

CHAPTER 18

Learning New Cultures

Processes, Premises, and Policies

Michael W. Morris, Katrina M. Fincher,
and Krishna Savani

In this age of globalization, rates of migration across national boundaries are at an all-time high. Hence, more people than ever before—whether exchange students, expatriate employees, economic immigrants, or political refugees—face the task of learning new cultures. We focus in this chapter focuses on how newcomers learn the norms of a culture, particularly the tacit norms of interpersonal interactions. While traditional theory and practice have emphasized the primacy of conscious declarative knowledge, we propose that some kinds of cultural learning begin with procedural knowledge that is often unconscious. To investigate our theory, we outline a dual-process model, in which procedural learning can come first and declarative learning later. We further propose domains and conditions in which this is likely to happen. In addition, we address the age-old question of how internalizing one culture affects competency and fluency in another culture. If people pick up new cultures through procedural learning, fluency in one culture may interfere with fluency in another culture because of processes in procedural learning, such as blocking, state dependence, and priming. Finally, we discuss the applied problem of how to select and prepare people for organizational roles that require intercultural fluency. The role of procedural mechanisms in cultural learning suggests a different approach to the aptitude dimensions for selecting candidates and to training and coaching methods to foster their learning.

Lisa's software company transferred her unit from San Jose to Bangalore a year ago. In her e-mails home, Lisa reports being "too busy meeting deadlines with her coders to learn anything about India." However, when some former coworkers visit, they notice some definite changes in her style. Lisa has become more patient in dealing with subordinates. In addition, she works more cooperatively with peers. Whereas in California she had protected her time, here in India she drops her own task to help a colleague

in need. Although Lisa did not consciously change her habits, she has, in fact, internalized some Indian interpersonal norms. Research has found that Indians, compared to Americans, are more likely to exhibit patience, accommodate requests, and offer help without concern for reciprocity (Miller et al., 2014; Perlow & Weeks, 2002; Savani, Morris, Naidu, Kumar, & Berlia, 2011). With these gradual changes to her operating style, Lisa has become a more effective manager in India than her fellow California

transplants, even those who made more effort to study Indian culture. Lisa's style has changed so dramatically that her friends understandably wondered whether, given her new habits, she would struggle to readapt if she came back to work in the United States.

The story of Lisa's adaptation to India challenges the dominant models of second-culture learning or acculturation in cross-cultural psychology (Bhawuk, 1998; Bhawuk, Sakuda, & Munusamy, 2008). These models draw upon classic studies of novices and experts in chess, physics, and other domains (Chase & Simon, 1973). They posit two key stages of expertise development. First, the learner acquires declarative knowledge, such as verbalized if-then rules about what action to choose in a certain situation. These verbalized rules require concentrated effort to recall and to enact. However, if the action is practiced in the relevant situation for a long enough time, the situationally contingent response can become automatized or proceduralized in a second stage of learning. After this happens, the person performs the action in the situation as a habitual reflex, without needing to concentrate on doing so (Anderson, 1982). Howell's (1982) model of intercultural learning elaborates this theory with more colloquial terminology. According to Howell, newcomers must initially acquire "conscious competence"—verbalized understandings of cultural norms that require concentrated effort. Only after repeated practice can newcomers eventually develop "unconscious competence"—retrained associations and reflexive habits that operate automatically. Similarly, Bennett's (1986) stage model of intercultural development proposes that an expatriate must first reach the stage of consciously recognizing differences in norms and, only later, progress to developing new behavioral and cognitive habits.

These models centering on declarative knowledge not only shaped basic research on cultural learning but also applied practices of cultural training. In the Peace Corps, the Armed Forces, and many corporations, candidates are trained with lectures and guidebooks emphasizing declarative knowledge. Trainings typically feature abstract verbal statements about value orientations ("Latin Americans are collectivistic") as well as behavioral injunctions, such as "Never pat a

Buddhist on the head." A similar approach is seen in the generalizations and "Dos and don'ts" lists offered in diversity trainings undertaken by hospitals, police forces, and universities for professionals who work with culturally diverse populations (Abbe, Gullick, & Herman, 2008; Crandall, George, Marion, & Davis, 2003; Ward, Landis, & Bhagat, 1996).

For some domains of cultural learning, the standard model and associated training methods work very well. When learning about a country's currency or cuisine, to name a few examples, novices start by following rules that they learn in a guidebook or cookbook. Only later do learners become able to choose the right bills or add the right ingredients on autopilot while their conscious attention is deployed elsewhere. This competence development works much like that in the domain of chess where this progression from declarative to procedural knowledge was first observed.

However, in other domains of cultural learning, competence may develop in other ways. Consider the tacit norms of interpersonal interactions, the dance steps of social life (Hall, 1983). In our opening example, Lisa developed new ways of interacting with colleagues that she seemed unaware of and certainly could not articulate as verbalized rules. She did not learn them from a guidebook or training session; she picked them up through long days of trial-and-error when interacting closely with locals to finish projects.

It is quite possible that in the domain of interpersonal behaviors, an expatriate might initially exhibit a new behavioral response through the mechanism of mimicry—reflexively mirroring the behavior of locals (Lakin & Chartrand, 2003). Yet mimicry is ephemeral, so the question remains of how such new responses become locked in. The key may be reinforcement: interpersonal interactions result in outcomes that provide positive or negative reinforcement (Kitayama, Varnum, & Salvador, Chapter 3, this volume). At the simplest level, reinforcement comes from whether or not the interaction succeeds: *Did the colleague agree to your favor request? Did your date accept the invitation to dinner? Did the client agree to the sale?* On another level, reinforcement also comes from positive or negative sanctions

delivered by interactants or onlookers: *Did they smile or frown? Did they draw closer or backpedal? Did they offer opportunities and introductions or cut off communication?* Studies indicate that newcomers tend to get rewarded interpersonally when they behave in ways that abide by local norms. For instance, job candidates who adopt the behavioral mannerisms of their foreign recruiters have more success in landing a job (Sanchez-Burks, Bartel, & Blount, 2009). In summary, mimicry is a reflexive mechanism that can induce a newcomer to perform a culturally appropriate action in a situation, and systematic reinforcement can then serve to lock in this new response (or at least increase the likelihood of repeating this response in the situation on future occasions). This is a process for gaining cultural competence without any need of verbalized declarative knowledge.

Lisa's story not only challenges traditional models but it also suggests alternative cognitive mechanisms that likely play a role in learning new cultures. It raises the following intriguing questions:

- Can expatriates pick up cultural norms from interactions through procedural learning without declarative learning?
- What features of interactions enable procedural learning rather than declarative learning?
- What types of individuals are more likely to learn norms procedurally?
- Does procedural learning help explain conflict between first- and second-culture competence?

By considering such questions, our intent is to provide a fresh look at how newcomers learn a culture's interpersonal norms. We advance this goal in three sections. Firstly, we outline a dual-process model in which cultural learning can begin with either explicit declarative knowledge or implicit procedural knowledge. As we have noted, the standard model of cultural learning accords primacy to declarative knowledge and posits that procedural knowledge only arises later as practiced behaviors become automatized. While declarative knowledge may be primary in some domains of cultural learning, procedural learning may come first in other

domains; that is people acquire competence without initial declarative knowledge. This may help to explain intriguing findings in cultural psychology on the tendency of immigrants' and sojourners to pick up implicit tendencies of the host culture (Heine & Lehman, 2004; Kitayama, Duffy, Kawamura, & Larsen, 2003; De Leersnyder, Mesquita, & Kim, 2011). Recent studies from our lab find evidence consistent with the procedural mechanism of reinforcement learning in the way people pick up cultural norms from interpersonal experiences. As we shall see, this way of learning implicitly from experience is especially likely under learning conditions that bedevil explicit rule-based reasoning (Savani, Morris, Fincher, Lu, & Kaufman, 2017).

Secondly, we use the dual-process model to investigate the age-old notion that first- and second-culture fluency can conflict. Interference can occur both ways. It is a familiar idea that deep grounding in one's first culture makes it hard to learn a second culture—one feels "culture shock" at the loss of familiar reference points. Communications researchers have expressed this notion in their claim that immigrants must "un-learn" their heritage culture norms in order to become fluent in the host culture (Gaw, 2000; Gudykunst & Kim, 2003).

A more provocative claim is that second-culture fluency can interfere with first-culture fluency and identification. In our example, Lisa's friends foresee reverse culture-shock—that Lisa will find that her new habits don't mesh when she returns to the United States. Political theorists have long argued (Plato, 360 B.C.E.) that extensive exposure to a foreign culture threatens a citizen's fit and bond to his or her first culture. Decreased adherence to norms as a result of foreign exposure has been documented in recent research (Lu et al., 2017).

But according to the standard model such interference of one cultural competence with another is hard to understand—newly gained declarative knowledge doesn't conflict with previously learned declarative knowledge. However, to the extent that second-culture fluency reflects retrained associations and habits, then it is easier to understand how acquiring a new set of habits can reduce one's fluency in the old set

of habits. The procedural-priming process suggests new ways to understand and transcend conflicts between first- and second-culture competency. To this end, we explore the dynamics of implicit cognition, such as blocking, state-dependent memory, and procedural priming.

Thirdly, in the final part of this chapter, we consider the applied problem of selecting and training personnel for overseas roles. Traditional selection practices focus on aptitudes relevant to declarative learning, and hence have selected personnel based on factual knowledge about the host country and aptitudes, such as IQ, that are relevant to declarative learning. Likewise, cultural and diversity training heavily emphasizes declarative knowledge about cultural differences. Such trainings teach general value orientations and if-then rules about what to do or not to do. We review evidence about which training methods have been found to be effective. Several empirical puzzles in this literature can be seen in a new light from the perspective of procedural learning as primary. The procedural primacy model oversees positions in which interpersonal fluency is paramount, such as sales, service, or spying roles.

PROCESSES: DECLARATIVE AND PROCEDURAL LEARNING MECHANISMS

Rival traditions in psychology have portrayed cognition in terms of associations (Rumelhart & McClelland, 1986; Thorndike, 1908) and rules (Anderson, 1990; Newell & Simon, 1972). In the past decade, however, many theorists have proposed that both camps are correct, that the mind encompasses two qualitatively different systems of cognition. The first, “System 1,” or “intuition,” is nonconscious, automatic, and effortless. It stores knowledge in the form of associations. “System 2,” or “reason,” on the other hand, is conscious, deliberate, and effortful. Unlike System 1, System 2 stores knowledge in the form of verbalized concepts and rules (Kahneman, 2011; Schacter, 1987; Sloman, 1996; Stanovich & West, 2008).

Procedural learning is part of System 1, in that it deals with the formation of habits and skills through the strengthening of

stimulus–response associations (Wood & Runger, 2016). Declarative learning is related to System 2, in that it involves the acquisition of rule-like verbalized representations through studying and reasoning (Fodor & Pylyshyn, 1988). In our evolutionary history, procedural learning was the first form of learning to appear and is shared by many other species. It is also every person’s first form of learning, as it begins in the womb (Tulving & Schacter, 1990). Declarative learning marks a later development in evolution, so it is shared by few (if any) other species. It also comes online later in child development. Declarative knowledge can be acquired very quickly through communication, whereas it can take many repeated experiences, through procedural learning, to form stimulus–response associations sufficient to complete a task. That said, procedural learning is long lasting; for instance, even after years of no practice, a person does not forget how to ride a bicycle. Thus, we suggest that both learning mechanisms play a crucial role in cultural learning, depending on the particular domains and conditions. The differing strengths and weaknesses of the two learning mechanisms can predict which mechanism predominates in a given domain of knowledge or under a given set of conditions.

One can acquire a competency through either mechanism or a combination of the two; however, each type of learning comes with its own set of advantages and disadvantages. Consider, for example, the task of memorizing a telephone number. Through mnemonic techniques such as chunking, a person can accomplish this task through declarative learning. Alternatively, he or she could dial the number, get reinforced by success, repeat the process, and eventually form procedural knowledge. As mentioned, each mode of learning presents its advantages. On the one hand, declarative memory enables one to recall and dial the telephone number anywhere as long as one is able to concentrate on the task. Procedural memory, on the other hand, makes the dialing of the number a response that surfaces only in the situation of looking at a telephone keypad. People often struggle to recall even brief PIN codes if they are not looking at a keypad.

When Is Cultural Learning Primarily Declarative?

Standard models of acculturation give primacy to declarative learning. They draw on models of expertise acquisition (Anderson, 1990; Fitts & Posner, 1967), grounded in studies of novices and experts in chess, physics, and other similar domains (Chase & Simon, 1973; Larkin, 1981). According to these models, all learning starts out as declarative knowledge, and procedural knowledge is acquired only later. The learner begins by memorizing verbal rules about the domain, which require concentrated effort to follow. Only after an action in a situation has been repeated many times can it become proceduralized, such that it can be performed reflexively when one's attention is focused on other tasks. Howell (1982) proposed that this sequence applies to the development of expatriates' cultural competence as well, that "conscious competence" must precede "unconscious competence." Similarly, classic models of immigrant acculturation portrayed it as a deliberate matter of following an assimilationist or separatist strategy (Berry, 1990).

But should we expect that all domains of life are learned in the same way? It doesn't look that way in the case of immigrant acculturation. Immigrant children learn host culture ways at dramatically different rates in structured domains, such as classroom comportment, and less structured domains, such as playground interactions with peers (Phinney, Berry, Sam, & Vedder, 2006). New children from foreign cultures often manage quickly to master appropriate classroom behaviors toward their teachers but take longer to become fluent in the ways that their peers socialize. No doubt, this may reflect what they (or their parents) prioritize, but in part it may reflect the structure of the domain. The norms of the classroom may be simpler to encode, as they apply to all students in the same way, and tend to be enforced unambiguously and articulated in verbal rules. In the domain of playground interactions, the regularities are hazier and the feedback is noisier. The norms of the classroom may afford declarative learning to a greater extent than the norms of the playground.

Similarly, expatriates may acquire cultural competence in different domains through

different processes. A Brazilian expatriate in Turkey might learn a local religious practice—"If entering a mosque, then remove your shoes"—from a guidebook. If not, he might be instructed verbally by a local on his first visit to a mosque. Rules about a religious setting are relatively easy to learn through declarative processing. Because the situation is visually salient, other people around can be seen following the rule, and they will give you explicit feedback if you violate the rule. The same is true in other well-structured domains, such as rules of traffic, cuisine, or currency. In such domains, the standard model of declarative learning as a primary step likely applies. But the domain of interpersonal interactions is different, so the model of learning norms first as explicit verbalized rules may not hold when it comes to the tacit interaction rituals of interpersonal activities, such as meeting, flirting, bargaining, mentoring, and so forth.

Declarative learning can take a number of forms. Expatriates and immigrants often begin declarative learning prior to departure—reading guidebooks, history, and novels; sitting in classes and trainings; conversing with people who have lived in the prospective host country. But declarative learning does not end there. Upon arrival, newcomers to a cultural setting inevitably encounter unfamiliar behaviors that puzzle them. These trigger an attributional process akin to how scientists investigate a hypothesis. Newcomers who witness an unexpected behavior may search for an explanation. They may "collect more data" by watching other people in the same situation and checking for a behavioral regularity or consensus. They may "conduct an experiment" and act in the new way in order to see what happens. When self-consciously trying out new behaviors in this way, one is learning from experiential feedback through reasoning about it as evidence, an explicit-cognition mechanism.

A strength of declarative learning is that it doesn't require many episodes of repeated experience. A single experience with a book, lecture, or conversation can impart a rule. And rules can be induced from experienced feedback sometimes after just a few episodes. Also declarative knowledge can be easily communicated. They be encoded into organizational policies, so that one expatri-

ate's insight about local norms can be shared with many fellow employees.

However, declarative learning has sharp limitations in bandwidth. Humans can hold only a few pieces of information simultaneously in our working memory (Cowan, 2010). If a religion's headgear prescriptions did not apply universally but instead depended on the season, setting, age, gender and marital status, the custom would be difficult to acquire via declarative learning. In experiments involving learning from feedback, when participants are tasked with learning a single-cue contingency, they perform better when given ample time for conscious processing. However, when participants have to learn a multiple-cue contingency (which cannot be easily verbalized), they perform better when put under time pressure and thereby forced to use procedural learning (Maddox, Ashby, Ing, & Pickering, 2004a).

In theory, another advantage of declarative knowledge is generality—one rule can cover many specific situations. General rules, however, tend to be very abstract, and, in practice, abstract rules are challenging to apply to new situations. For example, suppose a person had learned a rule about preserving face in China, such as “Do not refuse a public overture of generosity,” in the context of dinner invitations and applies the rule in this situation. When encountering an invitation in a different social situation, such as an offer to help solve a problem, the person may not recognize it as an overture of generosity and hence may decline the offer, insulting the Chinese host. This is known as the problem of “inert knowledge,” whereby abstract rules learned in one situation are applied in that situation but *not* applied in situations of the same kind that differ in superficial details (Ross & Kilbane, 1997).

Furthermore, acting on the basis of situation–action rules presents a challenge in interpersonal interactions, because interpersonal situations are fleeting events rather than concrete places. In the aforementioned religious norm example, the salient sight of the mosque triggers the application of the if-then rule. In contrast, interpersonal situations are not fixed settings that one can see as one approaches. They are events that unfold around one, often without advance notice. Moreover, mosques or churches are marked by iconic features, such as domes

and crosses, which help people to recognize them, whereas different interpersonal interactions such as a favor request or a show of respect don't have any salient visual identifiers. Instead, they are fuzzy prototypes of a multiplicity of features (Cantor, Mischel, & Schwartz, 1982). Thus, while knowledge in the form of verbalized rules has great cognitive economy, it may be challenging to apply such knowledge in the domain of interpersonal interactions.

In summary, the standard model that competence develops first as declarative knowledge and sometimes eventually becomes proceduralized no doubt applies in well-structured domains like chess, and well-structured domains of culture. However, gaining competence in some domains of a new culture may happen in a different sequence. Newcomers may start learning by developing procedural knowledge and only later, as a result of reflecting on their behavior, develop declarative knowledge of the behavioral pattern. Whichever way the learning happens (declarative primacy or procedural primacy), the different strengths of the two learning mechanisms complement each other.

When Do People Learn Culture Procedurally?

Increasing evidence suggests that immigrants and expatriates take on host culture patterns that they are not consciously aware of. People who immigrate from Hong Kong to Canada do not only adapt in their conscious behaviors (e.g., using a fork, rather than chopsticks), they also adapt in their spontaneous expressiveness, becoming more extraverted (McCrae, Yik, Trapnell, Bond, & Paulhus, 1998). Adaptation has been observed in implicit emotional and cognitive tendencies. Japanese who move to North America show increased self-esteem, while North Americans who move to Japan become more self-critical (Heine & Lehman, 2004). People's unconscious attentional patterns shift as well; for instance, Japanese sojourners in the United States showed the characteristic American pattern of decontextualized attention after 1 year. Conversely, American students in Japan showed the characteristic Japanese pattern of contextualized attention (Kitayama et al., 2003).

Field studies of sojourners and immigrants have not been able to isolate the mechanism underlying these changes. However, laboratory experiments that manipulate exposure to everyday situations in different cultures find parallel effects. After participants read typical Japanese situations, they exhibit interdependent, self-critical emotions. This happens even for non-Japanese participants who are unaware that the situations came from Japan. In contrast, everyday situations sampled from the United States evoke independent, self-enhancing thoughts and emotions (Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Morling, Kitayama, & Miyamoto, 2002). These experiments suggest that exposure to interpersonal situations can instill the cognitive and emotional tendencies characteristic of a culture.

Building on this work, our research group sampled the everyday influence attempts experienced by college students in the United States and in India. The students had to describe their most recent experiences in an influence situation (Savani et al., 2011). Regardless of whether they were asked about experiences as an influencer or influencee, Indian and U.S. samples differed starkly in their contents and, correspondingly, in the behaviors they evoked. Indian influence attempts were predominantly other-serving gestures, and they evoked accommodation. Conversely, U.S. influence attempts tended to be self-serving, and they evoked resistance. Furthermore, we exposed undergraduates to influence situations from their own culture and from the foreign culture. Across dozens of trials, students had to decide whether to accommodate to the influencer. At the beginning, Indians were much more likely to accommodate, whereas Americans were more likely to resist, consistent with the respective situation ecologies to which they are accustomed. However, as participants were exposed to situations from the foreign culture, their response bias began to shift toward that of the other culture. As a result, Americans became more inclined to accommodate in an ambiguous situation, while Indians became more likely to resist. Reward feedback was not provided in the study, but a measure showed that participants accommodated when they envisioned that it would produce positive outcomes. Thus, the study

could not determine precisely how the learning occurred.

Thorndike (1898) first described the mechanism through which stimulus-response associations could be strengthened with positive consequences and repetition. The "law of effect" holds that responses that produce satisfying outcomes become more dominant. The "law of exercise" holds that associations strengthen when rehearsed and atrophy when not rehearsed. In turn, Skinner (1938) found that reinforcement learning was not simply a function of the amount of rewards. Intermittent rewards, such as those provided by slot machines, are fewer in number than steady rewards but highly affecting; they produce learning that extinguishes more slowly. Reinforcement learning can shape behavior even when the feedback is so intermittent or noisy that the learner cannot consciously identify the contingency involved (which response to what stimulus generates the reward).

More recent research focuses on the neural substrates of reinforcement learning, especially on the neurotransmitter dopamine. When the organism experiences a reward, dopamine is released broadly throughout the brain, amplifying the sensitivity of all recently activated synapses to response signals. In other words, it stamps in or "embrains" the stimulus-response associations (Schultz, 2013; Wise, 2004). Although dopamine signals of various sorts occur in both the midbrain and the prefrontal cortex, they are reward signals only in the anterior striatum (Menegas, Babayan, Uchida, Watabe-Uchida, 2017). Frank, Seeberger, and O'Reilly (2004) found that Parkinson's patients, who are treated for dopamine deficits, learn less from positive rewards when they are off their medication. The neural mechanism of dopamine broadcasting elucidates why procedural learning has a broad bandwidth: it can take into account many simultaneous cues because all the stimulus-response associations present during the dopamine release get amplified at once. At the same time, it elucidates why procedural learning fails when the reward feedback is delayed. For reinforcement learning, rewards must come immediately, so that the synapses involved are still active and can be stamped in by the dopamine blast. This condition of delay doesn't undermine declarative learning. For

example, you can learn from feedback on a math test even if the feedback comes a week later. But a smile would not work to reinforce an interpersonal gesture if the smile were delivered a week later.

Procedural Learning and Implicit versus Explicit Aptitudes

In order to test the procedural mechanisms of reinforcement learning, we created a paradigm in which participants encounter a series of situations from another culture, in each case choosing an action, then receiving feedback about whether this was the culturally correct behavior (Savani et al., 2017). Feedback of this sort can be drawn upon by either the declarative learning system or the procedural learning system. To test which learning process predominates, we measured individual differences in aptitudes related to the two mechanisms as a way of tracing which mechanism is used.

Some of the most important evidence for the distinction between declarative and procedural learning comes the study of individual differences, in particular, individuals with brain lesion in specific areas relevant to these processes (McGlynn & Schacter, 1989; Mishkin, Malamut, & Bachevalier, 1984; Young, de Haan, & Newcombe, 1990). Amnesiacs have damage to the medial temporal lobe (MTL) that interferes with forming new declarative knowledge. However, they can form new associations, habits, and skills from repeated practice, such as navigating a floorplan or maze (Knowlton, Ramus, & Squire, 1992; Knowlton, Squire, & Gluck, 1994; Nissen, Willingham, & Hartman, 1989). Similarly, Bechara et al. (1995) found that damage to the MTL hippocampal region is associated with the inability to acquire declarative knowledge about the stimuli experienced in a conditioning experiment. Nevertheless, this did not stop people from acquiring associations to such stimuli. Conversely, damage to the subcortical region of the basal ganglia, specifically the amygdala, is associated with an inability to acquire associations but retention of the ability to acquire declarative knowledge.

In the same way that individual differences in lesions differentially inhibit declarative and procedural processes, individual differences in aptitudes differentially enable

them. The declarative mechanism of reasoning about rules and evidence is facilitated by aptitudes related to abstract thinking, such as IQ. Studies of brain morphology confirm IQ's connection to declarative learning, as they show its association with the size and shape of the hippocampus but not of the amygdala (Amat et al., 2008). IQ tests, such as Raven's Progressive Matrices test, assess individual differences in reasoning aptitude (Raven & Court, 1998). Additionally, IQ has been found to predict both performance on many tasks, career success, and even longevity (e.g., F. Schmidt & Hunter, 2004). To the extent that the acquisition of cultural norms from feedback operates through the declarative process of reasoning about rules and evidence, individual differences in analytic abilities such as IQ should predict learning.

By contrast, to the extent that the procedural mechanism of reinforcement learning operates, individual differences in implicit pattern detection should predict learning. The most widely used measure of this is artificial grammar learning task (Reber, 1967, 1969). Participants in the task are shown a series of letter strings and type out each one. For a subsequent surprise test, they are told that there was a pattern in these strings, and they are shown new strings and asked whether each string fits the pattern or not. Participants typically feel that they are just guessing and, indeed, some individuals perform at chance level. However, others perform well above chance, indicating that they implicitly detected the pattern from their exposure to the original strings. This pattern detection is an elemental cognitive aptitude, a matter of memory and recognition. Strength in this aptitude helps people learn situation–action contingencies, because it helps people identify and remember the relevant situational cues.

Only a few prior studies have compared individual differences in analytic aptitudes and intuitive aptitudes. A study of high school students in England found that students' IQ (as measured by Raven's Progressive Matrices test, the Differential Aptitude Test Verbal Reasoning scale, and the mental rotation test) predicted their performance on standardized math exams better than their implicit aptitude (as assessed through the serial reaction time task; Nissen & Bullemer,

1987). However, the opposite was true—implicit aptitude predicted—for performance on foreign-language exams (Kaufman et al., 2010).

A series of studies in our lab measured both kinds of individual differences (Savani et al., 2017). The outcome measure was the speed with which participants became accurate in choosing the behavior that goes with a given situation. For example, participants were asked to imagine that they were in a new country and had to learn the local greeting rituals through trial-and-error feedback. They encountered many different individuals from the local culture (ranging from 30 to 80 in different studies) and had to choose how to greet each person (e.g., shake hands or bow). After each decision, participants received feedback about whether their decision was culturally appropriate. They had to figure out that it depends on factors such as the gender or the age of the other person. The key dependent measure was the speed with which participants learned the new cultural norms, that is, the increase in participants' accuracy across successive trials. Savani et al. found that participants with higher implicit aptitude (as assessed by the artificial grammar learning task) were faster in learning the new cultural norms, whereas participants' explicit aptitudes (as assessed by a series solution task that is parallel to the artificial grammar learning task but taps IQ) did not predict participants' speed of learning. Thus, this finding is consistent with the idea that people learn the norms of a new culture through a procedural learning mechanism rather than a declarative knowledge mechanism.

In the next set of studies, we tested hypotheses about conditions that theory suggests would particularly favor procedural mechanisms in norm learning from experiential feedback. We introduced factors to the learning situation known to disrupt explicit declarative processing but not implicit associational processing: when contingency involves a multiplicity of cues, when the reward feedback is fleeting, and when the reward feedback is noisy. Complex contingencies are present in many interpersonal norms (e.g., whether to greet someone by their first name depends on a combination of multiple factors). We conducted an experiment that varied whether the culturally correct action

depended on a single cue (e.g., if a man, salute; if a woman, wave) or on multiple cues (e.g., if a man encountered indoors at nighttime, salute; otherwise wave). We found that participants' implicit aptitude was a stronger predictor of learning speed in the multiple-cue condition than in the single-cue condition (Savani et al., 2017). Intriguingly, explicit aptitude negatively predicted learning speed in the multiple-cue condition. The feedback in interpersonal interactions tends to be noisy rather than perfectly reliable, because people often feign positive responses in order to be polite (Reis, 2008). Also, people tend to mask their spontaneous emotions after a brief micro expression, so the feedback received in interactions is often quite fleeting (Ekman & Friesen, 2003). In our laboratory paradigm, we manipulated these aspects of feedback. We provided participants with reliable feedback 100% of the time (e.g., all men in a new culture would respond positively to handshakes and negatively to bows, and vice versa for all women) versus only 75% of the time. In another study, we varied supraliminal versus intraluminal feedback, that is, a smiling or frowning face depicted for 16 milliseconds (with both backward and forward masking) or 416 milliseconds. As expected, learning speed tracked implicit aptitude (indicating a procedural mechanism) especially when feedback was noisy and when it was fleeting (Savani et al., 2017). By contrast, explicit aptitude did not predict learning from noisy feedback and it negatively predicted learning from fleeting feedback.

Conversely, we also investigated a condition predicted to impede implicit procedural mechanisms but not declarative mechanisms to see whether learning, and the predictiveness of implicit aptitude, diminishes. When reward feedback is even slightly delayed, procedural learning breaks down (Maddox, Ashby, & Bohil, 2003). In category learning tasks that require integration of multiple cues, participants cannot verbally articulate the rule, but they still learn to correctly categorize the items through implicit associational processing of the feedback. In such tasks that require implicit associational mechanisms, even a 5-second delay in feedback disrupts people's ability to learn (Maddox, Bohil, & Ing, 2004b; Foerde & Shohamy, 2011). Thus, in our cultural learn-

ing paradigm, we manipulated whether participants received immediate versus delayed feedback. Implicit aptitudes predicted the speed with which participants learned the cultural norm in the presence of immediate feedback. In the case of delayed feedback, participants did not learn the cultural norm on average, and their implicit aptitude did not predict their extent of learning (Savani et al., 2017).

In sum, implicit mechanisms particularly dominate under the conditions of cue complexity, fleeting feedback, and noisy feedback, where explicit mechanisms founder. However, implicit mechanisms cannot operate under the condition of delayed feedback. These findings provide converging evidence for our proposal that people learn the interpersonal norms of a new culture from experiential feedback through implicit associational mechanisms. These results suggest questions for future research about the social settings that evoke implicit and explicit learning mechanisms. From this we can predict the kinds of interpersonal settings where people are most likely to learn implicitly and develop tacit procedural knowledge. Consider, for instance, an expatriate's experience at parties. Such settings present a few kinds of interactions (e.g., greetings) over and over again with many different interactants and the feedback received tends to be noisy and fleeting. Hence, in this setting people will learn from experience through implicit associational processing rather than explicit rule-based processing. Now consider an expatriate conducting negotiations over e-mail. Because e-mail is an asynchronous communication media, others' responses come after a delay rather than immediately. Hence, implicit associational mechanisms cannot operate and learning requires conscious reasoning about other people's positive or negative responses as evidence relevant to hypotheses about unwritten rules of etiquette. If expatriates learn from the experiential feedback of parties and of e-mail negotiations through different mechanisms, this entails that the resulting knowledge would be in a different form. The implicit mechanisms that operate in the setting of parties would produce implicit procedural knowledge. The explicit mechanisms that operate in e-mail negotiations would produce explicit declarative knowledge.

The Role of Metacognition

Metacognition refers to monitoring and control of one's own thought processes (Flavell, 1979). Individuals differ widely in their metacognitive proclivity. These differences are associated with measures of neural functioning, morphology, and connectivity (Fleming & Dolan, 2012). Self-report measures of metacognitive activity predict which individuals are likely to learn better from the same training course (A. Schmidt & Ford, 2003).

A growing body of research shows that metacognitive processes of error monitoring and correction occur implicitly (Frith, 2012). Cultural intelligence theorists have hypothesized that cultural metacognition represents an explicit conscious process (e.g., D. Thomas et al., 2008). However, basic research on cognitive psychology has always posited both explicit and implicit forms of metacognition. Implicit error monitoring is the voice from the gut that tells us we have just locked our keys in the car. Skilled typists slow down after an error, even if they are not looking at their output, which suggests that they are implicitly monitoring their motor errors. In a clever study testing this (Logan & Crump, 2010), a word processor was rigged so that when typists made an error (e.g., typing "tha") the error was autocorrected on the screen (e.g., it appeared as "the"), but their typing speed still slowed down after errors, indicating that error monitoring happens through implicit processes. Their implicit monitoring system detected the error even though their conscious perception did not.

Models of cultural intelligence include a dimension of cultural metacognition, which assesses the extent to which people are aware of, and update, their cultural assumptions as they engage in intercultural interactions (sample item: "I am conscious of the cultural knowledge I apply to cross-cultural interactions"; Ang et al., 2007). Preliminary studies have indicated that metacognitive cultural intelligence scores are correlated with the extent to which people understand and adjust to foreign settings (Ang et al., 2007; Mor, Morris, & Joh, 2013). Metacognitive proclivity also predicts effective collaboration in intercultural working relationships and teams (Chua, Morris, & Mor, 2012;

Brett, Behfar, & Kern, 2006). Cultural intelligence theorists have hypothesized that such positive intercultural outcomes arise through a learning advantage. For instance, cultural metacognition possibly enables expatriates to better learn from their everyday experiences in a foreign cultural setting (Ng, Van Dyne, & Ang, 2009). However, evidence about this learning process has so far remained elusive.

Through our laboratory paradigm for assessing the learning of foreign norms from experiential feedback, we managed to test this important hypothesis. A series of experiments confirmed that participants scoring higher on the cultural metacognition scale (Ang et al., 2007) were faster at learning foreign norms from feedback across multiple trials. In some studies, they learned contingencies of cooperation behaviors from verbally represented interactions. In most of the studies, they learned contingencies of greeting behaviors from visually represented interactions. To make the task of learning greetings more challenging we ran it with noisy feedback.

The experiments also elucidated the metacognitive processes involved. Consistent with an error monitoring mechanism, the link between metacognitive proclivity and learning was mediated by surprise responses. Implicit error monitoring involves confidence judgments that make people less surprised by success feedback and more surprised by (spurious) error feedback after a correct answer. The surprise index showed that the advantage of individuals high on metacognitive proclivity was carried by their more active error monitoring activity during the learning task (M. W. Morris, Savani, & Fincher, *in press*).

To complement this correlational evidence from individual difference studies, we conducted experiments that manipulated situational prompts for metacognition. Metacognitive prompts are pauses and/or messages that encourage reflective processing about one's performance, often built into computer tutorials (Crook & Beier, 2010; Tanner, 2012; Thillmann, Künsting, Wirth, & Leutner, 2009). One experiment found support for a prediction from the implicit error monitoring mechanism that pauses after errors helped learning more than pauses after accuracy. Another experi-

ment varied the message that came with the pause. One condition was a directed prompt that instructed participants to think explicitly ("Please think—Analyze the Feedback"). The other condition was nondirected; the message with the pause gave no instruction for explicit reasoning ("Please wait—Image Loading Process"). Learning was faster with nondirected prompts than directed prompts, consistent with the role of implicit associational processing rather than explicit rule-based processing. Overall, these studies find that metacognitive activity, whether from a dispositional proclivity or a situational prompt, helps people learn foreign norms from experiential feedback.

While we have discussed implicit and explicit processing as separate mechanisms, it is important to emphasize that the two processes can work together in a learner's journey toward proficiency in a domain. The standard model of second-culture learning acknowledges this by proposing that initially declarative knowledge becomes proceduralized. Likewise, in domains where individuals learn an situation-action contingency through implicit associational learning, this tacit knowledge may eventually become "declarative-ized." Through reflecting on their behavioral patterns, individuals can become able to articulate the contingency that they have been following implicitly. Whichever form of knowledge comes first, it can spawn the other kind of knowledge. The two kinds of knowledge work together to regulate and guide behavior. Also, as Bandura (1989, 2001) reminds us, experiential learning of the type we studied is often preceded and complemented by vicarious learning, watching others in the situation and observing how their actions get rewarded. Vicarious learning, likewise, can operate implicitly or explicitly, and the two forms can work in combination just as in experiential learning.

PREMISES: REPLACEMENT VIEW VERSUS SUPPLEMENT VIEW

The question of whether learning a second culture changes one's proficiency in one's first culture has been an age-old debate. According to the replacement view, when a person acquires competence in a new culture,

such fluency conflicts, to a greater or lesser degree and for at least some time, with the person's native-culture fluency. In contrast, the supplement view, which has been more dominant in acculturation research, considers that the gain of second-culture proficiency leaves one's native-culture competence undiminished and, perhaps, even enhanced.

The replacement view underlies the age-old anxiety that exposure to a foreign culture may be corrupting. For example, in 360 B.C.E., Plato recommended that states should not allow ordinary citizens to have contact with foreign visitors. The fear was that citizens would embrace the foreign ways and lose touch with their domestic customs. Plato advised that foreign travel be restricted to citizens above the age of 40, presumably because they are less susceptible to learning new and different norms of behavior. Through history regimes have restricted immigration and foreign travel; ancient Mesopotamia (in its Hammurabi code), Japan (in the Sakoku Edict), and the contemporary hermit kingdom of North Korea. Some classical arguments about acculturation, such as that two cultures in contact inevitably change each other is also influenced by the replacement view. Similarly, the replacement view gave rise to the idea that migrants assimilate in a "straight line"; that is, that they increasingly fuse with the mainstream and, with each generation, gradually disconnect from their heritage culture and community (Gans, 1973; Herskovits, 1938).

Furthermore, the cross-cultural psychologists Gudykunst and Kim (2003) made the controversial claim that learning a second culture may require that the person "unlearn" his or her native culture. It is important to determine what is meant here by "unlearn." If it means forgetting declarative knowledge, that would seem unnecessary as knowing one set of rules doesn't inhibit learning a new set of rules. However, if to unlearn means to extinguish an automatic association or habit, then it makes more sense, as one pattern of associations can interfere with another. Consider the difficulties that foreign students from Korea encounter when they come to the United States for law school or business school. Acting deferentially in front of teachers and maintaining harmony in groups has been inculcated into them since childhood. But in the

American classroom they are supposed to ask challenging questions of the teacher and debate points made by fellow students. They know consciously what they are supposed to do in order to get a good class participation score, but they find it difficult to master it in practice and make it habitual. Even if they are fluent in English, their Korean norms of deference get in the way of adapting to the American norms of debate.

The interference between Korean and American cultural competencies would not be happening if they solely involved declarative knowledge. The Korean students have no trouble gaining conscious declarative knowledge about the expectations of classroom participation. However, if we accept that such competencies comprise trained stimulus-response associations and habits, it becomes easier to understand the conflict or interference. For example, interference in learning a second culture may result from blocking effects. In the case of blocking, the conditioning of a response to a stimulus is impaired when presented together with a second conditioned stimulus that is already associated with the response (Kamin, 1969; Blaisdell, Gunther, & Miller, 1999). For instance, Korean students may find it hard to pick up when the professor signals that student questions should end, as the mere presence of the professor already cues that response.

Even so, the conflicts that newcomers experience while learning a host culture are not permanent. Researchers have long observed that some immigrants become fluent in and engaged with the host culture without losing attachments to their heritage culture. For example, W. Thomas and Znaniecki (1918) studied Polish immigrants in Chicago and noted three acculturation patterns: The first type embraced the host culture and abandoned their heritage culture. The second type rejected the host culture and adhered to their culture of origin. Finally, the third type engaged with the host culture while also maintaining significant heritage-culture identity. Drawing on these ideas, Berry (1974, 1990) developed a self-report scale that categorizes immigrants into four acculturation strategies: assimilation, separation, integration, and marginalization. "Assimilation" denotes engagement with the host but not the heritage culture. "Separation" entails

engagement with the heritage but not the host culture. "Integration" involves engagement with both cultures. Finally, "marginalization" denotes the absence of engagement with either culture. Berry (1990) predicted, and found, that integration was associated with the highest levels of psychological adjustment. To summarize, the research on immigrants has shown that second-culture proficiency does not always crowd out first-culture proficiency. In addition, studies have indicated that second-culture attachments can balance, rather than displace, first-culture attachments.

The integrated acculturation strategy does not imply that immigrants develop habits that blend heritage-culture and host-culture patterns. Rather than having one mode of behavior that falls in between the two cultural prototypes, bicultural individuals have two modes of behavior. They switch from one cultural response mode to another, depending on cues in the situation (Benet-Martínez, Leu, Lee, & Morris, 2002; Hong, Morris, Chiu, & Benet-Martínez, 2000). The question we ask is, how do they manage their dual cultural competencies? For instance, if German and Turkish norms about how to respond to an insult diverge, how does a Turkish German, who moves between the two communities, manage respond appropriately? How do they avoid exhibiting a Turkish reflex in a German setting, or vice versa? One of the helpful characteristics of both procedural learning and declarative learning in this case is context dependence. For the German-Turkish bicultural person, the surrounding cultural context, such as familiar sounds, smells, and sights of a cultural setting, serves to prime the cultural cue for the enactment of Turkish or German norms, whether consciously or nonconsciously.

Certain artifacts, landmarks, and historical figures are so highly associated with a cultural tradition that they may be called icons. When bicultural person observes iconic symbols, such as a the dome of a mosque or the cross atop a church, this automatically elevates the accessibility of the declarative and procedural knowledge associated with the corresponding culture. As a result, its concepts and scripts are likely to activate and guide the person's information processing, which results in thoughts and

behaviors that adhere to the norms of that culture (Fu, Chiu, Morris, & Young, 2007; Hong, et al, 2000). Priming is thought to underlie biculturals' capacity to frame-switch from cultural mode to another. This occurs when they move from heritage situations to host-culture situations, and vice versa.

Nevertheless, any automatic process sometimes go haywire. In order to explore potential cases in which cultural priming impedes performance, Zhang, Morris, Cheng, and Yap (2013) studied newly arrived Chinese immigrants in the United States and tested whether the immigrants' fluency in English was disrupted when primed with visual cues to Chinese culture. In a simulated teleconference conversation conducted in English, Chinese immigrants spoke less fluently when their ostensible interactant had a Chinese face, rather than a European American one. This occurred despite the fact that the immigrants reported greater social comfort with the Chinese interactant. Another study replicated this effect; instead of faces, however, it used images of Chinese landmarks, such as The Great Wall, as opposed to American images, such as Mount Rushmore. In other studies, after their exposure to Chinese images, Chinese immigrants were more likely to use literal translations from Chinese in an object-naming task. For instance, they called pistachios "happy nuts." In a further study, the Chinese participants recognized these anomalous phrases faster after looking at Chinese images rather than American ones, indicating that these phrases had elevated accessibility in their minds.

In culturally mixed environments, visual cues to a person's heritage culture may interfere with the person's attempts to fluently enact the host culture. Birman, Trickett, and Buchanan (2005) compared adolescents' acculturation in two communities of Russian immigrants living in the same state in the United States. In one of the communities, the Russians lived in a concentrated ethnic enclave. In the other, the people lived dispersed throughout the area's multicultural neighborhoods. American acculturation and Russian culture retention was measured in terms of linguistic fluency and consumption behavior related to media, music, food, and entertainment. It was also measured in terms of identification, as expressed by

views such as “I consider myself American” and “I consider myself Russian.” Time spent in the United States positively predicted measures of U.S. acculturation in terms of language, behavior, and identification. At the same time, it negatively predicted Russian language and interpersonal behavior, but not identification. (This may reflect that language and interpersonal behavior are carried by implicit procedural knowledge whereas identification is carried by explicit declarative knowledge.)

Interestingly, time spent in United States also interacted with the type of community in which the immigrants lived. The relationship between time spent in the United States and U.S. linguistic, behavioral, and identity acculturation was stronger in the dispersed community, which suggests a faster process of acculturation. Less frequent social interactions with fellow Russians most likely meant less priming and reinforcement of Russian habits. To summarize, interference between host- and heritage culture fluency may arise out of both heritage–culture habits and accessibility of these habits.

There are reasons to believe that different types of norms follow different patterns of learning. Specifically, more affectively laden cultural norms may be more difficult to change than cultural norms that are affectively neutral. For instance, American immigrants acculturate to political and economic practices, such as voting and maintaining savings accounts, faster than they acculturate to religious and parenting practices (Glazer & Moynihan, 1963; Navas et al., 2005). Similarly, Hong Kong, a society that combines Chinese ethnicity and Western institutions, teaches schoolchildren about role models drawn from both Eastern and Western history. However, it is only in some domains of learning that the role models are drawn from both Eastern and Western history—the role models in instrumental domains are largely comprised of Westerners such as Thomas Edison, while role models in the moral domains tend to be exclusively Chinese (Fu & Chiu, 2007).

These results are consistent with studies according to which moral norms are distinct from other types of norms in several aspects (Turiel, 1983). People cognitively treat moral rules much in the way that they do scientific facts (Goodwin & Darley, 2008). Hence,

moral norms are likely to be primarily represented as declarative knowledge. They do not seem to be conditioned habits that are triggered only in certain situations. Such loyalty may also indicate that learning a second culture would not change a person's tendency to adhere to the moral norms of his or her native culture. For example, although Saudis who eat mutton in Saudi Arabia may adapt to beef in the United States, they might have a more difficult time adapting to norms in moral domains, such as gender equality.

POLICIES: PROMOTING CROSS-CULTURAL COMPETENCE

The United States, like many other countries, faces challenges of globalization in the areas of commerce, civic society, and the military. The absence of linguistically and culturally flexible employees in business puts the country at a disadvantage in competitive global industries, a loss estimated in the billions every year. Likewise, U.S. law enforcement, education, and health care systems struggle with the challenges of cultural diversity in our communities. Ethnic minorities constitute half of the population in California, Hawaii, New Mexico, and Texas. By 2050, it is predicted that they will amount to half of the nation's population. In Iraq and Afghanistan, the Army's shortage of competent translators and cultural expertise led to substitutes that would be considered comic had their results not been so tragic. Soldiers were issued wallet-sized “smart cards” with some basics about Iraqi customs and phrases. When that proved insufficient, they developed a handheld device, the “Phraselator,” which, via pushing buttons, emitted phrases in Arabic and in other languages. Among such phrases were “Not a step further,” “Put your hands on the wall,” and “Everyone stop talking.” However, the device did not have the capacity to understand locals' replies (Mackey, 2004). Additional devices are currently being developed (e.g., Huhns, Vidal, Ruvinsky, Mendoza, & Langevin, 2006). While mechanized cultural expertise may help to bridge unexpected gaps, it also potentially sends a meta-message of disinterest in learning the local culture. Hence, human competence in the local culture would be a better solution.

Organizations like the Army and the Peace Corps that send their members overseas grapple with two practical questions. The first relates to selection; namely, what measurable characteristics predict who will be more able to learn a new culture? The second relates to training; what is the best way to prepare an employee in advance or accelerate their learning from experience once arrived.

Selection

Large applied literatures on expatriate managers and exchange students search for predictors of success. As it is difficult to measure cultural learning per se (see Mezas & Scandura, 2005), studies of expatriate outcomes measure more general outcomes such as cultural adjustment and work/school effectiveness. While these general outcomes reflect host-culture learning, they also reflect other processes as well. In a valuable review, Ward, Bochner and Furnham (2001) noted that acculturation is studied in three different ways that emphasize different parts of the process: cultural learning, stress and coping, and social identification. The most widely used criterion variable is cultural adjustment, which measures the degree of a person's comfort in various domains of the host culture (Black, Mendenhall, & Oddou, 1991). It has been found that cultural adjustment hinges on both the expatriate's environment (e.g., cultural distance, family adjustment, and organizational support) and the individual (e.g., the expatriate's personality traits and social competences).

The selection of students or employees for overseas roles is contingent on individual factors that can be assessed prior to departure. Organizations such as the Foreign Service and the Central Intelligence Agency (CIA) have long relied on tests of intellectual aptitude and declarative knowledge about the host country and its language (Rositzke, 1977). However, field studies have found that expatriate managers' IQ do not predict their intercultural adjustment (e.g., Ward, Fischer, Lam, & Hall, 2009). Our laboratory tests of experiential learning of foreign norms mirror this finding (Savani et al., 2017). An additional surprising discovery is that greater knowledge of the host country language is associated with better

interpersonal socialization but not general life adjustment or work adjustment (Shaffer, Harrison, & Gilley, 1999). The evidence suggests that aptitude for explicit reasoning and declarative knowledge about the host culture are less sufficient drivers of adjustment than organizations have assumed.

At the same time, studies of expatriate adjustment have found consistent evidence for the predictiveness of other individual differences, so-called "noncognitive" factors. Regarding personality dimensions, Mol, Born, Willemsen, and van der Molen (2005) found that *Conscientiousness* and *Extraversion* predict job performance and work adjustment, while *Agreeableness*, or social flexibility, predicts better interpersonal adjustment. By contrast, *Emotional Instability*, or reactivity, negatively predicts adjustment, both interpersonal and work-related. *Openness to Experience*, or curiosity versus the comfort with routine, predicts both work adjustment and job performance.

The question of *how* exactly these noncognitive personal factors shape expatriate adjustment remains unclear. *Conscientiousness*, *Extraversion*, and *Agreeableness*, as well as low *Emotional Instability*, push people toward engagement with various aspects of life and may therefore be correlated with a higher degree of learning. Alternatively, the observed correlations between the personality dimensions and adjustment may reflect effects of the personality dimensions on expatriates' stress levels rather than their ability to learn. Also, the positive effects of *Openness to Experience* likely reflect general learning rather than culture-specific learning, as this dimension correlates with many different kinds of learning.

While *Openness* is associated with reading and intellectual activities that yield declarative knowledge, it may also relate to procedural learning. Past studies have found that *Openness* is associated with implicit processing aptitude (Kaufman et al., 2010). One possible explanation is that this factor involves a wider focus of attention or greater interest in patterns. Kaufman et al. further found that implicit aptitudes were correlated with an overlapping personality measure, *Intuition*. Prior studies similarly found individual differences in intuition to be correlated with implicit aptitudes (Woolhouse & Bayne, 2000). This indicates that the "non-

cognitive” dimensions of individual difference may actually be cognitive in their consequences. These dimensions may underlie implicit cognition and procedural learning, even if they do not correlate with explicit cognition or declarative learning.

Training

In addition to selecting the right people for expatriate roles, organizations strive to accelerate their adjustment through training. Over the past 50 years, researchers and practitioners have developed training methods and tested their efficacy (Black & Mendenhall, 1990; Littrell, Salas, Hess, Paley, & Reid, 2006). A recent meta-analysis revealed positive correlations between training, on the one hand, and intercultural adjustment ($p = .12$; $p < .05$) and performance ($p = .23$; $p < .05$), on the other (M. A. Morris & Robie, 2001). Most training programs focus on declarative knowledge—the history, legal system, and social identities in culture. Thus, such lessons emphasize declarative knowledge. We suggest that by considering the differing roles of explicit declarative learning and implicit procedural learning mechanisms, current findings may be understood and current practices improved.

Declarative Knowledge

One of the most common forms of cultural training today is the presentation of abstract findings from cross-cultural research, such as differences across countries in value orientations (Hofstede, 2001; Schwartz, 1994). Cross-cultural psychology has held values to be the essence of culture. However this equation is increasingly questioned (M. W. Morris, 2014; Leung & Morris, 2015). Critiques have been based on the evidence of limited value consensus within countries (Fischer & Schwartz, 2011) and low predictiveness of values relative to perceived norms in many domains (Vauclair & Fischer, 2011; Vauclair et al., 2015). Regardless of the extent to which values drive a society's characteristic cultural tendencies, whether expatriates and immigrants must take on those values in order to adapt or adjust is another question altogether. Ward and Searle (1991) found that the value discrepancies of international students in New Zealand did not

predict their level of sociocultural adaptation. Furthermore, Kurman and Ronen-Eilon (2004) looked at the degree to which immigrants in Israel matched native Israelis in values or in social worldviews (Leung et al., 2002). They found social worldviews to be more important and concluded: “Values may help in understanding a culture, but they have less to do with concrete, mundane behaviors” (Kurman & Ronen-Eilon, 2004, p. 203).

In fact, training people about intercountry value differences may actually have negative consequences. One of the goals of cross-cultural research is to supplant popular stereotypes with “sophisticated stereotypes” (Osland & Bird, 2000). Stereotypes represent rule-like beliefs about social categories that exaggerate differences and thereby simplify, as well as organize, the world (Brewer, 1988). Lessons about cultural differences have the effect of legitimizing generalizations about cultural groups. For example, essentialist beliefs about culture increased among students who took a cultural psychology class (Fischer, 2011). One study found that students in cultural psychology class gained relative to a control group in cultural metacognition, but students with relatively low grades in the class increased their endorsement of erroneous cultural stereotypes (Buchtel, 2014).

The cultural assimilator method is a long-standing training method that imparts declarative knowledge. It trains newcomers to make culturally appropriate attributions for behavior by locals that are often puzzling to newly arrived foreigners (Fiedler, Mitchell & Triandis, 1971). This method was developed by first asking American expatriates to describe interactions with locals that illustrated a cultural clash. The themes in these “critical incidents” were then distilled into a set of prototypical scenarios of confusing behaviors by locals, along with multiple-choice options of explanations for locals' behaviors. One of these explanations was endorsed by locals, while the others were based on cultural stereotypes or misplaced American assumptions. Despite its widespread use, assimilator training has limited evidence of efficacy. It has helped expatriates improve in tests of the attributions they are designed to correct, but it has not improved the behavioral or emotional aspects

of adjustment (Bhawuk, 1998). Originally the assimilators were country-specific; eventually, the similarity in their content led to the development of a culture-general assimilator that presents trainees with 100 critical incidents covering 18 themes (Brislin, 1986). This general tool was found to be as effective as country-specific tools (Cushner, 1989). This finding suggests that rather than teaching the specifics of another culture, assimilators primarily train the learner not to project his or her own cultural patterns onto any other culture. Yet even the best students have trouble remembering 18 distinct lessons. Recent versions that target only a few themes, rooted in theories of individualism and collectivism, have proved superior in retraining attributions (Bhawuk & Brislin, 2000).

Procedural Knowledge

Another tradition of cultural training focuses on learning to perform host-culture practices rather than on learning abstract values and attributions (Harrison, 1992). Influenced by Argyle's (1969) work on the role of social skills in interpersonal interactions, the approach views adaptation as a process in which one learns a repertoire of culture-specific behaviors needed to negotiate interpersonal encounters in a cultural milieu (Bochner, 1972; Furnham & Bochner, 1982). Some of this research has focused on communication styles, including nonverbal communication, such as appropriate gaze patterns, postures, and facial expressions. (Gudykunst & Kim, 1984; Hammer, Gudykunst & Wiseman, 1978; Ward & Kennedy, 1999). The latter fluency also includes the situation-appropriate performance of ritualized routines such as greetings and partings. These interaction rituals play a critical role in the negotiation of relationships (M. W. Morris & Keltner, 2000). Culturally congruent nonverbal behaviors are more powerful than ethnicity in predicting interpersonal attraction (Dew & Ward, 1993). In fact, immigrants who are linguistically fluent but not fluent in the nonverbal norms of the host culture may face particularly unfavorable outcomes (Molinsky, 2005).

One training method that can foster procedural learning is behavioral modeling. For instance, a behavior modification program named Excell (Mak, Barker, Logan, & Mill-

man, 1999), which is based on social learning theory (Bandura, 1989), aims to instill culturally appropriate actions needed to negotiate everyday encounters, such as initiating contact, entering group discussions, and expressing disagreement. Each skill is initially modeled by an instructor, often someone with theater training. Subsequently, the trainees practice the skills repeatedly while receiving feedback, which includes proxemics, gestures, phrases, intonation and cadence, and suppressing heritage-culture habits. A six-session course has been found to improve social efficacy and social interaction skills (Mak & Buckingham, 2007). Unfortunately, such a course requires the availability of highly skilled trainers. Parts of the course, however, can be replicated with automated tools on smartphones, via the Internet, and on devices such as Nintendo Wii, which use sensors, and face and voice recognition (Lane et al., 2008; for a review, see Laarmarti, Eid & Saddik, 2014).

While behavioral modification engages procedural learning mechanisms to some extent, other methods have shown even greater potential. Among them are experiential methods, such as field visits to the host culture or realistic simulations of the host culture (Brislin & Yoshida, 1994). While visits to a far-away country may be prohibitively expensive, visits to local immigrant neighborhoods may offer similar value as long as the participant is required to behave according to local norms, which is not always the case. Another approach is to establish working relationships, such as long-distance Skype collaborations, with host-country nationals. Expatriate adjustment literature has long found that interpersonal adjustment is associated with sufficient contact with locals (Ward & Searle, 1991) and friendships with them (Furnham & Bochner, 1982). Furnham and Bochner proposed that the best predictor of the cultural learning speed is the number of host-culture friends, as assessed by a network survey. No doubt part of why more relationships and interactions with locals helps is the experiential feedback that conditions the expatriate to local interpersonal norms.

Simulations present another way to receive the experiential feedback needed for procedural learning. The U.S. armed forces have long used interpersonal simulation games, similar to the way they use war games to

teach artillery tactics. In traditional simulation, trained confederates play the trainee's counterparts in an intercultural interaction, then provide feedback (Mendenhall et al., 2004; Raybourn, 2007). While the game-like structure makes learning more enjoyable, it is limited to only a few trials. In addition, the feedback represents an extensive verbal debrief rather than a clear reward; therefore, it engages declarative learning rather than the longer lasting procedural learning, as brief feedback engages the implicit learning system, whereas detailed feedback engages in the explicit learning system (Maddox, Love, Glass, & Filoteo, 2008). Recently, the Army commissioned an interactive virtual simulation to train culturally appropriate behavior (Johnson, Vilhjalmsson, & Marsella, 2005; Johnson, 2007). The players "explore an Iraqi village, hear the sounds, speak to locals, and make gestures" (Lane, 2007, p. 3). Feedback about the person's behavior arises organically from the responses of the avatars, such as the avatars' facial expressions and actions. Feedback also comes in the more artificial form of a disembodied voice that gives corrective advice. Such a voice resembles an omniscient sergeant looking over the trainee's shoulder. While these forms of feedback may seem well designed, they engage declarative rather than procedural learning. If the goal is to impart specific competencies as habits, our studies suggest that the key to learning is accuracy feedback across many trials, as opposed to verbalized explanations.

To summarize, most cultural training has predominantly focused on declarative learning, in part because it's efficient to deliver. Several methods that engage procedural learning, such as behavioral modeling and experiential education, have been developed and tried by organizations with ample training budgets at their disposal. That said, such methods have not been deployed widely as they are too costly in terms of time and resources. However, new methods have become available through communications and game technologies. Skype interactions with trainers from the host culture may be a good way to instill some important basic competencies. Our findings suggest that procedural learning could be instilled efficiently in first-person simulation games that present repeated examples of types of situations that must be mastered.

Summary

We reevaluate in this final section the long-standing literatures relevant to the selection and training for intercultural roles. Expatriate adjustment studies have identified individual-difference antecedents that might be used for selection. However, cultural learning has remained an unmeasured black box in between the measured antecedents, such as personality traits, and aptitudes and general measures of outcome, such as cultural adjustment. The surprising lack of importance of IQ and, conversely, the importance of personality factors such as Openness, can be better understood when we consider the role of procedural learning. We suggest that assessors should focus on implicit abilities, metacognition, and related personality variables, such as Openness and Intuition, when they select people for intercultural roles that require intercultural expertise.

In the training literature, the predominant focus has been on declarative learning. Methods that target procedural learning have been dismissed as too resource-intensive. However, our analysis suggests that new technologies make the new variations of these tools more accessible. As future research on procedural versus declarative mechanisms involved in cultural learning seems promising, increased clarity on how these mechanisms work in different domains of learning can be expected. In light of these, better tailored instruments for assessment and tools for training can then be developed.

CONCLUSION

We have addressed in this chapter the question of how people become competent in a new culture. Past theories and practices have emphasized the primacy of declarative learning—that conscious competence precedes unconscious competence. However, we have argued for the primacy of procedural learning in domains such as the norms of interpersonal interactions. We then outlined a dual-process model that distinguishes two sequences—one in which declarative learning comes first, the other in which procedural learning comes first. We have proposed that these two processes of learning operate in different domains of cultural knowl-

edge and under different task conditions. We reviewed evidence that implicit aptitude plays a larger role in helping people learn the norms of a new culture than explicit aptitude, particularly under conditions that challenge the limitations of conscious reasoning, such as multiplicity of cues, fleetingness of feedback, or noisiness of feedback. We have explored how this new model lends credibility to the age-old premise that competence in one culture can interfere with that in another. Finally, we traced implications for applied organizational policies relevant to selection and training of personnel for roles in other cultures.

REFERENCES

- Abbe, A., Gulick, L. M. V., & Herman, J. (2008). *Cross-cultural competence in army leaders: A conceptual and empirical foundation*. Arlington, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.
- Amat, J. A., Bansal, R., Whiteman, R., Haggerty, R., Royal, J., & Peterson, B. S. (2008). Correlates of intellectual ability with morphology of the hippocampus and amygdala in healthy adults. *Brain and Cognition*, 66, 105–114.
- Anderson, J. R. (1982). Acquisition of cognitive skill. *Psychological Review*, 89, 369–406.
- Anderson, J. R. (1990). *Cognitive psychology and its implications* (3rd ed.). New York: Freeman.
- Ang, S., Van Dyne, L., Koh, C., Ng, K. Y., Templer, K. J., Tay, C., & Chandrasekar, N. A. (2007). Cultural intelligence: Its measurement and effects on cultural judgment and decision making, cultural adaptation, and task performance. *Management and Organization Review*, 3, 335–371.
- Argyle, M. (1969). *Social interaction*. New York: Atherton Press.
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44, 1175–1184.
- Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1–26.
- Bechara, A., Tranel, D., Damasio, H., Adolphs, R., Rockland, C., & Damasio, A. R. (1995). Double dissociation of conditioning and declarative knowledge relative to the amygdala and hippocampus in humans. *Science*, 269, 1115–1118.
- Benet-Martínez, V., Leu, J., Lee, F., & Morris, M. W. (2002). Negotiating biculturalism cultural frame switching in biculturals with oppositional versus compatible cultural identities. *Journal of Cross-Cultural Psychology*, 33, 492–516.
- Bennett, M. J. (1986). A developmental approach to training for intercultural sensitivity. *International Journal of Intercultural Relations*, 10, 179–196.
- Berry, J. W. (1974). Psychological aspects of cultural pluralism: Unity and identity reconsidered. *Topics in Culture Learning*, 2, 17–22.
- Berry, J. W. (1990). Psychology of acculturation. In J. Berman (Ed.), *Nebraska Symposium on Motivation: Cross-cultural perspectives* (Vol. 37, pp. 201–234). Lincoln: University of Nebraska Press.
- Bhawuk, D. P. (1998). The role of culture theory in cross-cultural training: A multimethod study of culture-specific, culture-general, and culture theory-based assimilators. *Journal of Cross-Cultural Psychology*, 29, 630–655.
- Bhawuk, D., & Brislin, R. (2000). Cross-cultural training: A review. *Applied Psychology*, 49, 162–191.
- Bhawuk, D. P., Sakuda, K. H., & Munusamy, V. P. (2008). Intercultural competence development and triple-loop cultural learning. In S. Ang & L. Van Dyne (Eds.), *Handbook of cultural intelligence: Theory, method, and applications* (pp. 342–355). Armonk, NY: Sharpe.
- Birman, D., Trickett, E., & Buchanan, R. M. (2005). A tale of two cities: Replication of a study on the acculturation and adaptation of immigrant adolescents from the former Soviet Union in a different community context. *American Journal of Community Psychology*, 35, 83–101.
- Black, J. S., & Mendenhall, M. (1990). Cross-cultural training effectiveness: A review and a theoretical framework for future research. *Academy of Management Review*, 15, 113–136.
- Black, J. S., Mendenhall, M., & Oddou, G. (1991). Toward a comprehensive model of international adjustment: An integration of multiple theoretical perspectives. *Academy of Management Review*, 16, 291–317.
- Blaisdell, A. P., Gunther, L. M., & Miller, R. R. (1999). Recovery from blocking achieved by extinguishing the blocking CS. *Animal Learning and Behavior*, 27, 63–76.
- Bochner, S. (1972). Problems in culture learning. In S. Bochner & P. Wicks (Eds.), *Overseas students in Australia* (pp. 65–81). Sydney, Australia: University of New South Wales Press.
- Brett, J., Behfar, K., & Kern, M. C. (2006). Managing multicultural teams. *Harvard Business Review*, 84, 85–91.
- Brewer, M. B. (1988). A dual process model of impression formation. In T. K. Srull & R. S. Wyer, Jr. (Eds.), *Advances in social cognition* (Vol. 1, pp. 1–36). New York: Erlbaum.
- Brislin, R. W. (1986). A culture general assimilator: Preparation for various types of sojourns. *International Journal of Intercultural Relations*, 10, 215–234.

- Brislin, R. W., & Yoshida, T. (1994). *Intercultural communication training: An introduction* (Vol. 2). Thousand Oaks, CA: SAGE.
- Buchtel, E. E. (2014). Cultural sensitivity or cultural stereotyping?: Positive and negative effects of a cultural psychology class. *International Journal of Intercultural Relations*, 39, 40–52.
- Cantor, N., Mischel, W., & Schwartz, J. C. (1982). A prototype analysis of psychological situations. *Cognitive Psychology*, 14, 45–77.
- Chase, W. G., & Simon, H. A. (1973). Perception in chess. *Cognitive psychology*, 4(1), 55–81.
- Chua, R. Y., Morris, M. W., & Mor, S. (2012). Collaborating across cultures: Cultural metacognition and affect-based trust in creative collaboration. *Organizational Behavior and Human Decision Processes*, 118, 116–131.
- Cowan, N. (2010). The magical mystery four: How is working memory capacity limited, and why? *Current Directions in Psychological Science*, 19(1), 51–57.
- Crandall, S. J., George, G., Marion, G. S., & Davis, S. (2003). Applying theory to the design of cultural competency training for medical students: A case study. *Academic Medicine*, 78, 588–594.
- Crook, A. E., & Beier, M. E. (2010). When training with a partner is inferior to training alone: The importance of dyad type and interaction quality. *Journal of Experimental Psychology: Applied*, 16, 335–348.
- Cushner, K. (1989). Assessing the impact of a culture-general assimilator. *International Journal of Intercultural Relations*, 13, 125–146.
- De Leersnyder, J., Mesquita, B., & Kim, H. S. (2011). Where do my emotions belong?: A study of immigrants' emotional acculturation. *Personality and Social Psychology Bulletin*, 37, 451–463.
- Dew, A. M., & Ward, C. (1993). The effects of ethnicity and culturally congruent and incongruent nonverbal behaviors on interpersonal attraction. *Journal of Applied Social Psychology*, 23, 1376–1389.
- Ekman, P., & Friesen, W. V. (2003). *Unmasking the face: A guide to recognizing emotions from facial clues*. Los Altos, CA: ISHK.
- Fiedler, F. E., Mitchell, T., & Triandis, H. C. (1971). The culture assimilator: An approach to cross-cultural training. *Journal of Applied Psychology*, 55, 95–102.
- Fischer, R. (2011). Cross-cultural training effects on cultural essentialism beliefs and cultural intelligence. *International Journal of Intercultural Relations*, 35, 767–775.
- Fischer, R., & Schwartz, S. (2011). Whence differences in value priorities?: Individual, cultural, or artifactual sources. *Journal of Cross-Cultural Psychology*, 42, 1127–1144.
- Fitts, P., & Posner, M. I. (1967). *Human performance*. Monterey, CA: Brooks/Cole.
- Flavell, J. H. (1979). Metacognition and cognitive monitoring: A new area of cognitive-developmental inquiry. *American Psychologist*, 34, 906–911.
- Fleming, S. M., & Dolan, R. J. (2012). The neural basis of metacognitive ability. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 367, 1338–1349.
- Fodor, J. A., & Pylyshyn, Z. W. (1988). Connectionism and cognitive architecture: A critical analysis. *Cognition*, 28(12), 3–71.
- Foerde, K., & Shohamy, D. (2011). The role of the basal ganglia in learning and memory: Insight from Parkinson's disease. *Neurobiology of Learning and Memory*, 96, 624–636.
- Frank, M. J., Seeberger, L. C., & O'Reilly, R. C. (2004). By carrot or by stick: Cognitive reinforcement learning in parkinsonism. *Science*, 306, 1940–1943.
- Frith, C. D. (2012). The role of metacognition in human social interactions. *Philosophical Transactions of the Royal Society of London B: Biological Sciences*, 367(1599), 2213–2223.
- Fu, J. H. Y., & Chiu, C. Y. (2007). Local culture's responses to globalization: Exemplary persons and their attendant values. *Journal of Cross-Cultural Psychology*, 38, 636–653.
- Fu, J. H. Y., Chiu, C. Y., Morris, M. W., & Young, M. J. (2007). Spontaneous inferences from cultural cues: Varying responses of cultural insiders and outsiders. *Journal of Cross-Cultural Psychology*, 38, 58–75.
- Furnham, A. F., & Bochner, S. (1982). Social difficulty in a foreign culture: An empirical analysis of culture shock. In S. Bochner (Ed.), *Culture in contact: Studies in cross cultural interaction* (pp. 161–198). Oxford, UK: Pergamon Press.
- Gans, H. J. (1973). *More equality*. New York: Pantheon.
- Gaw, K. F. (2000). Reverse culture shock in students returning from overseas. *International Journal of Intercultural Relations*, 24, 83–104.
- Glazer, N., & Moynihan, D. P. (1963). *Beyond the melting pot: The Negroes, Puerto Ricans, Jews, Italians and Irish of New York City*. Cambridge, MA: MIT Press.
- Goodwin, G. P., & Darley, J. M. (2008). The psychology of meta-ethics: Exploring objectivism. *Cognition*, 106, 1339–1366.
- Gudykunst, W. B., & Kim, Y. Y. (1984). *Communicating with strangers: An approach to intercultural communication*. New York: Random House.
- Gudykunst, W., & Kim, Y. (2003). Communicating with strangers: An approach to intercultural communication. In J. Stewart (Ed.), *Bridges not walls* (6th ed., pp. 429–442). New York: McGraw-Hill.
- Hall, E. T. (1983). *The dance of life: The other dimension of life*. Garden City, NY: Anchor Press.

- Hammer, M. R., Gudykunst, W. B., & Wiseman, R. L. (1978). Dimensions of intercultural effectiveness: An exploratory study. *International Journal of Intercultural Relations*, 2, 382-393.
- Harrison, J. K. (1992). Individual and combined effects of behavior modeling and the cultural assimilator in cross-cultural management training. *Journal of Applied Psychology*, 77, 952-962.
- Heine, S. J., & Lehman, D. R. (2004). Move the body, change the self: Acculturative effects on the self-concept. *Psychological Foundations of Culture*, 8, 305-331.
- Herskovits, M. (1938). *Dahomey: An ancient west African kingdom*. Evanston, IL: Northwestern University Press.
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations*. Thousand Oaks, CA: SAGE.
- Hong, Y. Y., Morris, M. W., Chiu, C. Y., & Benet-Martínez, V. (2000). Multicultural minds: A dynamic constructivist approach to culture and cognition. *American Psychologist*, 55, 709-720.
- Howell, W. S. (1982). *The empathic communicator*. Belmont, CA: Wadsworth.
- Huhns, M., Vidal, J., Ruvinsky, A., Mendoza, B., & Langevin, S. (2006, November). *Cultural tactical advisor for warfighters in the urban battlespace*. Paper presented at the proceedings of the 25th Army Science Conference, Orlando, FL.
- Johnson, W. L. (2007). Serious use of a serious game for language learning. *Frontiers in Artificial Intelligence and Applications*, 158, 67-74.
- Johnson, W. L., Vilhjálmsson, H. H., & Marsella, S. (2005). Serious games for language learning: How much game, how much AI? In C.-K. Looi, G. McCalla, & B. Bredeweg (Eds.), *Artificial intelligence in education: Supporting learning through intelligent and socially informed technology* (pp. 306-313). Amsterdam: IOS Press.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus & Giroux.
- Kamin, L. J. (1969). Predictability, surprise, attention and conditioning. In B. A. Campbell & R. M. Church (Eds.), *Punishment and aversive behavior* (pp. 279-296). New York: Appleton-Century-Crofts.
- Kaufman, S. B., DeYoung, C. G., Gray, J. R., Jiménez, L., Brown, J., & Mackintosh, N. (2010). Implicit learning as an ability. *Cognition*, 116, 321-340.
- Kitayama, S., Duffy, S., Kawamura, T., & Larsen, J. T. (2003). Perceiving an object and its context in different cultures: A cultural look at new look. *Psychological Science*, 14, 201-206.
- Kitayama, S., Markus, H. R., Matsumoto, H., & Norasakkunkit, V. (1997). Individual and collective processes in the construction of the self: Self-enhancement in the United States and self-criticism in Japan. *Journal of Personality and Social Psychology*, 72, 1245-1267.
- Knowlton, B. J., Ramus, S. J., & Squire, L. R. (1992). Intact artificial grammar learning in amnesia: Dissociation of classification learning and explicit memory for specific instances. *Psychological Science*, 3, 172-179.
- Knowlton, B. J., Squire, L. R., & Gluck, M. A. (1994). Probabilistic classification learning in amnesia. *Learning and Memory*, 1, 106-120.
- Kurman, J., & Ronen-Eilon, C. (2004). Lack of knowledge of a culture's social axioms and adaptation difficulties among immigrants. *Journal of Cross-Cultural Psychology*, 35, 192-208.
- Laamarti, F., Eid, M., & Saddik, A. E. (2014). An overview of serious games. *International Journal of Computer Games Technology*, 2014, 11-25.
- Lakin, J. L., & Chartrand, T. L. (2003). Using nonconscious behavioral mimicry to create affiliation and rapport. *Psychological Science*, 14, 334-339.
- Lane, H. C. (2007, July). *Metacognition and the development of intercultural competence*. Presented at the 13th international conference on Artificial Intelligence in Education, Los Angeles, CA.
- Lane, H. C., Hays, M. J., Core, M., Gomboc, D., Forbell, E., & Rosenberg, M. (2008). *Coaching intercultural communication in a serious game*. Presented at the 16th International Conference on Computers in Education, Taipei, Taiwan.
- Larkin, J. H. (1981). Enriching formal knowledge: A model for learning to solve textbook physics problems. In J. R. Anderson (Ed.) *Cognitive skills and their acquisition* (pp. 311-334). Hillsdale, NJ: Erlbaum.
- Leung, K., Bond, M. H., de Carrasquel, S., Munoz, C., Hernandez, M., Morakumi, F., . . . Singelis, T. M. (2002). Social axioms: The search for universal dimensions of beliefs about how the world functions. *Journal of Cross-Cultural Psychology*, 33, 286-302.
- Leung, K., & Morris, M. W. (2015). Values, schemas and norms in the culture-behavior nexus: A situated dynamics framework. *Journal of International Business Studies*, 46, 1028-1050.
- Littrell, L. N., Salas, E., Hess, K. P., Paley, M., & Riedel, S. (2006). Expatriate preparation: A critical analysis of 25 years of cross-cultural training research. *Human Resource Development Review*, 5, 355-388.
- Logan, G. D., & Crump, M. J. (2010). Cognitive illusions of authorship reveal hierarchical error detection in skilled typists. *Science*, 330(6004), 683-686.
- Lu, J. G., Quoidbach, J., Gino, F., Chakroff, A., Maddux, W. W., & Galinsky, A. D. (2017). The dark side of going abroad: How broad foreign experiences increase immoral behavior. *Journal of Personality and Social Psychology*, 112(1), 1.

- Mackey, R. (2004, December 12). The Phraselator. *The New York Times Magazine*, p. 86.
- Maddox, W. T., Ashby, F. G., & Bohil, C. J. (2003). Delayed feedback effects on rule-based and information-integration category learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 29, 650–662.
- Maddox, W. T., Ashby, F. G., Ing, A. D., & Pickering, A. D. (2004a). Disrupting feedback processing interferes with rule-based but not information-integration category learning. *Memory and Cognition*, 32, 582–591.
- Maddox, W. T., Bohil, C. J., & Ing, A. D. (2004b). Evidence for a procedural-learning-based system in perceptual category learning. *Psychonomic Bulletin and Review*, 11, 945–952.
- Maddox, W. T., Love, B. C., Glass, B. D., & Filoteo, J. V. (2008). When more is less: Feedback effects in perceptual category learning. *Cognition*, 108, 578–589.
- Mak, A. S., Barker, M., Logan, G., & Millman, L. (1999). Benefits of cultural diversity for international and local students: Contributions from an experiential social learning program (the EXCELL Program). In D. Davis, & A. Olsen (Eds.), *International education: The professional edge* (pp. 63–76). Sydney, Australia: IDP Education.
- Mak, A. S., & Buckingham, K. (2007). Beyond communication courses: Are there benefits in adding skills-based Excell™ sociocultural training? *International Journal of Intercultural Relations*, 31, 277–291.
- McCrae, R. R., Yik, M. S., Trapnell, P. D., Bond, M. H., & Paulhus, D. L. (1998). Interpreting personality profiles across cultures: Bilingual, acculturation, and peer rating studies of Chinese undergraduates. *Journal of Personality and Social Psychology*, 74, 1041–1055.
- McGlynn, S. M., & Schacter, D. L. (1989). Unawareness of deficits in neuropsychological syndromes. *Journal of Clinical and Experimental Neuropsychology*, 11, 143–205.
- Mendenhall, M. E., Stahl, G. K., Ehnert, I., Oddou, G., Osland, J. S., & Kuhlmann, T. M. (2004). Evaluation studies of cross-cultural training programs: A review of the literature from 1988 to 2000. In D. Landis, J. M. Bennett, & M. J. Bennett (Eds.), *Handbook of intercultural training* (3rd ed., pp. 129–143). Thousand Oaks, CA: SAGE.
- Menegas, W., Babayan, B. M., Uchida, N., & Watabe-Uchida, M. (2017). Opposite initialization to novel cues in dopamine signaling in ventral and posterior striatum in mice. *eLife*, 6, e21886. Retrieved from <http://doi.org/10.7554/eLife.21886>.
- Mezias, J. M., & Scandura, T. A. (2005). A needs-driven approach to expatriate adjustment and career development: A multiple mentoring perspective. *Journal of International Business Studies*, 36, 519–538.
- Miller, J. G., Bland, C., Källberg-Shroff, M., Tseng, C. Y., Montes-George, J., Ryan, K., . . . Chakravarthy, S. (2014). Culture and the role of exchange vs. communal norms in friendship. *Journal of Experimental Social Psychology*, 53, 79–93.
- Mishkin, M., Malamut, B., & Bachevalier, J. (1984). Memories and habits: Two neural systems. In G. Lynch, J. L. McGough, & N. M. Weinberger (Eds.), *Neurobiology of learning and memory* (pp. 65–77). New York: Guilford Press.
- Mol, S. T., Born, M. P., Willemsen, M. E., & Van Der Molen, H. T. (2005). Predicting expatriate job performance for selection purposes: A quantitative review. *Journal of Cross-Cultural Psychology*, 36, 590–620.
- Molinsky, A. (2005). Language fluency and the evaluation of cultural faux pas: Russians interviewing for jobs in the United States. *Social Psychology Quarterly*, 68, 103–120.
- Mor, S., Morris, M. W., & Joh, J. (2013). Identifying and training adaptive cross-cultural management skills: The crucial role of cultural metacognition. *Academy of Management Learning and Education*, 12, 453–475.
- Morling, B., Kitayama, S., & Miyamoto, Y. (2002). Cultural practices emphasize influence in the United States and adjustment in Japan. *Personality and Social Psychology Bulletin*, 28(3), 311–323.
- Morris, M. A., & Robie, C. (2001). A meta-analysis of the effects of cross-cultural training on expatriate performance and adjustment. *International Journal of Training and Development*, 5, 112–125.
- Morris, M. W. (2014). Values as the essence of culture: Foundation or fallacy? *Journal of Cross-Cultural Psychology*, 45, 14–24.
- Morris, M. W., & Keltner, D. (2000). How emotions work: The social functions of emotional expression in negotiations. *Research in Organizational Behavior*, 22, 1–50.
- Morris, M. W., Savani, K., & Fincher, K. (in press). Metacognition and cultural learning: Individual differences, error monitoring, and error-based updating. *Journal of Personality and Social Psychology*.
- Navas, M., García, M. C., Sánchez, J., Rojas, A. J., Pumares, P., & Fernández, J. S. (2005). Relative Acculturation Extended Model (RAEM): New contributions with regard to the study of acculturation. *International Journal of Intercultural Relations*, 29, 21–37.
- Newell, A., & Simon, H. A. (1972). *Human problem solving*. Englewood Cliffs, NJ: Prentice-Hall.
- Ng, K. Y., Van Dyne, L., & Ang, S. (2009). From

- experience to experiential learning: Cultural intelligence as a learning capability for global leader development. *Academy of Management Learning and Education*, 8, 511–526.
- Nissen, M. J., & Bullemer, P. (1987). Attentional requirements of learning: Evidence from performance measures. *Cognitive Psychology*, 19(1), 1–32.
- Nissen, M. J., Willingham, D., & Hartman, M. (1989). Explicit and implicit remembering: When is learning preserved in amnesia? *Neuropsychologia*, 27, 341–352.
- Osland, J. S., & Bird, A. (2000). Beyond sophisticated stereotyping: Cultural sensemaking in context. *Academy of Management Executive*, 14, 65–77.
- Perlow, L., & Weeks, J. (2002). Who's helping whom?: Layers of culture and workplace behavior. *Journal of Organizational Behavior*, 23, 345–361.
- Phinney, J. S., Berry, J. W., Sam, D. L., & Vedder, P. (2006). Understanding immigrant youth: Conclusions and implications. In J. W. Berry, J. S. Phinney, D. L. Sam, & P. Vedder (Eds.), *Immigrant youth in cultural transition: Acculturation, identity and adaptation across national contexts* (pp. 211–234). Mahwah, NJ: Erlbaum.
- Raven, J. C., & Court, J. H. (1998). *Raven's progressive matrices and vocabulary scales*. Oxford, UK: Oxford Psychologists Press.
- Raybourn, E. M. (2007). Applying simulation experience design methods to creating serious game-based adaptive training systems. *Interacting with Computers*, 19, 206–214.
- Reber, A. S. (1967). Implicit learning of artificial grammars. *Journal of Verbal Learning and Verbal Behavior*, 6, 855–863.
- Reber, A. S. (1969). Transfer of syntactic structure in synthetic languages. *Journal of Experimental Psychology*, 81, 115–119.
- Reis, H. T. (2008). Reinvigorating the concept of situation in social psychology. *Personality and Social Psychology Review*, 12, 311–329.
- Rositzke, H. (1977). *The CIA's secret operations: Espionage, counterespionage, and covert action*. New York: Reader's Digest Press.
- Ross, B. H., & Kilbane, M. C. (1997). Effects of principle explanation and superficial similarity on analogical mapping in problem solving. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 23, 427–440.
- Rumelhart, D. E., & McClelland, J. L. (Eds.). (1986). *Parallel distributed processing*. Cambridge, MA: MIT Press.
- Sanchez-Burks, J., Bartel, C. A., & Blount, S. (2009). Performance in intercultural interactions at work: Cross-cultural differences in response to behavioral mirroring. *Journal of Applied Psychology*, 94, 216–223.
- Savani, K., Morris, M. W., Fincher, K. M., Lu, G., & Kaufman, S. B. (2017). *Relationship between implicit learning processes and cultural learning*. Unpublished manuscript, Nanyang Technological University, Singapore.
- Savani, K., Morris, M. W., Naidu, N. V. R., Kumar, S., & Berlia, N. V. (2011). Cultural conditioning: Understanding interpersonal accommodation in India and the United States in terms of the modal characteristics of interpersonal influence situations. *Journal of Personality and Social Psychology*, 100, 84–102.
- Schacter, D. L. (1987). Memory, amnesia, and frontal lobe dysfunction. *Psychobiology*, 15, 21–36.
- Schmidt, A. M., & Ford, J. K. (2003). Learning within a learner control training environment: The interactive effects of goal orientation and metacognitive instruction on learning outcomes. *Personnel Psychology*, 56, 405–429.
- Schmidt, F. L., & Hunter, J. (2004). General mental ability in the world of work: Occupational attainment and job performance. *Journal of Personality and Social Psychology*, 86, 162–173.
- Schultz, W. (2013). Updating dopamine reward signals. *Current Opinion in Neurobiology*, 23, 229–238.
- Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, 50, 19–45.
- Shaffer, M. A., Harrison, D. A., & Gilley, K. M. (1999). Dimensions, determinants, and differences in the expatriate adjustment process. *Journal of International Business Studies*, 30, 557–581.
- Skinner, B. F. (1938). *The behavior of organisms: An experimental analysis*. New York: Appleton-Century.
- Sloman, S. A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin*, 119, 3–22.
- Stanovich, K. E., & West, R. F. (2008). On the relative independence of thinking biases and cognitive ability. *Journal of Personality and Social Psychology*, 94, 672–695.
- Tanner, K. D. (2012). Promoting student metacognition. *CBE-Life Sciences Education*, 11, 113–120.
- Thillmann, H., Küsting, J., Wirth, J., & Leutner, D. (2009). Is it merely a question of “what” to prompt or also “when” to prompt? *Zeitschrift für Pädagogische Psychologie*, 23, 105–115.
- Thomas, D. C., Elron, E., Stahl, G., Ekelund, B. Z., Ravlin, E. C., Cerdin, J. L., . . . Maznevski, M. (2008). Cultural intelligence: Domain and assessment. *International Journal of Cross Cultural Management*, 8, 123–143.
- Thomas, W. I., & Znaniecki, F. (1918). *The Polish peasant in Europe and America*. New York: Knopf.

- Thorndike, E. L. (1898). Animal intelligence: An experimental study of the associative processes in animals. *Psychological Monographs: General and Applied*, 2, 1–109.
- Thorndike, E. L. (1908). Memory for paired associates. *Psychological Review*, 15, 122–138.
- Tulving, E., & Schacter, D. L. (1990). Priming and human memory systems. *Science*, 247, 301–306.
- Turiel, E. (1983). *The development of social knowledge: Morality and convention*. Cambridge, UK: Cambridge University Press.
- Vauclair, C. M., & Fischer, R. (2011). Do cultural values predict individuals' moral attitudes?: A cross-cultural multilevel approach. *European Journal of Social Psychology*, 41, 645–657.
- Vauclair, C. M., Fischer, R., Ferreira, M. C., Guerra, V., Hossler, U., Karabati, S., . . . Spiess, E. (2015). What kinds of value motives guide people in their moral attitudes?: The role of personal and prescriptive values at the culture level and individual level. *Journal of Cross-Cultural Psychology*, 46, 211–228.
- Ward, C., Bochner, S., & Furnham, A. (2001). *The psychology of culture shock*. London: Routledge.
- Ward, C., Fischer, R., Lam, F. S. Z., & Hall, L. (2009). The convergent, discriminant, and incremental validity of scores on a self-report measure of cultural intelligence. *Educational and Psychological Measurement*, 69, 85–105.
- Ward, C., & Kennedy, A. (1999). The measurement of sociocultural adaptation. *International Journal of Intercultural Relations*, 56, 1–19.
- Ward, C., Landis, D., & Bhagat, R. S. (1996). *Acculturation handbook of intercultural training* (pp. 124–147). Thousand Oaks, CA: SAGE.
- Ward, C., & Searle, W. (1991). The impact of value discrepancies and cultural identity on psychological and sociocultural adjustment of sojourners. *International Journal of Intercultural Relations*, 15, 209–224.
- Wise, R. A. (2004). Dopamine, learning and motivation. *Nature Reviews Neuroscience*, 5, 483–494.
- Wood, W., & Rünger, D. (2016). Psychology of habit. *Annual Review of Psychology*, 67, 289–314.
- Woolhouse, L. S., & Bayne, R. (2000). Personality and the use of intuition: Individual differences in strategy and performance on an implicit learning task. *European Journal of Personality*, 14, 157–169.
- Young, A. W., de Haan, E. H., & Newcombe, F. (1990). Unawareness of impaired face recognition. *Brain and Cognition*, 14, 1–18.
- Zhang, S., Morris, M. W., Cheng, C. Y., & Yap, A. J. (2013). Heritage–culture images disrupt immigrants' second-language processing through triggering first-language interference. *Proceedings of the National Academy of Sciences of the USA*, 110, 11272–11277.