*, 382–406.
- Berry, J.W., Kim, U., Power, S., Young, M., & Bujaki, M. (1989). Acculturation attitudes in plural societies. *Applied Psychology: An International Review*, *38*, 185–206.
- Burgess, A.C. (Ed.). (2005). *Insiders' guide: Guide to Western Canada* (7th ed.). Guilford, England: Globe Pequot Press.
- Chin, C.S. (2003). The development of absolute pitch: A theory concerning the roles of music training at an early developmental age and individual cognitive style. *Psychology of Music*, *31*, 155–171.
- DeWitt, T., Sih, A., & Wilson, D.S. (1998). Costs and limits of phenotypic plasticity. *Trends in Ecology & Evolution*, *13*, 77–81.
- Heine, S.J. (2008). *Cultural psychology*. New York, NY: W.W. Norton.
- Huynh, Q.-L., Howell, R.T., & Benet-Martínez, V. (2009). Reliability of bidimensional acculturation scores. *Journal of Cross-Cultural Psychology*, *40*, 256–274.
- Johnson, J., & Newport, E.L. (1989). Critical period effects in second language learning: The influence of maturational state on the acquisition of English as a second language. *Cognitive Psychology*, *21*, 60–99.
- Kim, K.H.S., Relkin, N., & Lee, K. (1997). Distinct cortical areas associated with native and second languages. *Nature*, *388*, 171–174.
- LaFromboise, T., Coleman, H.L.K., & Gerton, J. (1993). Psychological impact of biculturalism: Evidence and theory. *Psychological Bulletin*, *114*, 395–412.
- Lenneberg, E.H. (1967). *Biological foundations of language*. New York, NY: Wiley.
- Lim, S.-L., Yeh, M., Liang, J., Lau, A.S., & McCabe, K. (2009). Acculturation gap, intergenerational conflict, parenting style, and

- youth distress in immigrant Chinese American families. *Marriage & Family Review*, 45, 84–106.
- Mayberry, R.I. (1993). First-language acquisition after childhood differs from second-language acquisition: The case of American Sign Language. *Journal of Speech and Hearing Research*, 36, 1258–1270.
- McCauley, R.N., & Henrich, J. (2006). Susceptibility to the Müller-Lyer illusion, theory-neutral observation, and the diachronic penetrability of the visual input system. *Philosophical Psychology*, 19, 79–101.
- Minoura, Y. (1992). A sensitive period for the incorporation of a cultural meaning system: A study of Japanese children growing up in the United States. *Ethos*, 20, 304–339.
- Oh, J.S., Jun, S.-A., Knightly, L.M., & Au, T.K.-F. (2003). Holding on to childhood language memory. *Cognition*, 86, B53–B64.
- Pigliucci, M. (2005). Evolution of phenotypic plasticity: Where are we going now? *Trends in Ecology & Evolution*, 20, 481–486.
- Redfield, R., Linton, R., & Herskovits, M.J. (1936). Memorandum for the study of acculturation. *American Anthropologist*, 38, 149–152.
- Ross, M., Xun, W.Q.E., & Wilson, A.E. (2002). Language and the bicultural self. *Personality and Social Psychology Bulletin*, 28, 1040–1050.
- Ryder, A.G., Alden, L.E., & Paulhus, D.L. (2000). Is acculturation unidimensional or bidimensional? A head-to-head comparison in the prediction of personality, self-identity, and adjustment. *Journal of Personality and Social Psychology*, 79, 49–65.
- Sam, D.L., & Berry, J.W. (Eds.). (2006). *The Cambridge handbook of acculturation psychology*. Cambridge, England: Cambridge University Press.
- Statistics Canada. (2008a). *Place of birth for the immigrant population by period of immigration, 2006 counts and percentage distribution, for census metropolitan areas and census agglomerations – 20% sample data*. Retrieved April 9, 2010, from <http://www12.statcan.gc.ca/census-recensement/2006/dp-pd/hlt/97-557/T404-eng.cfm?SR=1>
- Statistics Canada. (2008b). *Selected demographic, cultural, educational, labour force and income characteristics (830), mother tongue (4), age groups (8A) and sex (3) for the population of Canada, provinces, territories, census divisions and census subdivisions, 2006 Census*. Retrieved November 1, 2009, from <http://www12.statcan.gc.ca/english/census06/data>
- Tsai, J.L., Ying, Y.-W., & Lee, P.A. (2000). The meaning of “being Chinese” and “being American”: Variation among Chinese American young adults. *Journal of Cross-Cultural Psychology*, 31, 302–332.
- Ward, C., Bochner, S., & Furnham, A. (2001). *The psychology of culture shock* (2nd ed.). New York, NY: Routledge.
- Ward, C., Leong, C., & Low, M. (2004). Personality and sojourner adjustment: An exploration of the Big Five and the cultural fit proposition. *Journal of Cross-Cultural Psychology*, 35, 137–151.
- Werker, J.F., Maurer, D.M., & Yoshida, K. (2009). Perception. In M. Bornstein (Ed.), *Handbook of cross cultural developmental science* (pp. 89–125). New York, NY: Erlbaum.