

CONSEQUENCES OF CULTURAL FLUENCY

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Cultural expertise implies knowing how things are done in everyday life (“pink on Valentine’s Day,” “obituaries celebrate and are mournful”) such that one’s conscious or nonconscious culture-based expectations typically match situations as they unfold. We synthesize cultural, neural prediction, and social cognition models to predict that a hallmark of this culture-based expectation-to-situation match is the experience of *cultural fluency* (and its opposite, *cultural disfluency*). Cultural disfluency arises as a result of a mismatch between culture-based conscious or nonconscious expectation and situation, cuing a switch in processing style from associative to rule-based systematic processing. Eight experiments demonstrate that these effects are cultural, found only among people who know the culture, and only if the cultural situation is cued. People are influenced by plate design on holidays they know, not ones they do not know. Effects are found during, but not after, cultural events and generalize beyond holidays to everyday events.

Keywords: culture; acculturation; situated cognition; fluency, metacognitive experience

We gratefully acknowledge financial support from the Humboldt Foundation (Oyserman) and from the University of Michigan Rackham Graduate School (Mourey) and the helpful comments we received from Norbert Schwarz, Michigan’s Culture and Self Lab group, and from participants in research seminars and colloquia at the Chinese University of Hong Kong (Robert Wyer), the Hong Kong University of Science and Technology (Rashmi Adaval), Hong Kong Polytechnic University of Hong Kong (Sylvia Chen and Michael Bond), the University of Leuven, Psychology (Batja Mesquita) and Marketing (Luk Warlop), Stanford University (Hazel Markus), and the University of California at Los Angeles (Phillip Goff).

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“Nothing evades our attention so persistently as that which is taken for granted.”
(Gustav Ichheiser, 1949, p. 1)

Imagine you attend a 4th of July picnic and the plates are decorated with stars and red and white stripes. Imagine you are shown photos of an American wedding and the bride wore white, or you read an American obituary and the family expresses grief and a planned memorial service. If you are an American or know American culture, these scenarios are not attention grabbing. After all, stars and red and white stripes are American flag symbols and would be expected on a patriotic holiday. What about a bride in white? Our Google search on the question “What percentage of American brides wear white?” yielded a range from 87% to 99%. Similarly, Googling the word “grief” in the U.S. turns up funeral home advertisements; funeral services and expressions of grief are clearly commonly associated (see also Long, 2004). Picnics and weddings are happy events, funerals not so much, but as Ichheiser notes in our opening quote, for Americans there is no need to think a lot about things that seem as obvious as patriotic themes on the 4th of July, the color white at weddings, or grief in obituaries.

However, just as knowing if the words in a melody have been replaced with other words requires knowing the original song, knowing what is to be taken for granted requires a certain prerequisite knowledge as well. This knowledge can be called cultural knowledge or cultural expertise; it is what new immigrants lack, what acculturation promises to provide, and the lack of which makes workgroups including members with diverse racial and ethnic backgrounds feel less smooth and more difficult to navigate (Milliken & Martins, 1996; Pelled, Eisenhardt, & Xin, 1999; Williams & O’Reilly, 1998). To understand what we mean, imagine that instead of the taken-for-granted versions described above, the patriotic holiday picnic involves plates decorated with jack-o-lanterns, the wedding photos show a bride in green, and the obituary is not solemn and grieving but instead irreverently lambasts the departed. The fundamentals—a picnic, a wedding, an obituary, are still there. What differs is that some piece of the taken-for-granted, implicitly or explicitly predicted situation is not what is actually observed. This mismatch with one’s culturally rooted but not necessarily conscious automatic predictive knowledge base increases the likelihood of switching gears to process information systematically.

In the current article we coin the terms *cultural fluency* and *cultural disfluency* to reflect the experience of culture as that which goes without saying. There is no need to think if things unfold as culturally expected, but people should be sensitive to small shifts from what is culturally expected and this should trigger more systematic processing. By building on culture, neural prediction, and social cognition foundations, we develop a novel prediction: that cultural fluency preserves associative reasoning while cultural disfluency cues a shift to systematic reasoning. Because under conditions of “mindlessness” people often accept choices as presented to them, this prediction has consequences for choice as well as for reasoning.

GETTING BY, GETTING ALONG: CULTURE AS EXPERTISE

First, with regard to culture, we start with the premise that humans need other humans to survive and that sticking together is both vital and problematic (Boyd & Richerson 1985; for a detailed discussion see Oyserman, 2011, 2015). Culture is a solution to the problems that arise from sticking together. These include managing relationships to minimize dangerous conflict, clarifying group boundaries so that resources can be shared with in-group members and out-group members can be exploited, and facilitating individual innovation so that the group can develop and not stagnate. Each human group develops its own particular way of handling these universals (distinguishing in- from out-group, fitting in and connecting with in-group, and innovating), and knowing the way things are done within one's own group can be described as cultural knowledge or cultural expertise. Cultural expertise resides in rich associative knowledge networks that facilitate knowing what will happen next—knowing how situations will unfold over time. In the current article, we focus on the implications this cultural expertise has on cognition and judgment.

In doing so, we take a step back from what has been a major thrust of psychological research on culture, which has been on using simplifying models to describe main themes in societies (e.g., contrasting individualism and collectivism; Hofstede, 2001). It is not that these simplifying models have not been useful. They have been quite useful in highlighting how values (Triandis, 1995), relational styles (Fiske, 1992), self-concepts (Markus & Kitayama, 1991), and cognitive processing (Nisbett, 2003) may cluster, whether data are based in contrasting samples based in country of origin or in immigration-acculturation (Hong, Morris, Chiu, & Benet-Martinez, 2000; LaFromboise, Coleman, & Gerton, 1993; Leung, Lee, & Chiu, 2013). Indeed, meta-analytic synthesis supports the notion that expressed values, relationality, and communicative and cognitive styles can be sorted using an individualism-collectivism contrast (for a meta-analytic review, see Oyserman, Coon, & Kimmelmeier, 2002).

At the same time, as is true for any simplifying model, these models shed light on some issues while casting others into shadow. The technique of contrasting using between-group comparisons has highlighted the possibility that societies differ but has not facilitated studying the ways in which culture serves more universal functions. By taking a step back to consider culture as a universal element of human group life, we are able to consider one of those shadowed domains, which is how living in a culture scaffolds associative knowledge networks that yield implicit predictions as to how everyday life should unfold. If things unfold as implicitly expected, there is no ambiguity, no question to be resolved, and hence no need to shift to systematic, rule-based processing. This scaffolding of associative processing should have predictable consequences, increasing likelihood of reasoning associatively rather than using rule-based strategies even if rule-based strategies are needed in culturally fluent situations (and the reverse in culturally

disfluent situations). Our model does not assume that predictions or shift from associative to systematic reasoning is necessarily explicit or conscious choice. Indeed the power of the cultural fluency model is that predictions are likely implicit and nonconscious, cultural fluency is experienced when things are right, even when people are unlikely to be able to say what that actually means.

To better articulate our prediction, we start with a classic working definition of culture, which is that being embedded in a culture means knowing everything one needs to know to function (Geertz, 1973). Having cultural expertise means knowing a way of doing things (e.g., Geertz, 1973; Smith, 2010) and knowing the pattern of perception accepted by one's group (e.g., Adler, 1975). In this way, cultural knowledge yields automatic predictions about what goes together, what to expect, and how things should unfold in everyday situations (see for example, Ivey, 1977). Cultural knowledge is often implicit and nonconscious: people have tacit knowledge that may or may not be the same as their explicit knowledge or their personal values, norms, or plans for action. Cultural knowledge is often discontinuous, depending on the specific group to which it is attached (Adler, 1975). Indeed, within anthropology, cultural knowledge is often described as a bodily or mental habitus just below conscious awareness (Gershon, 2012). The implication is that people know what is likely to happen and how to act whether or not they would themselves act that way and whether or not they could explicitly verbalize their prediction or the rationale for it (D'Andrade, 1987; Leung, Lee, & Chiu, 2013).

As popularized by the term "culture shock," all of this expertise is local; the shock occurs for people who move and find that their easy, automatic predictions about what to do and when to do it are no longer necessarily on target and unfolding situations do not quite match their culture-based expectations. Because contexts differ, associative knowledge networks, that are themselves context dependent, only facilitate making everyday life predictable if cued associations actually disambiguate experience (Adler, 1975; Furnham & Bochner, 1986; Oberg, 1960; Segall, Dasen, Berry, & Poortinga, 1999). As reported by minority and low-income students arriving on campus, Peace Corps volunteers and others, this lack of predictability is draining: people feel suspicious, "on edge," and vigilant to being cheated (Adler, 1975). Cultural expertise involves both content (e.g., what breakfast entails) and a set of procedures (e.g., what making a choice entails, Savani, Markus, Naidu, Kumar, & Berlia, 2010; how to accommodate others, Savani, Moris, Naidu, Kumar, & Berlia, 2011; how relationships work, Fiske, 1992). Indeed, individuals within a culture not only share norms for how to behave and what to expect but also share the implicit or explicit idea that these norms are in-group defining, the way "we" do things (Lehman, Chiu, & Schaller, 2004). Cultural knowledge networks, though composed of information that for the most part could be brought to conscious awareness, are not themselves explicitly accessible. As a result, though people might know that Valentine's Day goes with pink and might even say roses and valentines and cupcake icing are often pink on that day, they would not necessarily say that the color pink itself feels right on Valentine's Day.

MAKING PREDICTIONS ABOUT AND IN THE WORLD

NEURAL PREDICTION MODELS

Our formulation of cultural knowledge as rich associative webs including knowledge and procedures implies that culture should influence both mind and brain—how people think and the structures supporting these functions (for more detail, see Freeman, Rule, & Ambady, 2009; Oyserman, 2011). While the growing field of cultural neuroscience uses a contrasting frame (e.g., individualistic vs. collectivistic) to highlight neural differences (for a review, see Kitayama & Uskul, 2011), our cultural expertise formulation fits better with *neural prediction* models (e.g., Bar 2009; Friston, 2009; Friston & Stephan, 2007; Schultz & Dickinson, 2000). Neural prediction models suggest that the brain responds to environmental cues by readying for action, which it does by generating predictions about each to-be-entered situation based on associative networks. Even the perception of elementary information is rapidly linked to existing mental representations, activating associative networks and representations that most resemble the stimulus, if the stimulus is familiar (Bar, 2007, 2009; Barsalou, 2009). Indeed, prediction generation is often implicit and nonconscious (Friston, 2009), though it can be explicit and conscious (Bar, 2007; Gilbert & Wilson, 2007).

Prediction systems rely on continuous feedback about match or mismatch between implicitly or explicitly predicted and observed unfolding experience; this feedback is fed back to shift mental effort and allocated attention (e.g., Bar, 2009; Friston, 2009; Friston & Stephan, 2007; Schultz & Dickinson, 2000). Signal error is low if predicted and actual situation match, saving energy and limiting attention to the expected while efficiently husbanding brain resources to attend to novelties in the environment (Bar, 2009; Friston & Stephan, 2007; Schultz & Dickinson, 2000). In contrast, signal error is higher if mismatch occurs; shifting from lower to higher cortical levels facilitates updating predictions and attending to the unexpected stimulus. Mismatch yields information that the prediction was wrong and allows for learning (e.g., Bar, 2009; Fletcher & Frith, 2008; Friston, 2005; Schultz, Dayan, & Montague, 1997). Expertise in a domain makes for tight implicit or explicit prediction, yielding a neural response if the situation even slightly differs from expectation. Thus, for example, music experts showed neural responses to improvisations around a melody, but novices did not, presumably because they differed in the tightness of their prediction (Vuust et al., 2005). Prediction models demonstrate that neural activity tracks the task at hand: match between unfolding experience and prediction can increase higher-level neural activity while decreasing lower-level neural activity (Bar, 2009; Friston & Stephan, 2007). This neural response should be the case for cultural expertise as well (for a review, see Oyserman, Novin, Flinkenflögel, & Krabbendam, 2014). That is, cultural expertise should yield tight implicit predictions and shift cortical function if mismatch between unfolding experience and implicit prediction occurs. Cultural-mismatch implies ambigu-

ity—something is wrong but what is wrong is typically not immediately apparent, hence the need to switch to higher-level processing. Mismatch with prediction is not necessarily explicit and conscious and neither is the response, both are likely to be automatic.

SOCIAL COGNITION MODELS

Core findings from the social cognition literature are that people are highly sensitive to accessible information and quite insensitive to context as a source of this information, processing information associatively by default and switching to systematic, rule-based, processing if cued (Fiske, 2013; Gawronski & Bodenhausen, 2006; Kahneman, 2003, 2011; Schwarz, 2004; Strack & Deutsch, 2004). Unless alerted not to, people use easily accessible information and what it seems to imply as if it were sufficient, assuming that whatever comes to mind is relevant to the task at hand even if it comes to mind for extraneous reasons. Accessible information can include content or perceptual knowledge, perceptual or conceptual fluency, and lay theories about what such fluency implies (Bless & Schwarz, 2010; Higgins, 1998; Reber, Schwarz, & Winkielman, 2004; Winkielman, Schwarz, Fazendeiro, & Reber, 2003).

People switch from associative to systematic processing if the situation seems to require it (De Houwer, Gawronski, & Barnes-Holmes, 2013; Hassin, 2013; Sherman, Gawronski, & Trope, 2014). For example, systematic reasoning is more likely if bringing to mind or processing information is experienced as difficult or disfluent and hence potentially problematic, requiring more careful attention, rather than easy, fluent, and nonproblematic (Alter, Oppenheimer, Epley, & Eyre, 2007; Reber, Winkielman, & Schwarz, 1998; Schwarz, 2003, 2004, 2012; Schwarz et al., 1991). Across studies, processing fluency is manipulated conceptually (e.g., by requiring that people bring to mind many vs. few pieces of information) or perceptually (e.g., by providing information in difficult- vs. easy-to-read formats). Unless attention is drawn to the task-irrelevant source of fluency, these cued fluency experiences are used as if they are indicative of fluency from a source relevant to the judgment task (Reber, Schwarz, & Winkielman, 2004; Reber, Winkielman, & Schwarz, 1998; Winkielman, Schwarz, Reber, & Fazendeiro, 2003). What fluency is taken to mean is context specific, influencing judgments of truth, liking, familiarity, innovativeness, and expertise (Alter et al., 2007; Diemand-Yauman, Oppenheimer, & Vaughan, 2011; Labroo & Kim, 2009; Mantonakis & Galiffi, 2011; Song & Schwarz, 2008a, 2008b).

CULTURAL FLUENCY

Fluency studies to date have shown effects from what are presumably universal features of fluency, whether perceptual (e.g., color contrast) or conceptual (e.g.,

how difficult it is to come up with examples). We predict another universal feature: cultural fluency. What is different about cultural fluency however is that experiences of disfluency and fluency arising from mismatch and match with culturally grounded predictions are particularized, specific to the culture, time, and place in which they are embedded. Hence the influence of cultural fluency and disfluency on judgment should be particularized, influencing only those that know the culture.

We predict that culturally fluent experiences arise when a match exists between culturally grounded expectations and the unfolding situation, scaffolding a sense that all is “right,” that one understands what is going on and how to proceed. This implies no need to process systematically. In contrast, culturally disfluent experiences arise when a mismatch between culturally grounded expectations and the unfolding situation scaffolds a sense that something is awry in the immediate situation that one does not fully understand; so rule-based, systematic processing is necessary. People may or may not be consciously aware that they made a prediction and may or may not be able to report on whether the prediction (mis)matched the unfolding situation. Yet the result of a (mis)match should be visible to researchers as a shift in cortical function and, importantly for the current studies, also behaviorally visible to researchers as downstream use of associative versus systematic processing. This downstream consequence occurs because people are likely to be sensitive to the implications of their experience of cultural (dis)fluency but not to its source. Cultural disfluency should be used as if it is indicative of disfluency from a source relevant to the judgment task, resulting in a choice and cognitive style indicative of a “no” answer to the questions cued by the task (e.g., “do I want more of this,” “should I go with my gut”).

CURRENT STUDIES

In the current studies, we use holidays (Studies 1, 2, and 6), weddings (Studies 3, 4, and 5), and funerals (Studies 7 and 8) to test our prediction that cultural disfluency and fluency influence processing style and choice. Specifically, we predict that compared to cultural disfluency, cultural fluency preserves mindlessness, with implications for choice and reasoning. In choice situations such as choosing how much to put on one’s plate (Studies 1, 2) or whether one is interested in a small consumer product (Studies 3, 6), mindlessness should increase “yes” responses in situations such as ours (eating, Wansink, 2007; and single simple choices, Johnson et al., 2012). We test this prediction with weight of food on plate (Study 1), portion size (Study 2), self-rated likelihood of buying a shovel in winter (Study 3) or a USB solar charger or key fob that locates items (Study 7). In reasoning situations, mindlessness should result in associative processing even when systematic processing is more helpful. We test this prediction in four studies (Studies 4, 5, 6, and 8) using a variant of the Cognitive Reflective Task as our dependent variable and Valentine’s Day, Weddings, and Funerals as our cultural cues.

TABLE 1. Summary of Manipulation Check Results

Study	Manipulation Check Question	Fluent <i>M</i> (<i>SD</i>)	Disfluent <i>M</i> (<i>SD</i>)	<i>t</i> -test (<i>df</i>)
3	Traditionality of wedding photos	5.62 (1.01)	2.59 (1.40)	14.31 (130)
5	Traditionality of wedding photos	5.60 (.99)	2.45 (1.21)	14.33 (99)
7	Traditionality of funeral obituary	4.84 (1.45)	1.95 (1.43)	20.04 (339)
8	Traditionality of funeral obituary	4.35 (1.45)	1.71 (1.32)	10.41 (60)

Note. All *ps* < .001.

Our manipulations are subtle because we assume that this is how culture's effects operate: People rarely are alerted to culture as the cause of their action. Moreover heavy-handed manipulations yield unclear results because people notice and may attempt to correct for the influence attempt (Bargh, 2014). In each study, participants were probed for suspicion; none guessed the purpose of the studies.

We start with field experiments (Studies 1a and 1b) to provide an ecologically valid initial demonstration that cultural (dis)fluency influences choice. We follow up with controlled experiments with a goal of demonstrating that effects require cultural knowledge. We do so in Study 2 by varying timing and country sampled to contrast responses when associative networks related to a holiday are likely to be accessible and when they are not among people likely to have culturally grounded expectations about the holiday and those unlikely to. We do so in Study 3 by demonstrating that cultural fluency or disfluency experienced in one context has downstream consequences for choice in another context. In Studies 4 and 5 we document that cultural fluency in one context has downstream consequences for reasoning style in another. In Study 6 we document the time sensitivity of cultural fluency effects for cognitive style. In Studies 7 and 8 we document that effects on choice and reasoning style are not dependent on the cultural situation being positive. We provide a meta-analytic synthesis for our choice and processing style dependent variables to provide both a single weighted mean effect size and a confidence interval around this point estimate. In our situations, the mindless consumption choice is "yes" (Keil, 1984; Wansink, 2007).

Where relevant (weddings, Studies 3–5; funerals, Studies 7, 8), we asked about traditionality as a manipulation check (Table 1). Disfluent situations were less traditional. Traditionality itself did not mediate effects, however effects are stronger (as summarized in the meta-analysis section) if participants who failed the manipulation check (rating traditional weddings as nontraditional and the reverse) are excluded from analysis. In four studies (Chinese New Year, Study 2; Wedding, Study 5; and Funerals, Studies 7, 8), we included a measurement of positive and negative mood to test for the alternative explanation that effects are mediated by positive and negative mood (Table 2). Mood was not influenced by cultural fluency or disfluency primes and did not moderate or mediate effects. This ruled out

TABLE 2. Summary of Mood Results

Study (country)	Mood (scale reliability)	t-test (df)	p	Mediation 95% CI
2 (Hong Kong)	Positive ($\alpha = .78$)	$t(44) = 1.43$	.16	[-.04, .36]
	Negative ($\alpha = .90$)	$t(44) = 1.71$	.09	[-.39, .10]
2 (U.S.)	Positive ($\alpha = .80$)	$t(63) = -.54$	.59	[-.10, .04]
	Negative ($\alpha = .82$)	$t(63) = 1.14$	.26	[-.23, .04]
5 (U.S.)	Positive ($\alpha = .83$)	$t(99) = .88$	.38	[-.04, .01]
	Negative ($\alpha = .85$)	$t(99) = .51$	.61	[-.02, .02]
7 (U.S.)	Positive ($\alpha = .81$)	$t(399) = 1.02$	.31	[-.01, .06]
	Negative ($\alpha = .90$)	$t(399) = .96$	.34	[-.01, .02]
8 (U.S.)	Positive ($\alpha = .76$)	$t(60) = .93$	.36	[-.02, .05]
	Negative ($\alpha = .90$)	$t(60) = .17$	.87	[-.02, .03]

Note. Mood when all participants in each study are included. Preliminary analyses showed that one of the PANAS items (alert) did not correlate with the others in the Hong Kong samples so this item was dropped from analyses in all samples. Studies 5, 7, and 8 have manipulation checks and in these studies, dropping those who failed the manipulation check does not change results.

the alternative explanation that cultural fluency and disfluency effects are simply mood effects so this will not be further discussed.¹

With regard to sample size decisions, the available population for Studies 1a and 1b were the people who came to two picnics. In our subsequent studies, we used more standard experimental techniques with college students and adults (online samples). To have stable results, we planned to obtain about 40 usable responses per condition, stopping either when cells were filled or for time-sensitive studies, when time ran out, whichever occurred first. Sometimes we obtained quite a bit more than 40 per cell. This happened when a posting yielded a high number of respondents quickly. Other times, our posting took time and we closed data collec-

1. The full set of results is presented here. Study 2: plate color \times time (during vs. after Chinese New Year) for Chinese participants (positive mood, $F(1, 92) = 0.99, p = .32$; negative mood, $F(1, 92) = 2.26, p = .14$), plate color \times country (positive mood, $F(1, 107) = 0.46, p = .50$; negative mood, $F(1, 107) = 4.67, p < .05$; for Americans positive mood, $t(63) = -0.54, p = .59$; negative mood, $t(63) = 1.14, p = .26$; for Chinese positive mood, $t(44) = 1.43, p = .16$; negative mood, $t(44) = 1.71, p = .09$, red-bordered plate associated with trend-level more negative mood ($M = 2.50, SD = 1.30$) than black-bordered plate ($M = 1.91, SD = 1.03$). This is the opposite direction from a mood effect prediction and follow-up analyses showed that negative mood did not moderate, $F(1, 42) = 0.09, p = .76$, or mediate effects of plate condition (95% bias-corrected CI [-0.39, 0.10]; Preacher & Hayes, 2008). Study 5: Positive mood (95% CI [-0.02, 0.06]) and negative mood (95% CI [-0.06, 0.11]) did not mediate the relationship between wedding condition and error rate. Study 7: Obituary condition: full sample, positive mood, $F(1, 399) = 1.04, p = .31$; negative mood, $F(1, 399) = .93, p = .34$; excluding those who failed the manipulation check from analysis, positive mood, $F(1, 307) = 2.29, p = .13$; negative mood, $F(1, 307) = .02, p = .88$. Mediating effect of mood on the relationship between obituary condition and purchase likelihood (full sample, positive mood 95% CI [-0.01, 0.06]; negative mood 95% CI [-0.01, 0.02]; excluding those who failed the manipulation check, positive mood 95% CI [-0.01, 0.07]; negative mood 95% CI [-0.01, 0.02]). Test for indirect mediation (positive 95% CI [-0.01, 0.08]; negative 95% CI [-0.01, 0.02]). Study 8: Obituary condition: positive mood, $F(1, 60) = 0.87, p = .36$; negative mood, $F(1, 60) = 0.03, p = .87$. Effect on CRT performance: positive mood, $\beta = -0.02, t(60) = -0.54, p = .59$; negative mood, $\beta = 0.002, t(60) = .04, p = .97$, and on the relationship between obituary condition and CRT performance (positive mood 95% CI [-0.02, 0.05]; negative mood 95% CI [-0.02, 0.03]).

tion somewhat shy of the planned 40 per cell. We are not able to discern why the online panel showed this variability. In one study (Study 7), we obtained a much larger sample, some receiving one dependent variable and others a second, so that condition effects are shown for cell sizes closer to 100.

Age and gender were obtained in each study and did not influence choice results. Gender predicted reasoning task scores, a finding consistent with prior research using the same task (Frederick, 2005). Therefore, gender was used as a control in all analyses of the reasoning task.

4TH OF JULY AND LABOR DAY (STUDY 1)

To induce cultural fluency and disfluency, we manipulated design of the plate at a set of picnics. In Study 1a the plate either had no decoration (control) or matched the holiday theme (cultural fluency condition). In Study 1b the plate either had no decoration (control) or matched the “wrong” holiday theme (the upcoming rather than the current holiday), constituting the cultural disfluency condition. We predicted that the cultural fluency or disfluency engendered by the plate would carry over to the judgment task (which was in essence, “do I want some [more] of this?”) resulting in heavier weight (more food laden) plates. The reverse was predicted for cultural disfluency. As operationalized in Study 1 our prediction was people with holiday-themed plates would put more food on their plates than people with neutral or wrong-holiday plates.

SAMPLE AND PROCEDURE

American participants attended one of two picnic parties hosted by the first author’s mother, one on the 4th of July (Study 1a, $N = 26$) and the other on Labor Day (Study 1b, $N = 19$). Both holidays share a similar patriotic American theme. Given the logistics of a picnic, each picnic involved only two conditions and there was no sampling—all guests were included. On the 4th of July, the two conditions were a stars and stripes plate and a control (white) plate. On Labor Day, the two conditions were a Halloween-themed plate with pumpkins and bats and a control (white) plate. We used a Halloween plate since Halloween was the next holiday coming up (and involves eating and decorations), but is not the culturally fluent “right” plate on the patriotic Labor Day picnic. The first author’s mother hosted the picnics; she was blind to the hypothesis and simply invited whom she wanted and set up as usual: The event was outside but food was inside to reduce spoilage, problems with insects and so on. The first author purchased the plates and set them at the table. Plates were pre-randomized. Each participant took a plate from the plate stack and served him or herself, then was stopped by the first author, who was ostensibly interested in a catch-up chat. While chatting, the first author gently took the plate and discreetly slid it onto a digital scale hidden under a paper towel (weight in ounces was obtained). After all plates were weighed, participants

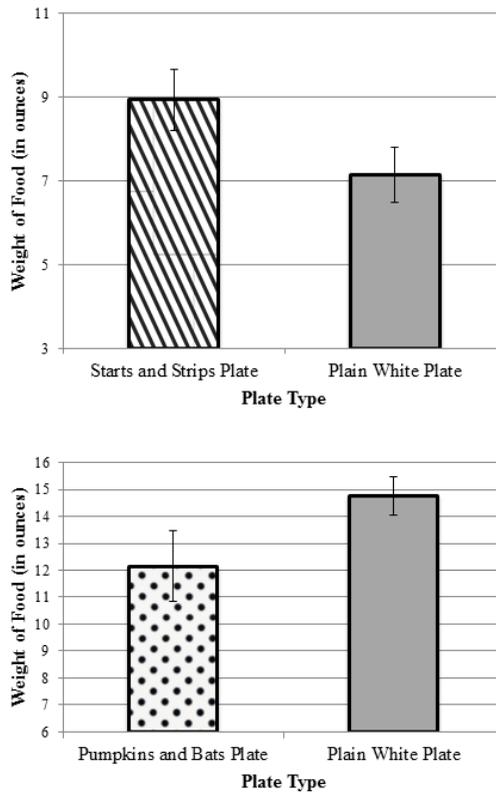


FIGURE 1. Study 1: Plate decorations influence the weight of food Americans put on their plates during holiday picnics. Top panel: The 4th of July. Bottom panel: Labor Day. Bars represent means and error bars are standard errors.

were informed of the study and asked for consent. Participants were surprised and amused. None reported paying attention to plate decoration. The format did not allow for individual funnel debriefing.

RESULTS AND DISCUSSION

Figure 1 presents means and standard errors. As can be seen, the weight of the food put on a stars and stripes plate on the 4th of July was 25% more than the weight of food put on a control plate, $t(24) = 1.83$, $p = .08$, $d = .72$; the weight of food put on a Halloween plate on Labor Day was 18% less than the weight of food put on a control plate, $t(17) = 1.69$, $p = .11$, $d = .79$. We combined the studies by standardizing the outcome to examine the overall effect across picnics, as shown in Figure 2. Again the pattern was as expected, $F(2, 41) = 3.17$, $p = .10$, partial $\eta^2 = .13$. The weight of food put on the culturally fluent plate ($M = 0.33$, $SD = 0.66$) was more than the weight of food put on the culturally disfluent plate ($M = -0.47$, $SD = 1.03$), $t(41) = 2.52$, $p < .02$, $d = .91$; the weight of food put on control plates was in between ($M = 0.001$, $SD = 1.10$).

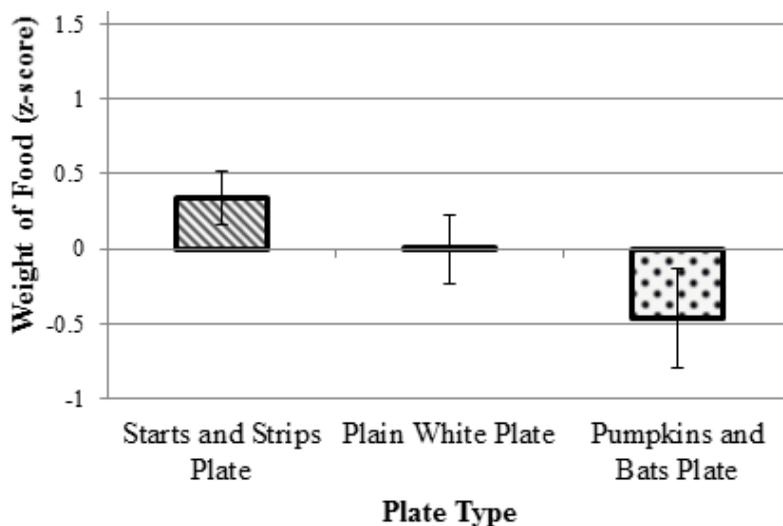


FIGURE 2. Study 1 combined: Plate decorations influence the weight of food Americans put on their plates during holiday picnics. Note. Standardized weight (z-scores) on the 4th of July and Labor Day picnics combined. Bars represent means and error bars are standard errors.

Our field experiment provided an ecologically valid test of cultural fluency but entailed the limitations of the real world: sample size was small and could only be used to provide an initial demonstration of our prediction, we could not rule out the possibility that effects were due to the plates themselves. Perhaps everyone would have eaten more on the stars and stripes plate no matter when it was used, maybe the plates changed people's mood. We begin to address these limitations in Study 2.

CHINESE NEW YEAR (STUDY 2)

The color red is representative of Chinese New Year, with red lanterns and spring scrolls in homes and streets and red-wrapped gifts, packages, and envelopes. We told students that they were testing a restaurant's offering, gave them a virtual plate (with a red border or not) and had them serve themselves, buffet-style. Given our prediction that cultural fluency protects associative processing and arises when a match exists between culturally grounded expectations and the unfolding situation, we expected that compared to the other conditions, students in the red plate condition would serve themselves more if they were themselves Chinese and it was Chinese New Year.

SAMPLE AND PROCEDURE

Undergraduates were tested using Qualtrics.com either during Chinese New Year (Hong Kong Chinese, $N = 46$; Americans, $N = 65$) or one month after Chinese New

Year (Hong Kong Chinese, $N = 50$). Hong Kong participants were recruited from the university's mass-mailing system and asked to complete an online questionnaire for a monetary reward of H.K. dollar \$50 (about \$6 U.S. dollars) that they collected at a later time point. American participants were part of a subject pool and completed the studies for course credit while seated at a computer terminal in a behavioral lab on campus. Participants were told that a nearby restaurant was testing its menu. They were asked to choose their desired serving size (1 = *very small*, to 9 = *very large*) from a buffet including entrées, side dishes, and desserts. Unbeknownst to them, the food items were presented in random order within category and they were randomly assigned to plate condition (red-bordered or black-bordered white plate). Participants then filled out the ten-item, 7-point response Positive and Negative Affect Scale (PANAS; 1 = *very slightly or not at all*, 7 = *extremely*) that has been demonstrated to be culturally sensitive (Thompson, 2007). American participants were then asked "How familiar are you with Chinese customs/holidays and/or Chinese culture?" (1 = *very unfamiliar*, to 7 = *very familiar*). Dietary information was then obtained as possible controls (these did not influence outcomes so were not included in final analyses).

RESULTS AND DISCUSSION

Figure 3 presents means and standard errors by condition. First, consider the two leftmost bars, which represent the effect of color on portion size for Chinese participants during Chinese New Year. As can be seen, Chinese participants took 18% larger portions if they were using a red-bordered rather than a black-bordered plate during Chinese New Year, $t(44) = 1.81$, $p = .08$, $d = .53$. Next, consider the two middle bars, which represent the effect of color on portion size for American participants during Chinese New Year, $t(63) = -0.42$, $p = .66$, and finally consider the two rightmost bars, which represent the effect of color on portion size for Chinese participants after Chinese New Year, $t(48) = -0.45$, $p = .66$. As can be seen, plate-border color did not matter when a particular color was not culturally fluent, that is for Americans during Chinese New Year, and for Chinese after Chinese New Year. When we included culture and timing (Americans during Chinese New Year, Chinese during Chinese New Year, and Chinese after Chinese New Year) and plate-border color (black, red) in planned linear contrasts, we found clear cultural fluency effects. Chinese participants given red-bordered plates during Chinese New Year took larger portions than other participants, $t(155) = 4.27$, $p < .001$, $d = .69$. This effect was consistent whether we looked at the contrast between portion size in the culturally fluent condition (Chinese participants in the red-bordered plate condition during Chinese New Year) and portion size in the other conditions during Chinese New Year, $t(107) = 3.98$, $p < .001$, $d = .77$ (first four bars), or portion size in the other conditions after Chinese New Year, $t(92) = 3.26$, $p < .001$, $d = .68$ (first two bars compared to last two bars).

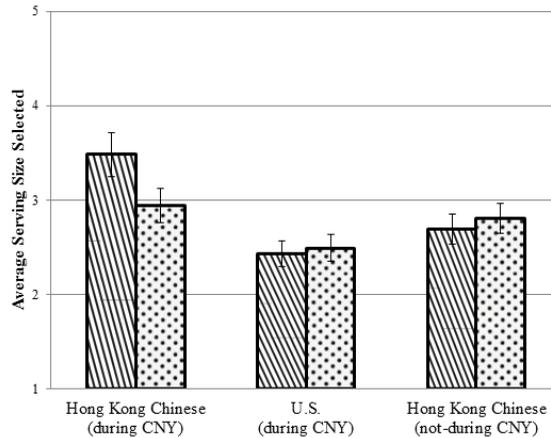


FIGURE 3. Study 2: Chinese New Year plate decoration influences the amount of food Chinese put on their plates during Chinese New Year (not after), Americans who do not know Chinese New Year are not affected. Note. Stripped bar is red-bordered plate, spotted bar is black-bordered plate. Left two bars are choices of Hong Kong (HK) Chinese during Chinese New Year (CNY). Middle two bars are choices of Americans during CNY. Right two bars reflect choices of HK Chinese participants one month after CNY. Bars represent means and error bars are standard errors.

American participants rated their familiarity with Chinese culture as low ($M = 2.40$, $SD = 1.68$ on a 7-point scale, 4 would be the midpoint); perhaps for this reason American participants took smaller portions on average than Chinese participants, $t(140) = -4.32$, $p < .001$. Familiarity neither significantly influenced portion size, $F(1, 60) = 1.81$, $p = .18$, nor moderated the effect of condition, $F(1, 60) = 0.41$, $p = .52$. Hence the extent of American's familiarity with Chinese culture was insufficient to make the relevant cultural knowledge (when is Chinese New Year and what color is to be expected on Chinese New Year) accessible.

Studies 1 and 2 demonstrate that people put more on their plates if the unfolding situation fits culturally grounded expectation, supporting the prediction that cultural fluency facilitates maintaining associative processing in the immediate context. Experienced cultural fluency was (mis)read as an affirmative answer to the implicit question, "Do I want some (more) of this?" It was not the red border itself; red borders only mattered in conjunction with the holiday for the people who likely had a relevant associative network. In addition to a larger sample size, Study 2 rules out a mood effect (see footnote 1 and Table 2) and addresses a limitation of Study 1, which is that the possibility of a non-culture contingent effect of plate decoration and demonstrates that the phenomenon in question occurs in Eastern as well as Western contexts. In both cultures, the mindless consumption choice is "yes, I will take some more" (see also Wansink, 2007). We now turn to different cultural cues and downstream consequences for choices other than eating.

TABLE 3. Adapted Cognitive Reflection Task (CRT) Questions

Questions	Gut, incorrect answers	Systematic, correct answers
A fishing rod and fishing bait cost \$11 in total. The fishing rod costs \$10 more than the bait. How much does the bait cost?	\$1.00	\$.50
If it takes 3 workers 3 minutes to make 3 toys, how long would it take 500 workers to make 500 toys?	500 minutes	3 minutes
An infectious bacteria found in the jungle has a nasty habit of doubling in quantity every day. If it takes 16 days to infect the entire human body, how long would it take for the bacteria to infect half the human body?	8 days	16 days

Note. We adapted responses so that our online panel could not simply look up the answers to the typically used CRT problems.

WEDDINGS (STUDIES 3–5)

The goals of the Wedding Studies are to demonstrate that cultural fluency effects are not limited to holidays and can carry over to choice and processing style in a subsequent task. Participants viewed pictures of a wedding. Then they completed a choice task or a cognitive task that allowed a direct test of the prediction that cultural (dis)fluency in one context will carry over to a subsequent context and hence be misread as an indication of whether to shift to systematic reasoning. The choice task was not an eating task, but choice of an unrelated consumer product to test the domain generalizability of the findings on mindless consumption under conditions of cultural fluency. The specific prediction as operationalized in the study materials was that seeing a culturally fluent wedding would increase willingness to purchase an unrelated consumer product and reduced use of systematic processing on a cognitive-reflective task.

SAMPLE AND PROCEDURE

Americans (Study 3, $N = 132$; Study 4, $N = 69$; Study 5, $N = 101$; paid mTurk online panel) were asked to rate the quality of eight photographs for a wedding website (1 = *extremely bad*, to 7 = *extremely good*). The photographs were taken from a wedding photographer's site and so were all of high quality and documented weddings that had in fact taken place. Unbeknownst to them, participants were divided into two groups. Half were randomized to view photographs in which the bride was in a long white dress, the groom was in a black tuxedo, the cake was a formal tiered wedding cake, and a wedding party accompanied the bride and groom (referred to as the white wedding dress condition). The other half of participants were randomized to view photographs in which the bride wore a green dress, the groom wore a purple tuxedo, the wedding cake was neither covered in white fondant nor formal, and there was no wedding party (referred to as

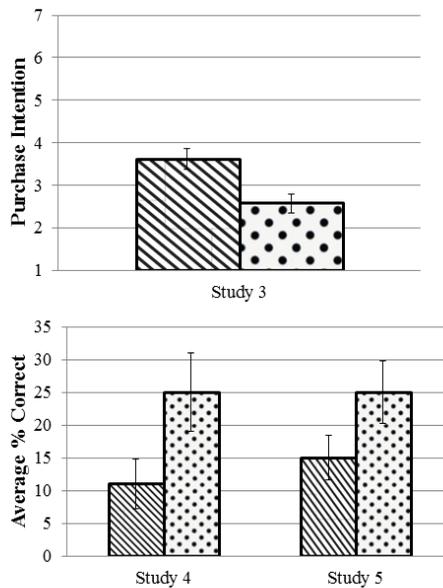


FIGURE 4. Studies 3–5: Wedding photographs influence Choice and Reasoning. Note. Participants saw photos with a bride in white, a groom in black, a tiered white wedding cake (stripped bar), or a bride in green, groom in purple, a tiered wedding cake with colorful decorations (spotted bar). Top panel: Intention to purchase a shovel (Study 3). Bottom panel: Cognitive Reflective Task percentage correct responses (Study 4, left and Study 5 right set of bars). Bars represent means and error bars are standard errors.

the green wedding dress condition). Following the rating task, participants were thanked and told to, “Click the arrow to proceed to the next task.”

On the next screen, participants completed an ostensibly unrelated task. This was the dependent variable. In Study 3 the dependent variable was a purchase choice: A picture of a shovel was presented and participants indicated their likelihood of purchasing it (“Below is an item available for purchase...How likely are you to buy this product?” 1 = *very unlikely*, to 7 = *very likely*). In Studies 4 and 5 the dependent variable was the three-problem Cognitive Reflective Task (CRT; Frederick, 2005). The problems (presented in full in Table 3) were adapted to ensure that participants had not previously encountered them; response and response latency were obtained. In Study 5 participants also completed the PANAS used in Study 2 and two items to test mediation: “When you think of your own wedding, how similar were the images of the wedding photos you saw previously to the wedding you imagine for yourself?” (1 = *very dissimilar*, 7 = *very similar*), “How easy was it to imagine your own wedding after seeing the wedding photos you saw?” (1 = *very difficult*, 7 = *very easy*). Age and gender were then obtained.

Manipulation Check. As a manipulation check, participants were asked how traditional the weddings they viewed were (1 = *very nontraditional*, to 7 = *very traditional*). The question was omitted from Study 4 due to a programming error. The manipulation worked: in the white wedding dress condition the weddings were

rated as significantly more traditional than in the green wedding dress condition (means and *SDs* are presented in Table 1).

RESULTS AND DISCUSSION

Study 3. As presented in Figure 4 (top panel), intention to purchase was 40% higher in the white wedding dress than the green wedding dress condition, $t(130) = 3.07, p < .003, d = .53$. Participants rated the photographs as above the midpoint in quality in both conditions, $t(130) = 1.40, p = .16$. Neither quality rating (95% CI [-0.32, 0.02]) nor rated traditionality of the wedding mediated the effect of condition on purchase intention (95% CI [-.70, .95]). The implication is that explicit awareness of traditionality did *not* drive the cultural fluency effect.

Studies 4 and 5. As presented in Figure 4 (bottom panel), systematic processing was more likely in the green than the white wedding dress condition (including gender as a covariate), resulting in an increase of 127% in correct answers in Study 4, $F(1, 65) = 3.86, p < .05, d = .48$, and of 66% in Study 5, $F(1, 98) = 3.28, p = .07, d = .34$. Looking at the pattern of errors, intuitive but incorrect responses were more common in the white than in the green wedding dress condition (Study 4, 68% vs. 52%, $\chi^2[1, N = 69] = 4.29, p < .03$; Study 5, 73% vs. 64%, $\chi^2[1, N = 101] = 1.84, p = .17$). Average response time was under 30 seconds and did not differ by condition (Study 4: white wedding dress, $M = 25.40, SD = 23.10$, green wedding dress, $M = 23.02, SD = 16.42$; $t[67] = 0.49, p = .63$; Study 5: white wedding dress, $M = 24.59, SD = 16.99$, green wedding dress, $M = 28.28, SD = 18.01$; $t[99] = 1.06, p = .29$). Quick response and no time difference by condition together imply that participants in the green wedding dress condition did not first solve incorrectly and then go back, check, and correct their answers.

Effects were not due to differences in photograph quality or mood, which did not differ by condition or traditionality ($t < 1$ in all comparisons). Participants rated the photographs as above the midpoint in quality and rated their mood as about mid-range in positivity and not negative. Traditionality rating did not mediate the effect of condition on CRT errors (95% CI [-0.05, 0.06]), suggesting explicit awareness of traditionality did *not* drive the effect.

We used similarity and ease as single items to test for mediation via a concomitant of fluency, which is ease of processing. Similarity between one's own wedding and the photographs was higher in the white ($M = 3.98, SD = 1.38$) than the green wedding dress condition ($M = 2.43, SD = 1.53$), $t(99) = 5.35, p < .001$. Ease of visualizing one's own wedding was also higher in the white ($M = 5.12, SD = 1.04$) than the green wedding dress condition ($M = 4.41, SD = 1.53$), $t(99) = 2.72, p < .001$. Similarity mediated the effect of condition on CRT performance (95% CI [-0.10, -0.01]), greater similarity to one's own wedding led to poorer CRT performance, $\beta = -.04, t(99) = -2.06, p < .04$, an effect that gets even stronger when participants who failed the manipulation check are excluded, $\beta = -.05, t(87) = -2.31, p < .02$. The effect of ease of visualization was not significant, $\beta = .04, t(99) = 1.69, p = .09$, and this effect remains nonsignificant when participants who failed the manipulation check are excluded, $\beta = .04, t(87) = 1.53, p = .13$. The similarity item was asked first so it is possible that had question order been reversed, an effect for ease may have

been found. Thus, we have evidence that part of the effect of cultural fluency on processing was due the fact that culturally fluent situations seem more similar to ones that one has experienced in the past.

Studies 1–3 provide converging evidence that people (mis)read cultural (dis)fluency as relevant to questions posed by choice tasks, “Do I want this?” Studies 1 and 2 show effects on choice in context, Study 3 shows that these effects carry over. Studies 4 and 5 show the predicted shift to systematic reasoning in culturally disfluent compared to culturally fluent situations. Study 6 tests the effect on systematic reasoning using a different cultural event.

VALENTINE’S DAY (STUDY 6)

In Study 6 we use the same cognitive task and a different holiday, Valentine’s Day. Valentine’s Day is celebrated in many countries, including the U.S. and Hong Kong, with a common color (pink) and date (February 14th). On Valentine’s Day, but not otherwise, people will experience pink, compared to not pink (e.g., white, black), as matched with culturally grounded prediction. That is, pink is the kind of color that one should expect on Valentine’s Day, otherwise, not. In Study 6 our cultural fluency prediction is operationalized as follows. On Valentine’s Day (February 14), but not otherwise (February 21) non-Valentine’s Day colors (e.g., black) would be culturally disfluent compared to Valentine’s Day colors (e.g., pink), as a result, people should process information less systematically when they see pink on Valentine’s Day.

SAMPLE AND PROCEDURE

Participants were undergraduates (Hong Kong Chinese, $N = 76$; Americans, $N = 73$) who completed an adapted three-item CRT presented online in black font with a white background and one of three colored borders (pink, white, or black) either on February 14th or February 21st. We recruited in Hong Kong and the U.S. as we did in Study 2.

RESULTS AND DISCUSSION

Initial analysis showed that the black and white color conditions did not differ from each other on, $t(142) = -1.15, p = .25$, or after, $t(142) = -0.42, p = .68$, Valentine’s Day and country did not moderate effects—though Hong Kong Chinese (43%, $SD = 0.34$) outperformed Americans (21%, $SD = 0.28$), $t(147) = 4.33, p < .001$. Therefore we conducted an ANCOVA with country and gender as covariates and Time (Valentine’s Day, not Valentine’s Day) and Color (pink, not pink) as factors, finding a significant interaction of Time and Color, $F(1, 142) = 5.33, p < .02$, partial $\eta^2 = .04$, $d = .60$. We decomposed this interaction by comparing pink and not-pink on Valentine’s Day, $t(142) = -2.07, p < .04$, $d = .35$, and a week later, $t(142) = 0.62, p = .54$, d

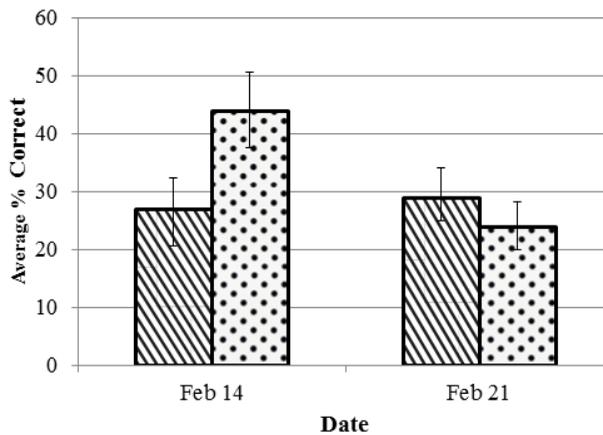


FIGURE 5. Study 6: Color influences reasoning on Valentine's Day, not the week after. Note. Stripped bar is percentage correct responses on the Cognitive Reflective Task presented with a pink border. Spotted bar is percentage correct responses on the Cognitive Reflective Task presented with a black or white border. Bars represent means and error bars are standard errors.

= .10. As presented in Figure 5, systematic processing was 51% more likely in the not-pink than the pink condition on Valentine's Day, an effect that disappeared after Valentine's Day. Looking at errors, the pattern was the same: on Valentine's Day intuitive but incorrect responses were (non-significantly) more common in the pink (55%) than in the not-pink condition (42%), $\chi^2(1, N = 191) = .78, p = .38$. A week later, when color was just color and not a signal of mismatch to culturally grounded expectations, errors in the pink (54%) and not-pink (59%) conditions reflected the intuitive but incorrect responses of associative reasoning, $\chi^2(1, N = 188) = .08, p = .78$. Average time to respond was under 30 seconds and did not differ by Color, $F(1, 142) = 0.03, p = .88$, Time, $F(1, 142) = 1.81, p = .18$, or their interaction, $F(1, 142) = 0.20, p = .65$. Time to respond did not mediate the effect of Color on performance on Valentine's Day (95% CI [-0.03, 0.06]).

Quick response, no time difference by condition, and no mediation by time together imply that participants did not first solve incorrectly and then go back, check, and correct their answers. Indeed, mismatch between unfolding situation and culturally grounded expectation predicted shift to systematic processing only when mismatch occurs (February 14th) and not otherwise (February 21st). Studies 7 and 8 address a final potential limitation, which is that while cultural fluency effects are not predicated on positivity, the unfolding situation was positive in Studies 1 to 6.

FUNERALS (STUDIES 7 AND 8)

Our choice prediction, as operationalized in the funeral studies, was that exposure to a culturally fluent as compared to a culturally disfluent obituary would increase willingness to purchase small consumer goods (e.g., a locator key fob). Our cogni-

tive processing prediction, as operationalized in the funeral studies, was that exposure to a culturally disfluent as compared to a culturally fluent obituary would increase systematic processing.

SAMPLE AND PROCEDURE

Americans (Study 7, $N = 401$; Study 8, $N = 62$; all paid online panel) were asked to read two versions of an obituary and select the one that “read better.” The two versions were identical except for the order in which the sentences were presented. Participants were paid for completing the study (\$.20). The computer program randomly assigned half of participants to a solemn, reverent obituary and the other half to receive an irreverent, flippant obituary. Full text is provided in the Appendix.

After choosing, participants were directed to an ostensibly unrelated task. In Study 7 the task was likelihood of purchasing (1 = *very unlikely*, to 7 = *very likely*) a product. Participants were shown either a solar-powered keychain phone charger that also provided USB charging or a fob locator that connected with one’s smart phone to locate lost items. In Study 8 the task was the CRT problems used previously, presented as a task for the U.S. Department of Education. Participants filled in their gender and age, the manipulation check, the 10-item PANAS scale, and two items to test mediation: “How similar was the funeral in the obituary you read to your own imagined funeral (1 = *very dissimilar*, 7 = *very similar*)?” “How easy was it for you to imagine your own funeral after reading the obituaries (1 = *very difficult*, 7 = *very easy*)?”

Manipulation Check. As a manipulation check, participants were asked how traditional the obituary they viewed was (1 = *very nontraditional*, to 7 = *very traditional*). The manipulation worked: in the solemn condition the obituary was rated as significantly more traditional than in the irreverent condition (means and *SDs* are presented in Table 1).

RESULTS AND DISCUSSION

Study 7. Willingness to purchase did not vary based on the product ($M_{\text{Charger}} = 4.80$, $SD = 1.78$; $M_{\text{Fob}} = 4.64$, $SD = 1.79$), $F(1, 399) = 0.72$, $p = .40$, so the analyses include both products. The pattern was in the expected direction, with willingness to purchase higher in the solemn ($M = 4.87$, $SD = 1.75$) than in the irreverent obituary condition ($M = 4.61$, $SD = 1.81$), $F(1, 399) = 2.06$, $p = .15$, $d = .15$. If participants who failed the manipulation check are excluded, the effect is significant (solemn, $M = 5.16$, $SD = 1.66$; irreverent, $M = 4.58$, $SD = 1.82$), $F(1, 307) = 8.28$, $p < .004$, $d = .33$ (Figure 6 top panel). This latter result holds whether the products are analyzed together or separately: Charger, $F(1, 185) = 4.68$, $p < .03$; Keychain fob, $F(1, 120) = 3.72$, $p < .05$.²

2. Separate from this condition effect, positive mood was associated with increased likelihood of purchase, $\beta = 0.21$, $t(307) = 2.82$, $p < .01$, replicating Rook (1987) and Shiv and Fedorikhin (2002).

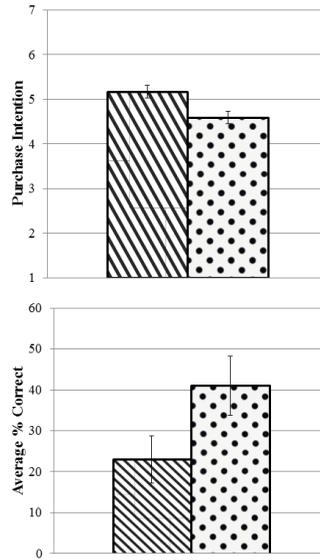


FIGURE 6. Studies 7 and 8: Obituary tone influences Choice and Reasoning. Note: Participants either read an obituary using a solemn tone, describing grieving and information about funeral arrangements (stripped bar); or an obituary using an irreverent tone, which described no grieving and no funeral arrangements (spotted bar). Top panel: Study 7 intention to purchase a keychain charger. Bottom panel: Study 8 percentage correct responses on the Cognitive Reflection Task. Bars represent means and error bars are standard errors.

Similarity between one's own imagined funeral and the obituary was higher in the solemn ($M = 3.98$, $SD = 1.38$) than the irreverent obituary condition ($M = 3.98$, $SD = 1.60$), $F(1, 399) = 178.63$, $p < .001$. Ease of visualizing one's own funeral was not influenced by condition (solemn, $M = 3.68$, $SD = 1.66$; irreverent, $M = 3.43$, $SD = 1.61$), $F(1, 399) = 2.34$, $p = .13$. Neither similarity (95% CI [-0.13, 0.19]) nor ease (95% CI [-0.01, 0.03]) mediated the effect of condition on purchase.³

Study 8. As presented in Figure 6 (bottom panel) irreverent funeral obituary condition increased systematic processing by 73% compared to the solemn obituary condition, $F(1, 60) = 4.36$, $p < .04$, $d = .46$ (gender included as covariate). The pattern of errors shows the same pattern with intuitive but incorrect responses more common in the irreverent (70%) than solemn obituary condition (55%) participants, $\chi^2(1, N = 62) = 5.18$, $p < .03$. Average response time was under 30 seconds. Though obituary condition influenced time to respond (solemn, $M = 22.39$, $SD = 13.32$; irreverent, $M = 15.94$, $SD = 5.71$), $t(60) = 2.48$, $p < .02$, the effect of obituary condition on time was the opposite of its effect on processing style and time did not mediate the effect of obituary on CRT performance (95% CI [-0.04, 0.07]). Quick response and no mediation by time together imply that participants in the irreverent obitu-

3. When participants who failed the manipulation check were excluded, effect of condition on similarity remained (solemn, $M = 3.76$, $SD = 1.69$; irreverent, $M = 3.30$, $SD = 1.59$), $F(1, 307) = 6.01$, $p < .02$, and an effect of condition on ease emerged (solemn, $M = 4.34$, $SD = 1.51$; irreverent, $M = 1.55$, $SD = 0.97$), $F(1, 307) = 391.51$, $p < .001$. As before, neither similarity (95% CI [-0.24, 0.27]) nor ease (95% CI [-0.02, 0.05]) mediated the effect of condition on purchase.

ary condition did not first solve incorrectly and then go back, check, and correct their answers.

Solemn obituary condition participants rated the obituary they saw as more similar to their own imagined funeral ($M = 3.51$, $SD = 1.65$) than irreverent obituary condition participants ($M = 1.74$, $SD = 1.06$), $F(1, 60) = 25.31$, $p < .001$. Solemn ($M = 3.71$, $SD = 1.49$) and irreverent condition ($M = 3.48$, $SD = 1.65$) did not differ in ease of imagining one's own funeral, $F(1, 60) = 0.32$, $p = .57$. Neither similarity (95% CI [-0.02, 0.24]) nor ease (95% CI [-0.01, 0.06]) mediated the effect of condition on accuracy.⁴

In spite of this limitation in not finding a mediation effect, Study 8 demonstrates that cultural fluency effects occur in negative situations, a culturally fluent (solemn) obituary increased willingness to purchase an unrelated product and reduces systematic reasoning.

META-ANALYTIC SUMMARY

Meta-analysis (Rosenthal, 1995) provides an overall effect, giving more weight to larger samples and a summary confidence interval for the effect of cultural fluency on choice and reasoning, as well as a test of heterogeneity of effects (Cochran's Q test of heterogeneity) across studies (Hedges & Olkin, 1985; Johnson & Eagly, 2000; Lipsey & Wilson, 2001). To do so we used Review Manager 5.3 software (RevMan, The Cochrane Collaboration, 2014).⁵ The comparisons used and effects by study and overall are summarized in Table 4. Overall weighted effect size for choice ($d = .28$, 95% CI [.12, .44]) and reasoning ($d = .47$, 95% CI [.25, .69]) were significant and not heterogeneous: choice, $Q(df = 3) = 6.39$, $p = .09$; reasoning, $Q(df = 3) = 0.82$, $p = .85$. Effects were in the same direction but of higher magnitude if participants who failed the manipulation checks in Studies 3 and 5 were excluded (choice, $d = .43$, 95% CI [.22, .64]; reasoning, $d = .50$, 95% CI [.26, .73]) and again were not heterogeneous: choice, $Q(df = 3) = 1.71$, $p = .63$; processing style, $Q(df = 3) = 0.68$, $p = .88$. In sum, experienced cultural (dis)fluency has meaningful small to moderate effects (using Cohen's, 1988, rule of thumb) on downstream choice and reasoning that do not appear to be dependent on the particular cultural event or task used. Examining weighted effect sizes is a reasonable strategy because effects are not heterogeneous across studies (Higgins, Thompson, Deeks, & Altman, 2003).

4. Though we asked the same questions in the wedding and funeral studies, in retrospect, imagining one's funeral and imagining one's wedding are not the same. Imagining one's own funeral is a standard mortality salience prime (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994) and is likely uncomfortable for most people, regardless of manipulation. Thus, we cannot really claim to have asked questions that would allow for a test of the mediating process in Study 8 the way that we were able to in Study 5.

5. For choice comparisons were Americans given a 4th of July or Halloween plate (Study 1), Hong Kong Chinese given a red-bordered or a black-bordered plate during Chinese New Year (Study 2), Americans who viewed white or green wedding dress photos (Study 3), and Americans who read a solemn or irreverent obituary (Study 7). For the cognitive style included comparisons were American adults who viewed white or green wedding dress photos (Studies 4, 5), American and Hong Kong Chinese students on Valentine's Day who completed the CRT with a pink or non-pink border (Study 6), and American adults who read a solemn or irreverent obituary (Study 8).

TABLE 4. Meta-Analytic Summary of The Effect of Cultural Disfluency and Fluency on Choice and Reasoning

Study	Dependent Variable (Choice)	Effect Size (<i>d</i>)	Lower CI	Upper CI
1	Amount of food on plate in ounces	0.91	0.02	1.80
2	Serving size of food selected	0.53	-0.07	1.13
3	Likelihood of buying a shovel	0.53	0.18	0.88
7	Likelihood of buying a charger/ fob locator	0.15	-.05	0.34
Weighted effect size		0.28	0.12	0.44
Cochran's Test for Heterogeneity		$Q(df = 3) = 6.39, p = .09$		
	Dependent Variable (Reasoning Style)	Effect Size (<i>d</i>)	Lower CI	Upper CI
4	CRT performance	0.48	-0.04	0.97
5	CRT performance	0.34	0.19	1.00
6	CRT performance	0.60	-0.06	0.73
8	CRT performance	0.46	-0.01	0.97
Weighted effect size		0.47	0.25	0.69
Cochran's Test for Heterogeneity		$Q(df = 3) = 0.82, p = .85$		

Note. Effect sizes when all participants in each study are included. Studies 4, 5, and 8 have manipulation checks. In these studies, excluding from analysis those who failed the manipulation check improves results, a difference that is marked in Study 8.

GENERAL DISCUSSION

We started with the prediction that culturally fluent experiences arise when a match exists between culturally grounded expectations and the unfolding situation, scaffolding a sense that all is “right,” that one understands what is going on and how to proceed. This implies no need to process systematically. In contrast, culturally disfluent experiences arise when a mismatch between culturally grounded expectations and the unfolding situation scaffolds a sense that something is awry in the immediate situation that one does not fully understand; so rule-based, systematic processing is necessary. Our predictions were supported in eight experiments with ten separate participant samples, two different types of dependent variables, and a variety of culture-based expectations. We tested our predictions during holidays (Studies 1, 2, 6), contrasting effects when it was and was not the holiday (Studies 2, 6). We also tested our predictions using culturally significant occasions (weddings, Studies 3–5; funerals, Studies 7, 8). Some experiments involved immersion in a cultural event and choice within the event: the holiday was taking place and participants were at the picnic (Study 1); other experiments involved less immersion: the holiday was taking place and participants chose from a virtual buffet (Study 2), or participants looked at wedding photos (Studies 3–5) or read an obituary (Studies 7, 8). In these less immersive experiments we also demonstrated that effects carried over to unrelated choices and judgments, including reasoning tasks

(Studies 4, 5, 6, and 8). We showed consistent effects on choice and on reasoning across each of these permutations.

For clarity of interpretation, we picked tasks in which the “mindless” choice would be to consume more (put more food on one’s plate, indicate willingness to buy a product) and choose an intuitive but wrong answer on a reasoning task. Effects are consistent across changes to possible sources of alternative explanation, ruling out alternative explanations such as one’s mood, valence of the event, or extraneous associations with the particular colors or other cues we used in our studies. Of course any one study might be explained in multiple ways but no alternative explanation holds across all studies and conditions. Effects are not only statistically significant but also meaningful in size with differences ranging from 18% to 127% that translate into a weighted mean effect size of .28–.47, small to moderate following Cohen’s (1988) rule of thumb. Moreover, although the studies differed slightly in detail and design, results are not due to differing hidden variables as statistical testing revealed no significant difference in heterogeneity among the studies included in either the choice decision or the cognitive processing meta-analysis.

We found that people put more food on their plates at holiday events in which decorations matched cultural expectations (Studies 1 and 2). They expressed more willingness to purchase a variety of unrelated products (a shovel in Study 3, a key chain charger or fob locator in Study 7) after viewing weddings and funerals that were a clearer match to cultural expectations than after viewing ones that were moderately incongruent with cultural expectations. In each case, the choice to take more fit a “go with the flow” associative reasoning style. To more directly demonstrate that it was reasoning style that was influenced, we also showed effects on a task set up to test use of systematic, rule-based processing style (a version of the Cognitive Reflection Task). People scored better on this task if the unfolding situation mismatched culturally grounded expectation. Scores were higher for participants not shown photographs of a wedding in which the bride wore white and the groom wore black (Studies 4 and 5), shown pink on Valentine’s Day (Study 6), and not asked to read a solemn obituary (Study 8).

Participants were either college students or adults in Hong Kong and the U.S., implying that effects are not limited to a particular age, life situation, or country. Effects were found only if the unfolding situation had cultural meaning for participants. Thus, effects are found only among people who know the culturally grounded expectation and only if the cultural situation is cued. During Chinese New Year, a clear match with culturally grounded expectation influenced Chinese participants in Hong Kong but not Americans in the U.S. who did not know about Chinese New Year and had no such culturally grounded expectation (Study 2). When it was not Chinese New Year, our Chinese New Year cue did not matter even for Hong Kong Chinese (Study 2). Americans are influenced by the patriotic plate decoration when at 4th of July and Labor Day picnics (Study 1) but not by the color red during Chinese New Year (Study 2). The color red influences Hong Kong Chinese during Chinese New Year, not after (Study 2). The same was true for our Valentine’s Day cue, which mattered on Valentine’s Day and not a week

later when it was not Valentine's Day (Study 6). Chinese and Americans reason less systematically on Valentine's Day if shown pink, but only during Valentine's Day, not a week later. Effects do not depend on whether the situation is positive (weddings) or not (funerals).

ADVANCING RESEARCH ON CULTURE'S CONSEQUENCES

Our research makes a number of contributions to cultural psychology. We focused on the downstream consequences of the match and mismatch between culturally grounded expectations and the situation as it unfolded on subsequent choice and reasoning. We demonstrated effects across two societies typically viewed as differing on the axes of individualism and collectivism (e.g., Oyserman, Coon, & Kemmelemer, 2002). In doing so, we advance research on culture's consequences in a number of ways. First, we demonstrate the predictive power of a different formulation of culture. Second, we demonstrate culture's influences on shifts from associative to systematic reasoning. Third, we provide a bridge to include a broader range of research in the field of cultural psychology, which has typically been framed in terms best suited to a between-country comparison.

Prior research regarding cultural effects on reasoning processes has been embedded in simplifying models of individualism and collectivism. This has been useful in demonstrating effects on reasoning seen as stemming from these differences by comparing results by country or region (e.g., Choi & Nisbett, 2000; Nisbett, 2003; Nisbett, Peng, Choi, & Norenzayan, 2001; Uskul, Kitayama, & Nisbett, 2008) or by priming individualistic and collectivistic cultural mindset across countries and regions (Oyserman & Lee, 2008a, 2008b; Oyserman, Sorensen, Reber, & Chen, 2009). What this research has not done, however, is demonstrate that within any culture people shift from associative to systematic reasoning depending on whether situations unfold in ways that are congruent or incongruent with culture-based prediction, a process we describe as cultural fluency and cultural disfluency.

We demonstrated that mismatches to implicit cultural expectations were enough to shift cognitive mindset from associative to systematic reasoning style. Effects were not predicated on whether participants rated the situation as traditional. Cultural fluency and disfluency effects are thus likely to be quite important in explaining why, within one's own society, associative processing is the norm, and a shift to systematic processing is more likely in times and places when things are off the predicted path.

A number of researchers have argued that people with deeper cross-cultural experience due to living in another society score better on creativity tasks especially when reminded of this experience (Leung & Chiu, 2010; Maddux & Galinsky, 2009). It is possible that such cross-cultural experience will also have effects on reasoning style because cross-cultural experience opens alternative possible predictions. This implies that any specific match or mismatch is more likely to be experienced as potentially fitting to *some* cultural script or schema so that in-

dividuals with deeper cross-cultural experience should be less likely to shift to systematic reasoning.

Finally, by focusing on the (mis)match between culture-based expectation and unfolding situation, we link back to literature on culture shock, a literature which highlighted the difficulties in moving (e.g., Adler, 1975). This literature includes a broader range of cultures than typically studied in cross-national research including military, social class, and workplace. We move the culture shock formulation forward by unpacking an aspect of what might be unsettling about moving, which is the risk inherent in not knowing whether one's culturally grounded predictions will match the unfolding situation. Lack of clarity means that it is difficult to learn from the situation or to know what will happen next, requiring a shift to systematic processing, which as detailed in the introductory sections on neural prediction and social cognition, is a costly strategy. Thus it might be that what is depleting in moving into a new culture is not a shift from individualism to collectivism but rather a shift from experiencing certainty to experiencing uncertainty in prediction. This means never being quite sure and so always having to process systematically. This likely reflects part of the difficulties experienced by low socioeconomic status and minority students entering predominantly higher socioeconomic status and White contexts such as higher education, as well.

ADVANCING AND INTEGRATION OF NEURAL PREDICTION AND SOCIAL COGNITION RESEARCH ON METACOGNITION

We studied a process central to neural prediction and social cognition models: the prediction-error process. By synthesizing these with a culture-as-situated cognition perspective (Oyserman, 2011), the current studies make a number of substantive contributions. Each is discussed next.

First, consider the finding that a mismatch between an unfolding situation and an implicit or explicit culture-based prediction yields a shift to systematic processing that carries over to the next unrelated judgment. According to neural prediction models, the brain readies for action through prediction processes that are hierarchical and cyclical: higher cortical levels signal predictions about what sensory input should be to lower cortical levels, which provide feedback as to whether predictions were correct (e.g., Friston, 2005). This feedback influences mental effort and allocated attention. If the prediction is needed for ongoing perceptive processes, then correct predictions reduce attention to the expected, freeing up resources to attend to novelties (Bar, 2009; Friston & Stephan, 2007; Schultz & Dickenson, 2000). However, if the prediction is needed for a task, then predictions directly guide actions and *correct* predictions increase attention to the task rather than the situation (e.g., Bar, 2009). Thus, neural prediction models highlight that whether match or mismatch yields higher or lower cortical function depends on the type of predictive situation encountered; our research shows that effects carry over to the next task.

Second, consider the finding that cultural disfluency results in a shift to systematic processing. This contributes to the research on effects of metacognitive disfluency because we show particularized rather than universal fluency and disfluency effects. Social cognition models assume that people are actively processing information about their social world, using their experiences and how they are interpreted to take action and make meaning (Fiske, 2013). However, rather than focus on a shift in cortical processing given match and mismatch from prediction to situation, social cognition models have focused on context effects on what comes to mind, including content, experience of thinking, and what that experience likely means (Bless & Schwarz 2010; Kahneman, 2011). In particular, this research has demonstrated that the theory brought to bear on the experience of thinking influences how experience and accessible content are utilized. In this literature, processing fluency (ease) and disfluency (difficulty) come from the nature of the task and what theory is brought to bear in interpreting what the experienced difficulty or ease implies comes from the question asked in context.

This literature demonstrates that people may interpret their own metacognitive experience of disfluency in a variety of ways depending on which theory is brought to bear. Experienced difficulty from having to bring many examples to mind or from reading text in difficult-to-read font is carried over to the task of answering the question. For example, how difficult the recipe is to make (Song & Schwarz, 2008b), whether the artist has talent, whether one is shy or assertive (Schwarz, 2012), whether one has studied enough to know the material (Miele & Molden, 2010), or how important something is (Labroo & Kim, 2009). In this research, what makes for fluency or disfluency is a universal feature of the task or stimuli. In our studies, we studied a distinct kind of fluency and disfluency that was not a feature of the task or stimuli itself, it was a feature of the cultural expertise participants brought to bear on their predictions.

Third, consider the findings that cultural disfluency carries over to non-related tasks. The results document that disfluency increases systematic processing. While culture is a meaning-making framework, cultural fluency theory makes predictions distinct from Neural Prediction and Metacognitive Experience of Fluency models. It also makes predictions distinct from Meaning Maintenance (MMM; Heine, Proulx, & Vohs, 2006; Proulx & Inzlicht, 2012) and Terror Management (Greenberg, Solomon, & Pyszczynski, 1997) models. Both argue that culture provides a way to create meaning and stave off dread. The distinct feature of the MMM model is that it predicts that people will substitute coherence in one part of their mental world for lack of coherence in another. These are interesting predictions, yet neither would predict that subtle shift away from culturally grounded not necessarily conscious predictions should increase systematic reasoning or that fit with culturally grounded not necessarily conscious prediction should increase acceptance of proffered choices.

LIMITATIONS AND FUTURE DIRECTIONS

Our studies raise a number of questions that deserve attention including questions about developmental processes, age and cohort effects, questions about individual differences, and possible generalizations across situations in which people are actors and those in which they are observers. Considering development, age, and cohort effects, we studied college students and middle-aged adults. It is possible that age may moderate our findings in a number of ways. While even very young children may have the same kinds of cultural expectations, testing this would require situations that are culturally relevant for young children and dependent variables that make sense to them. For example, American kindergarteners may know that red and green are colors associated with Christmas and may choose more candies in these colors when it is Christmas versus another holiday. Second, what constitutes match or mismatch may differ developmentally since executive functioning skills, including task switching, are still developing in very young children (Best & Miller, 2010). For young children, some tasks may simply be overwhelming given their cognitive demands.

On the other end of the spectrum, effects may also be moderated by age, as well. As they age, people become less able to inhibit incoming contextual information (Gazzaley et al., 2008; Hasher, Stoltzfus, Zacks, & Rypma, 1991) making them more vulnerable to some context effects on judgment and less vulnerable to others (Schwarz, 2003). This research shows that elderly participants are less able to filter out associations cued by context. The implication for our studies is that the moderate-sized effects we found might be even larger among elderly participants. Age may also have other effects that are better understood as period or cohort effects (Mason & Fienberg, 1985; Mason, Mason, Winsborough, & Poole, 1973; Rodgers, 1982). That is, effects may be larger in older participants not because of age but because they were socialized in eras in which cultural expectations were more clear (they experienced a "tighter" cultural context) or because their cohort experienced more abrupt changes (they experienced a "looser" cultural context). Both age and cohort effects might moderate cultural fluency effects.

With regard to individual differences, while we studied average effects across participants, it is possible that our effects would be influenced by individual difference variables. Consider, for example, differences in public versus private self-consciousness (Scheier, 1980) and differences in openness to new experience (McCrae, 1993, 1996). People who are higher in public self-consciousness pay more attention to what might be expected in the social situation. Prior research has shown participants higher in public self-consciousness shift their own attitudes to fit what they expect the situation to be like (Scheier, 1980) and are more susceptible to situational pressure for compliance (Froming & Carver, 1981). In our studies, there is no compliance pressure; however, the attentiveness of those higher in public self-consciousness to situational cues should yield larger effects since they will be more likely to notice if situations unfold in ways that (mis)match cultural

expectations. At the same time, the personality factor, openness to new experience, might moderate effects in either direction, increasing or decreasing effects. People who are more open to new experiences might pay attention to the possibility that something is new, increasing their sensitivity to whether a situation (mis)matches cultural expectations. Alternatively, people who are more open to new experiences might have less-specific cultural expectations in the first place, potentially as the result of a lifetime of willingness to experience new things. This would lead to less sensitivity to whether a situation (mis)matches cultural expectations.

With regard to generalizing across situations, we studied both situations in which participants were actors, immersed and experiencing events in real time (the picnic and buffet studies) and situations in which participants were observers considering events that had unfolded in the past (wedding photos, obituaries). Though it might be expected that the former would be more vivid than the latter, our meta-analysis did not show heterogeneity of effects across studies implying that there were not hidden variables moderating effects. Given that, future research could develop a broader taxonomy of everyday situations to test implications of cultural fluency and disfluency—for example in school settings, work places, and other situations. It might also be useful to consider subtle manipulation of actor and observer perspective—for example in visual materials—allowing for a more direct test of whether cultural fluency and disfluency effects are or are not stronger for actors compared to observers.

Our studies involve choice situations in which the mindless choice was to take more. The idea that mindlessness results in taking whatever is in front of oneself has been well-studied (e.g., Wansink, 2007) as have situations in which too many or too complex choices result in refusing to choose at all (Johnson et al., 2012). There should be choice situations in which the mindless choice is to take less, say “no” and refrain from consuming. Future research examining these situations would be useful.

We examined a number of possible mediators, ruling out the possibility that effects are simply due to mood or to the experience of the culturally fluent primes as more traditional. We found some evidence that effects are due in part to processing fluency in that the culturally fluent primes were closer to one’s own prior experience in the Wedding studies. Our predicted neural mechanism (increase in higher level processing) awaits future research to test.

IMPLICATIONS FOR POLICY AND INTERGROUP RELATIONS

The aforementioned qualifications aside, we believe that our studies make a strong empirical case that cultural disfluency has a practically significant impact on systematic processing. An obvious implication of this discovery is that institutions and institutional policies consider whether participants are likely to experience cultural fluency or disfluency and whether it is beneficial for them to process associatively or systematically. Across studies we provide consistent support for the prediction that mismatch with cultural expectations increases systematic reason-

ing. Whether that is something to be encouraged depends on the situation. Work groups with diverse members might increase experiences of disfluency among individual group members, which could improve quality of work if output depends on systematic reasoning. At the same time, these groups might want to build a set of common expectations to increase participants' fluent sense of comfort in the context.

Some things are as "American as apple pie." It is not that only Americans eat apple tarts; people do eat *tarte tatin* in Normandy, *apfel strudel* in Germany, and the British and Dutch have their apple pies as well. Rather a particular version of this treat, eaten in a certain way, is culturally fluent for Americans. The saying implies that things are the way they are supposed to be. For Americans, an apple pie served at the 4th of July is culturally fluent; the same apple pie is less culturally fluent if served as a special Easter treat, particularly without explanation. What allows for such automatic and quite tight predictions about how situations are likely to unfold is cultural expertise. In our studies, the consequences of cultural fluency versus disfluency were relatively benign, but cultural fluency and disfluency effects can be consequential and are not always benign. Cultural fluency can facilitate retention of an associative cognitive mindset when a shift to systematic mindset is needed and the reverse: cultural disfluency can facilitate a shift to systematic mindset and set up feelings of distrust and suspicion with potentially problematic consequences depending on the context. Cultural fluency and disfluency experiences are immediate and vivid because they are rooted in associative processing; this is both their strength—being in a cultural flow feels "right"—and their weakness—they are switched on automatically whether or not they are the right tool for the situation at hand.

REFERENCES

- Adler, P. S. (1975). The transitional experience: An alternative view of culture shock. *Journal of Humanistic Psychology, 15*(4), 13-23.
- Alter, A., Oppenheimer, D., Epley, N., & Eyre, R. (2007). Overcoming intuition: Metacognitive difficulty activates analytic reasoning. *Journal of Experimental Psychology: General, 136*, 569-576.
- Bar, M. (2007). The proactive brain: Using analogies and associations to generate predictions. *Trends in Cognitive Sciences, 11*(7), 280-289.
- Bar, M. (2009). The proactive brain: Memory for predictions. *Philosophical Transactions of the Royal Society B: Biological Sciences, 364*(1521), 1235-1243.
- Bargh, J. (2014). The historical origins of priming as the preparation of behavioral responses: Unconscious carry-over and contextual influences of real-world importance. *Social Cognition, 32*, 209-224.
- Barsalou, L. W. (2009). Simulation, situated conceptualization, and prediction. *Philosophical Transactions of the Royal Society of London: Biological Sciences, 364*, 1281-1289.
- Best, J. R., & Miller, P. H. (2010). A developmental perspective on executive function. *Child Development, 81*(6), 1641-1660.

- Bless, H., & Schwarz, N. (2010). Mental construal and the emergence of assimilation and contrast effects: The inclusion/exclusion model. *Advances in Experimental Social Psychology*, 42, 319-373.
- Boyd, R., & Richerson, P. J. (1985). *Culture and the evolutionary process*. Chicago: University of Chicago Press.
- Center for Evidence-Based Medicine, Brown University. (2013). Open Meta[Analyst] open source meta-analysis software. Available from http://www.cebm.brown.edu/open_meta.
- Choi, I., & Nisbett, R. (2000). Cultural psychology of surprise: Holistic theories and recognition of contradiction. *Journal of Personality and Social Psychology*, 79(6), 890-905.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. New York: Routledge Academic.
- D'Andrade, R. G. (1987). Modal responses and cultural expertise. *American Behavioral Scientist*, 31(2), 194-202.
- De Houwer, J., Gawronski, B., & Barnes-Holmes, D. (2013). A functional-cognitive framework for attitude research. *European Review of Social Psychology*, 24(1), 252-287.
- Diemand-Yauman, C., Oppenheimer, D., & Vaughan, E. (2011). Fortune favors the bold (and the italicized): Effects of disfluency on educational outcomes. *Cognition*, 118, 111-115.
- Fiske, A. P. (1992). The four elementary forms of sociality: Framework for a unified theory of social relations. *Psychological Review*, 99(4), 689-723.
- Fiske, S. T. (2013). *Social cognition: From brains to culture*. Thousand Oaks, CA: Sage.
- Fletcher, P. C., & Frith, C. D. (2008). Perceiving is believing: A Bayesian approach to explaining the positive symptoms of schizophrenia. *Nature Reviews Neuroscience*, 10(1), 48-58.
- Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives*, 19, 25-42.
- Freeman, J. B., Rule, N. O., & Ambady, N. (2009). The cultural neuroscience of person perception. *Progress in Brain Research*, 178, 191-201.
- Friston, K. (2005). A theory of cortical responses. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 360(1456), 815-836.
- Friston, K. (2009). The free-energy principle: A rough guide to the brain? *Trends in Cognitive Sciences*, 13(7), 293-301.
- Friston, K., & Stephan, K. E. (2007). Free-energy and the brain. *Synthese*, 159(3), 417-458.
- Froming, W., & Carver, C. (1981). Divergent influences of private and public self-consciousness in a compliance paradigm. *Journal of Research in Personality*, 15, 159-171.
- Furnham, A., & Bochner, S. (1986). *Culture shock: Psychological reactions to unfamiliar environments*. New York: Methuen.
- Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin*, 132, 692-731.
- Gazzaley, A., Clapp, W., Kelley, J., McEvoy, K., Knight, R., & D'Esposito, M. (2008). Age-related top-down suppression deficit in the early stages of cortical visual memory processing. *Proceedings of the National Academy of Sciences of the United States of America*, 105, 13122-13126.
- Gelfand, M., Raver, J., Nishii, L., Leslie, L., Lun, J., Lim, B., et al. (2011). Differences between tight and loose cultures: A 33-nation study. *Science*, 332, 1100-1104.
- Geertz, C. (1973). *The interpretation of cultures: Selected essays (Vol. 5019)*. New York: Basic Books.
- Gershon, I. (2012). *No family is an island: Cultural expertise among Samoans in diaspora*. Ithaca, NY: Cornell University Press.
- Gilbert, D., & Wilson, T. (2007). Propection: Experiencing the future. *Science*, 317, 1351-1354.
- Greenberg, J., Pyszczynski, T., Solomon, S., Simon, L., & Breus, M. (1994). Role of consciousness and accessibility of death-related thoughts in mortality salience effects. *Journal of Personality and Social Psychology*, 67, 627-637.
- Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). *Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements*. New York: Academic.
- Hasher, L., Stoltzfus, E. R., Zacks, R. T., & Rypma, B. (1991). Age and inhibition. *Journal of Experimental Psychology: Applied*, 1, 21-41.

- nal of Experimental Psychology: Learning, Memory, and Cognition*, 17, 163-169.
- Hassin, R. R. (2013). Yes it can: On the functional abilities of the human unconscious. *Perspectives in Psychological Science*, 8(2), 195-207.
- Hedges, L., & Olkin, I. (1985). *Statistical methods for meta-analysis*. Orlando, FL: Academic.
- Heine, S. J., Proulx, T., & Vohs, K. D. (2006). The meaning maintenance model: On the coherence of social motivations. *Personality and Social Psychology Review*, 10(2), 88-110.
- Higgins, E. T. (1998). The aboutness principle: A pervasive influence on human inference. *Social Cognition*, 16, 173-198.
- Higgins, J., Thompson, S., Deeks, J., & Altman, D. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal*, 327, 557-560.
- Hofstede, G. (2001). *Culture's consequences: Comparing values, behaviors, institutions and organizations across nations* (2nd ed.). Thousand Oaks, CA: Sage.
- Hong, Y.-Y., Morris, M., Chiu, C.-Y., & Benet-Martinez, V. (2000). Multicultural minds: A dynamic constructivist approach to culture and cognition. *American Psychologist*, 55, 709-720.
- Ichheiser, G. (1949). Misunderstandings in human relations: A study in false social perception. *American Journal of Sociology*, 55(2), 1-70.
- Ivey, A. E. (1977). Cultural expertise: Toward systematic outcome criteria in counseling and psychological education. *Personnel and Guidance Journal*, 55(6), 296-302.
- Johnson, B., & Eagly, A. (2000). *Quantitative synthesis of social psychological research. CHIP documents. Paper 13*. Retrieved from http://digitalcommons.uconn.edu/chip_docs/13.
- Johnson, E. J., Shu, S. B., Dellaert, B. G., Fox, C., Goldstein, D. G., Häubl, G., et al. (2012). Beyond nudges: Tools of a choice architecture. *Marketing Letters*, 23(2), 487-504.
- Kahneman, D. (2003). A perspective on judgment and choice. *American Psychologist*, 58, 697-720.
- Kahneman, D. (2011). *Thinking, fast and slow*. New York: Farrar, Straus, and Giroux.
- Keil, C. (1984). Music mediated and live in Japan. *Ethnomusicology*, 28, 91-96.
- Kitayama, S., & Uskul, A. K. (2011). Culture, mind, and the brain: Current evidence and future directions. *Annual Review of Psychology*, 62, 419-449.
- Labroo, A. A., & Kim, S. (2009). The "instrumentality" heuristic: Why metacognitive difficulty is desirable during goal pursuit. *Psychological Science*, 20, 127-134.
- LaFromboise, T., Coleman, H. L., & Gerton, J. (1993). Psychological impact of biculturalism: Evidence and theory. *Psychological Bulletin*, 114(3), 395.
- Lehman, D., Chiu, C.-Y., & Schaller, M. (2004). Psychology and culture. *Annual Review of Psychology*, 55, 689-714.
- Leung, A., & Chiu, C.-Y. (2010). Multicultural experience, idea receptiveness, and creativity. *Journal of Cross-Cultural Psychology*, 41, 723-741.
- Leung, A., Lee, S. L., & Chiu, C.-Y. (2013). Meta-knowledge of culture promotes cultural competence. *Journal of Cross-Cultural Psychology*, 44(6), 992-1006.
- Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis. Applied social research methods series, 49*. Thousand Oaks, CA: Sage.
- Long, S. O. (2004). Cultural scripts for a good death in Japan and the United States: Similarities and differences. *Social Science and Medicine*, 58, 913-928.
- Maddux, W., & Galinsky, A. (2009). Cultural borders and mental barriers: The relationship between living abroad and creativity. *Journal of Personality and Social Psychology*, 96, 1047-1061.
- Mantonakis, A., & Galiffi, B. (2011). *Does the fluency of a winery name affect taste perception?* Academy of Wine Business Research International Conference, Bordeaux, France.
- Markus, H., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, 98, 224-253.
- Mason, K., Mason, W., Winsborough, H., & Poole, K. (1973). Some methodological issues in cohort analysis of archival data. *American Sociological Review*, 38(2), 242-258.

- Mason, W., & Fienberg, S. (Eds.). (1985). *Cohort analysis in social research: Beyond the identification problem*. New York: Springer Verlag.
- McCrae, R. R. (1993). Openness to experience as a basic dimension of personality. *Imagination, Cognition and Personality, 13*(1), 39-55.
- McCrae, R. R. (1996). Social consequences of experiential openness. *Psychological Bulletin, 120*, 323-337.
- Miele, D., & Molden, D. (2010). Naive theories of intelligence and the role of processing fluency in perceived comprehension. *Journal of Experimental Psychology: General, 139*, 535-555.
- Milliken, F., & Martins, L. (1996). Searching for common threads: Understanding the multiple effects of diversity in organizational groups. *Academy of Management Review, 21*, 402-433.
- Nisbett, R. (2003). *The geography of thought: How Asians and Westerners think differently—and why*. New York: Free Press.
- Nisbett, R. E., Peng, K., Choi, I., & Norenzayan, A. (2001). Culture and systems of thought: Holistic versus analytic cognition. *Psychological Review, 108*(2), 291-310.
- Oberg, K. (1960). Cultural shock: Adjustment to new cultural environments. *Practical Anthropology, 7*(4), 177-182.
- Oyserman, D. (2011). Culture as situated cognition: Cultural mindsets, cultural fluency, and meaning-making. *European Review of Social Psychology, 22*, 164-214.
- Oyserman, D. (2015). Culture as situated cognition. In R. Scott (Ed.), *Emerging trends in the behavioral and social sciences* (pp. 1-20). New York: Wiley.
- Oyserman, D., Coon, H., & Kimmelmeier, M. (2002). Rethinking individualism and collectivism: Evaluation of theoretical assumptions and meta-analyses. *Psychological Bulletin, 128*, 3-72.
- Oyserman, D., & Lee, S. W. S. (2008a). Does culture influence what and how we think? Effects of priming individualism and collectivism. *Psychological Bulletin, 134*, 311-342.
- Oyserman, D., & Lee, S. W. S. (2008b). A situated cognition perspective on culture: Effects of priming cultural syndromes on cognition and motivation. In R. M. Sorrentino & S. Yamaguchi (Eds.), *Handbook of motivation and cognition across cultures* (pp. 237-265). San Diego: Elsevier.
- Oyserman, D., Novin, S., Flinkenflögel, N., & Krabbendam, L. (2014). Rethinking the culture-brain interface: Integrating culture-as-situated-cognition and neuroscience prediction models. *Culture and Brain, 2*(1), 1-26.
- Oyserman, D., Sorensen, N., Reber, R., & Chen, S. X. (2009). Connecting and separating mind-sets: Culture as situated cognition. *Journal of Personality and Social Psychology, 97*, 217-235.
- Pelled, L., Eisenhardt, K. M., & Xin, K. R. (1999). Exploring the black box: An analysis of work group diversity, conflict, and performance. *Administrative Science Quarterly, 44*, 1-28.
- Preacher, K., & Hayes, F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879-891.
- Price, R., & Bouffard, D. (1974). Behavioral appropriateness and situational constraint as dimensions of social behavior. *Journal of Personality and Social Psychology, 30*, 579-586.
- Proulx, T., & Inzlicht, M. (2012). The five "A"s of meaning maintenance: Finding meaning in the theories of sense-making. *Psychological Inquiry, 23*(4), 317-335.
- Reber, R., Schwarz, N., & Winkielman, P. (2004). Processing fluency and aesthetic pleasure: Is beauty in the perceiver's processing experience? *Personality and Social Psychology Review, 7*, 364-382.
- Reber, R., Winkielman, P., & Schwarz, N. (1998). Effects of perceptual fluency on affective judgments. *Psychological Science, 9*, 45-48.
- Review Manager (RevMan) [Computer program]. (2014). Version 5.3. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration.
- Rodgers, W. (1982). Estimable functions of age, period, and cohort effects. *American Sociological Review, 47*(6), 774-787.
- Rook, D. W. (1987). The buying impulse. *Journal of Consumer Research, 14*, 189-199.
- Rosenthal, R. (1995). Writing meta-analytic reviews. *Psychological Bulletin, 118*, 183-192.
- Savani, K., Markus, H., Naidu, N., Kumar, S., & Berlia, N. (2010). What counts as a

- choice? U.S. Americans are more likely than Indians to construe actions as choices. *Psychological Science*, 21(3), 391-398.
- Savani, K., Morris, M., Naidu, N., Kumar, S., & Berlia, N. (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(1), 84-102.
- Scheier, M. F. (1980). Effects of public and private self-consciousness on the public expression of personal beliefs. *Journal of Personality and Social Psychology*, 39(3), 514-521.
- Schultz, W., Dayan, P., & Montague, R. R. (1997). A neural substrate of prediction and reward. *Science*, 275, 1593-1599.
- Schultz, W., & Dickinson, A. (2000). Neuronal coding of prediction errors. *Annual Review of Neuroscience*, 23(1), 473-500.
- Schwarz, N. (2003). Self-reports in consumer research: The challenge of comparing cohorts and cultures. *Journal of Consumer Research*, 29, 588-594.
- Schwarz, N. (2004). Meta-cognitive experiences in consumer judgment and decision making. *Journal of Consumer Psychology*, 14, 332-348.
- Schwarz, N. (2012). Feelings-as-information theory. In P. Van Lange, A. Kruglanski, & E. T. Higgins (Eds.), *Handbook of theories of social psychology* (pp. 289-308). Thousand Oaks, CA: Sage.
- Schwarz, N., Bless, H., Strack, F., Klumpp, G., Rittenauer-Schatka, H., & Simons, A. (1991). Ease of retrieval as information: Another look at the availability heuristic. *Journal of Personality and Social Psychology*, 61(2), 195.
- Schwarz, N., Bless, H., Wänke, M., & Winkielman, P. (2003). Accessibility revisited. In G. V. Bodenhausen & A. J. Lambert (Eds.), *Foundations of social cognition: A Festschrift in honor of Robert S. Wyer, Jr.* (pp. 51-77). Mahwah, NJ: Erlbaum.
- Segall, M. H., Dasen, P. R., Berry, J. W., & Poortinga, Y. H. (1999). *Human behavior in global perspective*. Boston: Allyn and Bacon.
- Sherman, J. W., Gawronski, B., & Trope, Y. (Eds.). (2014). *Dual process theories of the social mind*. New York: Guilford.
- Shiv, B., & Fedorikhin, A. (2002). Spontaneous versus controlled influences of stimulus-based affect on choice behavior. *Organizational Behavior and Human Decision Processes*, 87, 324-370.
- Smith, E. R., & Semin, G. R. (2004). Socially situated cognition: Cognition in its social context. *Advances in Experimental Social Psychology*, 36, 53-117.
- Smith, P. (2010). Cross-cultural psychology: Some accomplishments and challenges. *National Academy of Psychology India Psychological Studies*, 55(2), 89-95.
- Song, H., & Schwarz, N. (2008a). Fluency and the detection of misleading questions. *Social Cognition*, 26, 791-799.
- Song, H., & Schwarz, N. (2008b). If it's hard to read, it's hard to do: Processing fluency affects effort prediction and motivation. *Psychological Science*, 19, 986-988.
- Strack, F., & Deutsch, R. (2004). Reflective and impulsive determinants of social behavior. *Personality and Social Psychology Review*, 8, 220-247.
- Thompson, E. R. (2007). Development and validation of an internationally reliable short-form of the Positive and Negative Affect Schedule (PANAS). *Journal of Cross-Cultural Psychology*, 38, 227-242.
- Triandis, H. C. (1989). The self and social behavior in differing cultural contexts. *Psychological Review*, 96, 506-520.
- Triandis, H. C. (1995). *Individualism and collectivism*. Boulder, CO: Westview Press.
- Uskul, A. K., Kitayama, S., & Nisbett, R. E. (2008). Ecocultural basis of cognition: Farmers and fishermen are more holistic than herders. *Proceedings of the National Academy of Sciences*, 105(25), 8552-8556.
- Vuust, P., Pallesen, K., Bailey, C., Van Zuijen, T., Gjedde, A., Roepstorff, A., & Østergaard, L. (2005). To musicians, the message is in the meter: Pre-attentive neuronal responses to incongruent rhythm are left-lateralized in musicians. *Neuro-Image*, 24, 560-564.
- Wansink, B. (2007). *Mindless eating: Why we eat more than we think*. New York: Bantam.
- Williams, K., & O'Reilly, C. (1998). Demography and diversity in organizations: A review of 40 years of research. In B. Staw & R. Sutton (Eds.), *Research in organizational behavior* (Vol. 20, pp. 77-140). Greenwich, CT: JAI.

- Winkielman, P., Schwarz, N., Fazendeiro, T., & Reber, R. (2003). The hedonic marking of processing fluency: Implications for evaluative judgment. In J. Musch & K. C. Klauer (Eds.), *The psychology of evaluation: Affective processes in cognition and emotion* (pp. 189-217). Mahwah, NJ: Erlbaum.
- Winkielman, P., Schwarz, N., Reber, R., & Fazendeiro, T. A. (2003). Cognitive and affective consequences of visual fluency: When seeing is easy on the mind. In L. Scott & R. Batra (Eds.), *Persuasive imagery: A consumer response perspective* (pp. 75-90). Mahwah, NJ: Erlbaum.

APPENDIX. OBITUARY TEXT USED IN STUDIES 7 AND 8

Participants in Studies 7–8 read the following instructions and then were presented with two versions of the same obituary in which the order of some of the sentences had been switched. The conditions are labeled solemn and irreverent in the article but there was no label in the materials presented. The directions were as follows:

Writing an obituary can be challenging for any family. Below are two versions of the same obituary. We are trying to decide which order of the sentences to use. Read the two passages and indicate which ONE of the TWO obituaries reads better to you. The [NEXT] button will appear after two minutes to allow you ample time to read the obituaries:

SOLEMN CONDITION

OPTION A: OBITUARY FOR REGINA SMITH

Regina Smith, born in 1929 in Arizona, left us on November 23, 2012. She will be met in the afterlife by her husband, John. She is survived by her daughters Jennifer, Rachel, and Sarah, and her sons John Jr. and Andrew; her grandchildren Jason, Alex, and Peter; and her great-grandchildren Abigail, Nicholas, and Stephanie.

Regina had many hobbies, made several contributions to society, and always shared kind words and deeds throughout her life. I speak for the majority of the family when I say her presence will be missed by many, several tears will be shed, and there will be much lamenting over her passing.

Her family will remember Regina and amongst ourselves we will remember her in our own way, which were mostly happy and enjoyable times throughout the years. We have many fond memories of her and we will think of those times. I know at the end of the day ALL of us will really miss what we had: a good and kind mother, grandmother, and great-grandmother. I hope she is finally at peace. As for the rest of us left behind, I hope this is the beginning of a time of healing and continuing on as family.

There will be a proper funeral service at Johnsons Funeral Home on Friday at 10:00 a.m. followed by burial at Green Meadows Cemetery so that we can come together in the end to see to it that her children, grandchildren, and great-grandchildren can say their goodbyes.

OPTION B: OBITUARY FOR REGINA SMITH

Regina Smith, born in 1929 in Arizona, left us on November 23, 2012. She will be met in the afterlife by her husband, John. She is survived by her daughters Jennifer, Rachel, and Sarah, and her sons John Jr. and Andrew; her grandchildren Jason, Alex, and Peter; and her great-grandchildren Abigail, Nicholas, and Stephanie.

Her family will remember Regina and amongst ourselves we will remember her in our own way, which were mostly happy and enjoyable times throughout the years. We have many fond memories of her and we will think of those times. I know at the end of the day ALL of us will really miss what we had: a good and kind mother, grandmother, and great-grandmother. I hope she is finally at peace. As for the rest of us left behind, I hope this is the beginning of a time of healing and continuing on as family.

Regina had many hobbies, made several contributions to society, and always shared kind words and deeds throughout her life. I speak for the majority of the family when I say her presence will be missed by many, several tears will be shed, and there will be much lamenting over her passing.

There will be a proper funeral service at Johnsons Funeral Home on Friday at 10:00 a.m. followed by burial at Green Meadows Cemetery so that we can come together in the end to see to it that her children, grandchildren, and great-grandchildren can say their goodbyes.

IRREVERENT CONDITION**OPTION A: OBITUARY FOR REGINA SMITH**

Regina Smith, born in 1929 in Arizona, left us on November 23, 2012. She will be met in the afterlife by her husband, John. She is survived by her daughters Jennifer, Rachel, and Sarah, and her sons John Jr. and Andrew; her grandchildren Jason, Alex, and Peter; and her great-grandchildren Abigail, Nicholas, and Stephanie.

Regina had no hobbies, made no contribution to society, and rarely shared a kind word or deed in her life. I speak for the majority of the family when I say her presence will not be missed by many, very few tears will be shed, and there will be no lamenting over her passing.

Her family will remember Regina and, amongst ourselves, we will remember her in our own way, which were mostly sad and troubling times throughout the years. We may have some fond memories of her and perhaps we will think of those times, too. But I truly believe at the end of the day ALL of us will really only miss what we never had: a good and kind mother, grandmother, and great-grandmother. I hope she is finally at peace with herself. As for the rest of us left behind, I hope this is the beginning of a time of healing and learning to be a family again.

There will be no service, no prayers, and no closure for the family she spent a lifetime tearing apart. We cannot come together in the end to see to it that her grandchildren and great-grandchildren can say their goodbyes. So I say here for all of us, GOODBYE MOM.

OPTION B: OBITUARY FOR REGINA SMITH

Regina Smith, born in 1929 in Arizona, left us on November 23, 2012. She will be met in the afterlife by her husband, John. She is survived by her daughters Jennifer, Rachel, and Sarah, and her sons John Jr. and Andrew; her grandchildren Jason, Alex, and Peter; and her great-grandchildren Abigail, Nicholas, and Stephanie.

Her family will remember Regina and amongst ourselves we will remember her in our own way, which were mostly sad and troubling times throughout the years. We may have some fond memories of her and perhaps we will think of those times, too. But I truly believe at the end of the day ALL of us will really only miss what we never had: a good and kind mother, grandmother, and great-grandmother. I hope she is finally at peace with herself. As for the rest of us left behind, I hope this is the beginning of a time of healing and learning to be a family again.

Regina had no hobbies, made no contribution to society, and rarely shared a kind word or deed in her life. I speak for the majority of the family when I say her presence will not be missed by many, very few tears will be shed, and there will be no lamenting over her passing. There will be no service, no prayers, and no closure for the family she spent a lifetime tearing apart. We cannot come together in the end to see to it that her grandchildren and great-grandchildren can say their goodbyes. So I say here for all of us, GOODBYE MOM.