

# Time is of the Essence? Investigating How Culturally-Based Perceptions of Time Affect Hindsight Bias for Task Completion

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## **Abstract**

Hindsight bias, known as the “Monday Morning Quarterback” syndrome, occurs when individuals feel they would have been able to predict the outcome to past events. This research examined if hindsight effects for personally-relevant task completion differs in monochronic cultures, which have a one-at-a-time approach to deadlines, and polychronic cultures, which are accustomed to working on many things at once. Based upon self-serving mechanisms, it was predicted and found that the former group would be more likely to show hindsight distortion. Participants made a list of tasks they planned to complete in a few weeks. After that time period, half the participants were asked to recall their number of listed tasks, and half provided recall estimates after noting how many tasks they had completed. As expected, relative to the polychronic group, the monochronic group’s retrospective judgments were biased in the direction of outcome information. Discussion focuses on applications and future research.

## **Introduction**

In today’s fast-paced world it is common for consumers to have a number of responsibilities that constrain their time. How many tasks and chores do you hope to complete in the coming days? Do you remember how many you planned to finish last week? Extant research suggests that recollection can be influenced by hindsight distortion, which is also referred to as the “knew it all along effect” or the “Monday Morning Quarterback Syndrome” (for reviews see Christensen-Szalanski & Willham, 1991; Guilbault, et al., 2004). Due to the bias, activities seem more predictable in hindsight than they were in foresight. For example, if a consumer planned to complete 10 tasks in a given week, but then actually only finished 5, he or she might recall planning to do a number biased in the direction of the actual outcome information, such as 6.

Since hindsight distortion enhances retrospective feelings of certainty it has been linked to reduced predictive accuracy (Hoch & Loewenstein, 1989) and exaggerated confidence (Bodenhausen, 1990; Bukszar & Connolly, 1988; Sharpe & Adair, 1993; Synodinos, 1986). The bias may lead individuals to feel they have accomplished a higher proportion on their to-do lists than they actually did, and allow them to feel overly confident about tackling future tasks. Hindsight effects are quite pervasive, persisting even when research participants have been warned not to show it (Fischhoff, 1977; Pohl & Hell, 1996; Wood, 1978). The display of the bias across disparate populations suggests that the information processes producing it are by-

products of adaptive learning (Pohl, et al., 2002) that might, for example, prevent our memory from overload (Hoffrage, et al., 2000).

Potentially deleterious effects of the bias have stimulated studies examining its causes. This research examines the impact of culture on hindsight effects. Past studies exploring international influences have been well executed but somewhat limited because they occurred in artificial lab conditions, which (a) may have not have fully evoked differences in social norms, and (b) do not have high applications to real life. For example, an experimental procedure that has traditionally shown strong hindsight effects entails presenting participants with almanac statements such as “Absinthe is (a) a precious stone or (b) a liqueur,” and then asking them to predict or to postdict (after being given the answer) the probability that one of the options is correct (Fischhoff, 1977). Using that format, Heine and Lehman (1996) found marginal to low differences in the bias between Japanese and Canadian students. Yet, although pondering almanac questions can be entertaining, it is not a typical part of everyday life and may therefore not have fully allowed participants’ to reveal cross-country differences. In contrast, this work examines if cultural discrepancies related to perspectives on time influence hindsight effects for the completion of personally relevant to-do lists.

## **Literature Review and Hypotheses**

### **Hindsight Bias**

In the article that introduced the hindsight bias Fischhoff and Beyth (1975) asked students to estimate the likelihood of various outcomes to then-President Nixon’s trips to Peking and Moscow. After the visits were completed the students were asked to recall or to reconstruct their original predictions; these after-the-fact estimates are referred to as “postdictions.” The recalled probabilities were generally higher than the original predictions for events believed to have occurred, and lower for those believed not to have happened.

In contrast to this within-subjects measurement, which is referred to as the “memory” design, other experiments have used a between-subjects approach called the “hypothetical” design. Bukszar and Connolly (1988) asked participants to read a managerial case that described a group’s decision to expand a company. One set of participants predicted the likelihood that the decision would result in a favorable or an unfavorable outcome. A different set of participants read about the same event but was additionally told that either a favorable or an unfavorable outcome resulted; these participants then made postdictions by estimating the a priori likelihood of occurrence of the two outcomes. As expected, participants who read outcome information, relative to those who did not, assigned higher likelihoods of occurrence to the particular outcome they received. While Bukszar and Connolly (1988) found strong hindsight bias in their between-subjects study, Fischhoff and Beyth (1975) reported both hindsight effects and a reasonable level of accuracy. As it may be easier for individuals to recall closely their own predictions than it is for them to estimate what they think they would have predicted, the within-subjects memory measure is a more conservative test of the bias.

Both cognitive and motivational components can influence retrospective estimates. The former were revealed in a study wherein participants ranged in age from 3 to 95 years old (Bernstein, et al., 2011). While the bias was pervasive, processing restrictions produced more in two groups. Preschoolers, whose limited capabilities prompted them to substitute the correct answer for their recalled answer, and older adults, who tended more to forget original predictions, exhibited more hindsight effects. Evidence of motivational influences comes from studies in which self-serving mechanisms that allow individuals to maintain a positive self view (Taylor & Brown, 1988) both enhanced and reduced hindsight effects (Mark & Mellor, 1991). In

decision making settings basking in the success of favorable outcomes encouraged hindsight effects (e.g., “I knew I would succeed”; Louie, 1999). When outcomes were unfavorable decision makers denying blame showed no bias (e.g., “I did not predict what would happen”), yet competitors witnessing the decision makers’ downfall did (e.g., “I knew they would blow it”; Louie, et al., 2000).

More recently, researchers have explored hindsight effects across cultural groups. Building upon Heine and Lehman’s (1996) almanac-statements study, Pohl, et al. (2002) explored the bias through 225 Internet participants from Asia, Australia, Europe and North America. The English- or Spanish-language stimuli consisted of almanac statements that were pre-established as difficult. The amount of hindsight bias was very similar for all but the Europeans, who showed smaller hindsight effects. That finding stemmed from German and Dutch participants who on average showed no hindsight bias because their predictions were better than those from the other groups. The researchers very honestly cautioned against drawing strong conclusions from their study because they themselves are German, and may have unintentionally chosen statements with which those participants were more familiar. In addition, they noted that the study was advertised highly on their campuses, and that the participant group may have included students who had participated in earlier experiments in which 85% of the almanac stimuli had already been presented. Finally, the use of English or Spanish may have self-selected participants who were more Western-oriented. Despite those concerns, their follow up study conducted in Germany and China revealed that the samples were discrepant in the almanac solutions that were deemed surprising; furthermore, surprise corresponded with lower hindsight effects. The researchers concluded that this finding, which is consistent with past research (Hoch & Loewenstein, 1989), attests to the universality of hindsight effects in low surprise settings.

Choi and Nisbett (2000) also studied cultural differences and unexpected outcomes. They compared Westerners’ use of analytical, attribute-based thinking with Easterners’ more holistic, dialectic approach to reasoning. Specifically, they hypothesized that East Asians, whose processing style makes them more accepting of apparent contradictions, would both experience less surprise and show greater hindsight effects. The researchers asked participants to read a scenario about a seminary student who came upon an individual needing assistance. Their South Korean and American “no-outcome” groups predicted the probability (between 0% and 100%) that the seminary student would stop to help a victim. Postdiction groups either (a) read that the student helped the victim, and then postdicted the probability that he would help, or (b) read that the student did not help the victim, and then postdicted the probability that he would help the victim. All participants rated how surprised they would be if the student did or did not provide assistance. As anticipated, relative to the control group South Korean participants expressed less surprise that the seminary student did not help, and showed hindsight effects for that outcome. In a second study, South Koreans provided the same level of surprise for each outcome condition, and displayed hindsight bias for both. Americans, who provided more discrepant ratings of surprise in both studies, showed no hindsight effects, not even in conditions of low/no surprise. Subsequent research findings using the same scenario-based stimuli suggest that Westerners’ lack of hindsight effects stems from their analytic, rule-based reasoning, which prompted their adherence to the postdiction instructions to ignore outcome information (Yama, et al., 2010).

The above-mentioned studies illustrate well how cultural differences in cognitive style influence the magnitude and even the occurrence of hindsight distortion. There is room to contribute to the literature by applying the bias to more personally relevant settings. Specifically, because past research was conducted in environments that were not self-involved (e.g., the settings

were lab-based with artificially induced almanac questions and scenarios involving fictional individuals), motivational tendencies may not have emerged. In more personal settings the influences of both cultural diversity and self-serving motivations may be revealed as they are in everyday life. This research examines hindsight estimates in an applied, relevant setting focusing on culturally-derived perceptions of “time.”

## **Culturally-Based Perceptions of Time**

While the inability to randomly assign participants to cultural groups makes controlled studies impossible, examinations of their social norms often reveal surprising differences that otherwise would have been assumed not to exist (Wagh & Miller, 2011). Such is the case with attitudes toward time which can mistakenly be assumed as common across the world. Traditionally, Americans and northern Europeans have held a “monochronic” temporal perspective that emphasizes focusing on one task before moving on to the next (Hall, 1983). Meeting deadlines has priority over interpersonal relationships, and time is perceived linearly (i.e., yesterday was before today, which is before tomorrow).

In contrast, individuals from “polychronic” cultures have a temporal view that emphasizes doing many things at once. Spending time on social relationships is valued equal to or more heavily than to-do tasks; time is relatively circular (i.e., “day” will come around again). For example, research findings suggest that those from the polychronic Latino cultures are less likely than monochronic Caucasians to stress punctuality, and more likely to have broad based judgments of lateness (for a review see Stone-Romero, et al., 2003). In addition, web sites for large corporations designed for polychronic-oriented South Koreans, relative to their American counterparts, encourage the simultaneous processing of multiple stimuli (Kim, et al., 2009). In addition to Latinos and Asians, individuals from Arab, Mediterranean and South American cultures tend toward the polychronic perspective (Bouncken, 2004)

Differences in monochronic and polychronic cultures might affect hindsight distortion because the outcome to task completion efforts may differentially trigger self-serving mechanisms. A monochronic individual might plan to complete 12 tasks in a month but successfully complete only 6. If asked to ignore that only half the tasks were finished, and asked to note how many tasks were initially intended for completion, the individual might provide a self-protective or self-presentation based postdiction that leans in the direction toward the 6 completed tasks. Postdictions of 8 or 4, for example, would reflect the hindsight effect. In contrast, for individuals in the polychronic culture maintaining relationships is more important than accomplishing tasks, and doing multiple things at once is viewed favorably. They may not feel the need for self protection after completing 6 of 12 listed items. Instead, they may readily admit having been optimistic by providing a postdiction that is not biased towards outcome information, and may not show standard hindsight distortion. Self-presentation for them might include having a full (albeit incomplete) to-do task list. This anticipated cultural difference is outlined in Hypothesis 1.

**H1: Relative to those from polychronic cultures, those from monochronic cultures will provide postdictions biased in the direction of their number of completed tasks.**

Individuals from monochronic and polychronic cultures may react differently to task completion. As the former emphasizes deadlines and a linear timeframe, crossing items off of a to-do list may produce strong feelings of accomplishment. On the other hand, the polychronic emphasis on relationships may trigger a more social approach that makes to-do items seem more outwardly focused (e.g., “these are tasks for the benefit of myself and others”) and less self-

focused than those from the monochronic culture (e.g., “these are tasks for my benefit”). This research is an opportunity to test the following hypotheses.

H2: Relative to those from polychronic cultures, those from monochronic cultures will associate task completion with a sense of accomplishment.

H3: Relative to those from polychronic cultures, those from monochronic cultures will have a more individualistic approach to task completion.

In sum, this research examines cultural differences in hindsight bias. Different from past efforts, it includes personal relevance by asking participants to create lists of tasks they plan to complete, and then to recall the number of items on their lists. Hindsight effects are therefore tested using the conservative “memory” design in which participants are asked to provide both predictions and postdictions. In addition, past work relied upon participants from various countries, a process that potentially introduced extraneous factors. To control for differences in student admission standards, in classroom experiences, in campus environments, and in attitudes toward the instructor/researcher, this research studies different subcultures within an American university.

## Method

### Participants

A total of 364 undergraduates (76% juniors and 24% seniors) taking marketing courses at a large public university were asked to voluntarily participate in the first part of the research study. After 12 students declined, 352 participants were asked to make a list of routine tasks (e.g., errand running, household duties) they planned to complete in a few weeks. To account for differences in experience with monochronic-based schools and work environments, they were asked to list chores unrelated to school or work. After that period of time had passed the participants were invited to take part in research for extra course credit, unaware that it comprised “part two” of this study. At that time, 38 (10.8%) of the sample was absent from class and hence ineligible for inclusion. Of the remaining 314, 8 (2.5%) declined part two and 9 (2.9%) provided incomplete surveys, leaving a total of 297 participants. Of the students whose attendance made them eligible for study inclusion, approximately 91% participated.

### Independent Variables

In the second part of the study participants were separated into one of two outcome conditions. Using the standard within-subjects memory design, those in an experimental control group were reminded that they created a list of tasks. They were asked, “How many tasks did you list? Please provide your best estimate.” On the survey they completed the blank in the statement, “I listed \_\_\_\_\_ tasks.” Then they were given their lists and asked to mark which tasks they indeed finished. Based upon the ordering of the procedure the control participants are referred to as the “outcome-last” group. In contrast, an “outcome-first” group was given back their list to mark which items they completed. About 20 minute later they read the instructions, “Please ignore the fact that you have seen your task list.” They then were asked, “Prior to seeing it, if you had been asked how many tasks were on your list, what number would you have used in your answer?” They filled in the blank in the statement, “I would have said that I listed \_\_\_\_\_ tasks.”

The sample was also divided into two cultural groups. A relatively simple approach would have been to divide participants based upon their ethnicities. Then, they could have been

categorized as being from monochronic or polychronic countries. However, such a division would not account for differences in acculturation to social norms in the United States, a process that can occur rather quickly (Cotte & Ratneshwar, 1999). Instead, the formation of cultural groups made use of characteristics somewhat unique to the college at which this research was conducted. That is, the campus is ethnically diverse, and the cost of living in the city is so high that a majority of students across racial groups commute from home and are still immersed in the cultures of their parents. Given those circumstances, it was reasoned that one of the strongest signals of cultural knowledge and maintenance was country-of-origin vernacular skills. All participants were asked if they spoke a language other than English, and noted if they were raised speaking it at home (i.e., learning the language from birth rather than through school). They also indicated from what country/countries they or their family members immigrated. A total of 162 grew up speaking a foreign language, with 160 (54% of the study sample) from polychronic-oriented countries (i.e., those from Arab, Asian, Latino and Mediterranean cultures). The rest of the sample at birth learned a language from a monochronic country (i.e., northern Europe or the United States) and were categorized accordingly.

### **Dependent Variables**

For all participants the “recalled number of tasks” was subtracted from the “original number of tasks listed.” If hindsight bias occurs, the outcome-last group should show more positive numbers than the control “outcome-first” group. If cultural effects occur, hindsight bias should be less prevalent in the polychronic culture than in the monochronic culture. Three participants provided responses more than three standard deviations from the mean and therefore were deemed outliers who were omitted from the analysis (Tukey, 1977).

In addition to providing predictions and postdictions, participants answered questions about their attitudes towards task completion. They rated their level of agreement on five-point scales (1 = strongly disagree, 5 = strongly agree) to the statements, (a) “Finishing tasks gives me a sense of accomplishment, and (b) “I have many to-do tasks that are for others’ benefit.” Since the majority of the university’s undergraduates live with their families and commute from home, the survey included the statement, “Spending time on chores and tasks for my family helps me feel like part of a team.”

## **Results**

### **Hindsight Effects**

Prior to conducting the analysis the data were examined to see if any participants finished all of their tasks. The lack of discrepancy between their listed and completed tasks makes such participants unable to show hindsight bias. A subset of 41 participants (13.9% of the 294 usable responses) completed all of their tasks, with no differences in the frequencies of these participants across cultural conditions for those in the no-outcome control group ( $ps > .21$ ), or in the outcome group ( $ps > .13$ ). Although retaining their data enhances statistical power, their presence makes interpretation of the hindsight findings difficult. While excluding data is not ideal it is not uncommon in cultural or in hindsight studies. For example, when examining Westerners and Easterners, Yama et al. (2010) removed 26% of their British university student sample who had grown up in an ethnic minority cultures in Great Britain (mostly South Asian). Based upon similar interpretation difficulties, data from participants completing all tasks were removed, and will be revisited in the Discussion.

The vast majority of participants did not complete all tasks, and their data were analyzed both with conservative non-parametric tests that examine the occurrence of hindsight bias, and with ANOVA to test its magnitude. Outcome-first participants who reviewed their task completion but were asked to ignore it show hindsight bias if their postdictions are biased in the direction of the number of tasks they actually completed. The data provide evidence that culturally-based perceptions of time influence retrospective judgments. Analysis of the frequencies, as shown in Table 1, reveals effects of cultural group and outcome condition,  $\chi^2(1) = 11.07, p < .001$ .

**Table 1. Frequencies for hindsight estimates**

	Postdiction Toward Number of Tasks Completed	Postdiction Away from Number of Tasks Completed
Monochronic*		
Outcome-last (control)	12 (21%)	46 (79%)
Outcome-first	30 (57%)	23 (43%)
Polychronic		
Outcome-last (control)	14 (22%)	50 (78%)
Outcome-first	23 (30%)	54 (70%)

\* Frequencies differ at  $p < .05$ .

As anticipated for the monochronic group, relative to those in the “control” outcome-last group, those who reviewed their task completion prior to making postdictions have a higher percentage of estimates shifted in that direction,  $\chi^2(1) = 15.18, p < .001$ . This is the standard hindsight effect. In contrast, and as expected, the polychronic group’s postdictions did not show this outcome-first and outcome-last discrepancy,  $\chi^2(1) = 1.15, ns$ .

Testing the magnitude of the bias, ANOVA performed on the predicted-minus-postdicted values reveals a significant main effect of culture that is qualified by a significant two-way interaction of outcome condition and culture,  $F(1, 252) = 4.22, p < .05$ . Table 2 presents the means for the hindsight estimates.

It was hypothesized (H1) that the monochronic group would provide postdictions biased in the direction of their number of completed tasks relative to the polychronic group. Although this hypothesis is supported via the non-parametric and parametric analyses, it is not quite in the manner anticipated. Specifically, although the monochronic group showed hindsight bias, the magnitude of the bias (i.e., the mean prediction-minus-postdiction) is rather small. The interaction effect is driven not by the monochronic group but by the polychronic group, which provided a mean “prediction-minus-postdiction” measure that was directed away from both their task completion and their predictions. As shown in Table 2, that mean is significantly different from that provided by (a) the monochronic group that received outcome information,  $F(1, 129) = 5.78, p < .02$ , and (b) the polychronic group that did not receive outcome information,  $F(1, 140) = 4.13, p < .05$ .

In short, since the monochronic group but not the polychronic group showed hindsight bias the data support hypothesis 1. However, in terms of the magnitude of effects, the polychronic group's overestimation away from outcome information is larger than anticipated.

*Table 2. Treatment means for hindsight estimates*

	Monochronic	Polychronic*
Outcome-last (control)		
<i>N</i>	59	64
Prediction minus postdiction mean	-0.27	-0.33
Prediction minus postdiction standard deviation	-2.84	-2.66
Outcome-first		
<i>N</i>	53	77
Prediction minus postdiction mean*	0.47	-1.81
Prediction minus postdiction standard deviation	5.33	5.31

\* Means in the same row or column differ at  $p < .05$ .

### Attitudes Toward Task Completion

Responses to the questions measuring attitudes toward completing to-do lists were analyzed with ANOVA across the outcome and cultural conditions. As there were no significant effects of the former ( $p_s > .15$ ) the data were collapsed across that variable, allowing for a focus on the monochronic/polychronic comparison. The means across cultural conditions are provided in Table 3.

*Table 3. Treatment means for attitudes towards task completion*

	Monochronic	Polychronic
Finishing tasks gives me a sense of accomplishment	4.48 (0.70)	4.30 (0.81)
I have many to-do tasks that are for others' benefit	2.67 (1.05)	2.86 (1.05)
Spending time on chores and tasks for my family helps me feel like part of a team	3.61 (0.87)	3.68 (0.95)

Note: numbers in parentheses are standard deviations



Hypothesis 2 predicted that, relative to those from polychronic cultures, those from monochronic cultures would view task completion with a sense of accomplishment. The means for the level of agreement to the statement, "Finishing tasks gives me a sense of accomplishment," are not significantly different. However, the mean for the monochronic group is marginally higher than that for the polychronic group,  $t(249) = 1.80, p < .08$ .

In hypothesis 3 it was anticipated that, relative to those from polychronic cultures, those from monochronic cultures will have a more individualistic approach to task completion. The first attitude measure designed for this prediction is, "I have many to-do tasks that are for others' benefit." Although it was thought that the polychronic group would provide higher ratings, the mean level of agreement for this statement does not differ across the cultural groups,  $t(249) = -1.38, ns$ . Analysis of the second measurement, "Spending time on chores and tasks for my family helps me feel part of a team," also reveals no statistical significance. However, the mean level of agreement is marginally higher for the polychronic than for the monochronic group,  $t(248) = -1.68, p < .10$ .

In sum, the measures do not support hypotheses two and three. However, the marginally significant differences perhaps suggest that attitudinal differences may emerge with more focused measures, a point further addressed in the Discussion.

## Discussion

### Recap

The results suggest that cultural perceptions of time influence hindsight bias for the everyday task completion. Relative to their corresponding outcome-last control groups, outcome-first participants in the monochronic group provided postdictions biased in the direction of their number of finished tasks, while those in the polychronic group did not. It is worthwhile to consider why the direction of hindsight effects was discrepant for both groups, and to explore both the anticipated and unexpected findings. In addition, it is useful to consider real world applications to this work.

### Monochronic Group Considerations

The monochronic group's low degree of bias reveals that they, like those in Fischhoff and Beyth's (1975) study, showed hindsight effects and a reasonable level of accuracy. Accordingly, both studies' use of the within-subjects "memory" design may have dramatically reduced the bias. Furthermore, Pohl et al. (2002) noted that with the between-subjects hypothetical design it may be self-serving to appear knowledgeable by appearing prescient (and, hence, to show hindsight distortion), yet with the memory design it would be disadvantageous because the experimenter can easily compare predictions and postdictions. In addition, Louie's (1999) findings suggest that individuals are less likely to show hindsight bias if they know they will be evaluated again in the future. Although the stimulus materials did not signal that participants would be approached again, they were not warned when they wrote their initial to-do lists that they would be asked to subsequently note their completion. So there was a precedent for a surprise follow up measure.

Perhaps even the possibility of continued measurement influenced participants to be more rule-based as in Yama et al.'s (2010) study wherein Westerners appeared to take seriously the instructions to ignore outcome information. Evidence of this adherence to the instructions comes from those earlier discarded participants who completed all of their tasks. Although they

might be expected to provide postdictions close to their actual and completed number of tasks, those in the outcome-first condition provided marginally less accurate estimates than those in the outcome-last control group ( $M = -3.36$ ,  $SD = 5.13$ , and  $M = -.70$ ,  $SD = 3.23$ , respectively),  $F(1, 40) = 3.23$ ,  $p < .09$ . (There are no other marginally significant or significant hindsight effects among the all-tasks-completed groups when using both parametric and non-parametric analyses,  $ps > .19$ .) In short, the conservative within-subjects memory design, the ability of the researchers to check both predictions and postdictions, and the possibility of future measures may have made all participants less likely to show hindsight effects.

Despite those factors it is worthwhile to note that, different from both Choi and Nisbett's (2000) and Yama et al.'s (2010) research, American university students from monochronic backgrounds in this personally-relevant study showed hindsight effects. In terms of applications, it is proposed that in real life settings hindsight bias might be larger than in this research. One reason is that when individuals construct to-do lists they may not formally write them down systematically as did participants in this work. Instead, many to-do chores (such as filing taxes every year) may be held in memory. In everyday life the evaluation of task completion may be more like the hypothetical design wherein individuals reflect on how much they have accomplished without having an initial list. That process may prevent learning from past completion rates, and may promote optimism when estimating how long tasks take to finish. Supporting evidence for this viewpoint comes from research on the planning fallacy, which suggests that individuals regularly underestimate their task completion times (Buehler, et al., 2005). Although the magnitude of hindsight bias for monochronic participants in this study is small, the real-world inability to reconstruct original task lists may produce hindsight bias and a related overconfidence seen in past work (Bukzar & Connolly, 1988) that enhances that frustrating feeling of not having enough time. It may be possible to reduce those negative thoughts by taking a lesson from polychronic cultures, whose findings will now be considered.

### **Polychronic Group Considerations**

It was anticipated and found that the polychronic group in this study would not be as prone to hindsight bias. However, relative to the control group the degree to which the outcome-first condition's estimates exceeded their number of originally listed tasks was unexpected. Recent research findings suggest that such "reverse" hindsight effects occur when outcomes are a thought-provoking surprise ("I would never have seen that coming") or when causal factors strongly support an alternative rather than the actual outcome (Yopchick & Kim, 2012). Therefore it is possible that the polychronic/outcome-first participants may have been surprised at their lack of task completion, which may have propelled them to aim high in their postdictions (e.g., "I am extremely surprised at how many tasks are unfinished, and without seeing outcome information would have said I expected to complete even more").

Or, the traditional polychronic emphasis on doing many things at once may itself have motivated the outcome-first participants to suggest they would have anticipated an even longer to-do list. Those originally providing a list of 10 tasks may have been driven to show they anticipated yet a fuller plate (e.g., "I would have thought I would do even more tasks, such as 12"). Finally, their more relaxed approach to deadlines may make task incompleteness less threatening than it is for monochronic participants, and their high postdictions may signal this indifferent attitude (e.g., "Who cares if I only finished some of my tasks; I probably would have thought I'd be even less successful"). Potential support of this idea comes from the marginally lower mean level of agreement from the polychronic group for the statement, "Finishing tasks gives me a sense of accomplishment."

If individuals from polychronic cultures are indeed able to distance their sense of accomplishment from task completion then it might behoove individuals from monochronic cultures wanting to reduce to-do-list stress to try a similar approach. Re-evaluating attitudes towards everyday tasks by being more accepting of unfinished items may not increase completion, but might provide a means of better handling the pressure. One idea is to protect oneself by not obsessing about outcome information, positive or negative. A perhaps surprising role model who avoids getting bogged down in the details is Daniel Kahneman, who won the 2002 Nobel Prize for work on the psychology of economic decision making. It might seem reasonable to assume that a world-renowned expert would be preoccupied with performance outcomes related to (for example) his investments. Yet, according to one author (Stewart, 2003), Kahneman protects himself from the information giving rise to emotions. Specifically, he does not take every opportunity to check his portfolio, stating, "I'd be swinging from good moods to bad all the time if I did" (Stewart, 2003, p. 83). Of course, it would be unwise to ignore all outcome information (related to investments, task completion or otherwise). And simply avoiding to-do lists is not beneficial. However, this illustration shows that it is possible to avoid frustration to some degree by not getting hung up on the details, similar to the traditional polychronic approach to time and task completion.

### **Applications of Hindsight Bias**

The findings of this research suggest that hindsight distortion occurs outside of laboratory settings and with to-do lists relevant to real life concerns. While the implications to consumers have been addressed in terms of the planning fallacy (Buehler, et al., 2005) and the frustration of task incompleteness, the bias can also have negative effects in business settings. As noted above, the knew-it-all-along aspect of hindsight bias has been linked to exaggerated confidence (Bodenhausen, 1990; Bukszar & Connolly, 1988; Sharpe & Adair, 1993; Synodinos, 1986) and reduced predictive accuracy (Hoch & Loewenstein, 1989). Disaster can result when overconfident professionals pay reduced attention to their to-do or "check" lists, and have unrealistic views of their ability to successfully complete tasks.

Real world examples of hindsight-biased hubris abound, with many involving service providers whose poor performances hurt not only business outcomes but trusting consumers. One event relevant to this research on task completion pertains to an ill-fated Mount Everest climb that has served as a lesson for current expeditions (Krakauer, 1997). This particular trek involved a highly experienced, well-respected professional guide who knew that for extreme excursions to be successful a list of conditions must be met. For example, there has to be altitude acclimation, enough food and water, help from professional mountaineering Sherpas, and a pre-determined turn-around time to obey regardless of reaching the summit. Unfortunately, on one fateful day the guide decided to take a risk by forgoing the turn-around rule. Sadly, a number of factors resulted in the death of four of five hikers who had reached the summit.

Striving to give his clients the experience of a lifetime, the respected guide also perished. It was thought that his decision making may have been based upon over-confidence built by past success ("I knew I would make it, and will in the future"). Back then, his list of conditions may have been based upon fortuitous circumstances that hid the importance of additional factors. For example, prior hikes had occurred in good weather, which was absent that day. In addition, previously the number of climbers was such that overcrowding was not an issue as it was during that excursion.

This example shows that hindsight bias and overconfidence from past success can impede the inclusion of important check list items. Also, the guide may have suffered from reduced

predictive accuracy that misaligned the prioritization of those items, as returning safely should of course have been more important than climbing to the top. It may seem strange to consider how to-do lists and the ability to accurately predict their completion pertain to extreme endeavors such as a Mount Everest climb. Yet, many risky ventures, such as space flight, are given the “go” only after lists of conditions have been met.

Less extreme consequences of hindsight-biased thinking are illustrated in professions in which many of us participate, such as the financial sector. In addition teams, not just individuals, can show the effect. A classic example comes from Long-Term Capital Management, a hedge fund firm run by prominent financial advisors and economists—including two Nobel laureates—who became overly-confident that past and future financial triumphs were inevitable (Glassman, 1998). The group continued borrowing heavily and investing, ignoring a list of known risk factors (e.g., collapsing economies around the world) of which they had been warned. During the stock market turmoil of the late 1990s their hindsight-fueled view of continued success caused the company to lose 90 percent of investors’ money. Although it might have been assumed that someone on the expert team would consider carefully established risks, their group status apparently fed hindsight effects.

Perhaps the most recent financial fiasco of hindsight-related hubris, combined this time with criminal intent, comes from Bernie Madoff. His apparent approach to his illegal Ponzi scheme, “I knew I could get away with this and will continue to do so,” was reported to have lost \$50 billion (Lenzner, 2008). His actions have been disastrous not only directly for his investors but also indirectly to those unaware that their financial analysts trusted his seeming success. Clients, businesses and even charities have suffered immensely. While it is not investors’ fault that he lied, their reputations were further diminished when some observers deemed Madoff’s unusually high returns a warning sign that should have been recognized. Hence, Madoff, investors following him, and observers judging them all were prone to hindsight effects.

Given the potential negative effects of hindsight-driven hubris, what can companies do to protect against it? It would be helpful to be aware of the bias, especially following times of success when the desire to take credit compounds retrospective tendencies. Then, screening should carefully hire individuals who are not prone to the effect. While there may be a tendency to focus on job candidates with records of success, those who have experience with both good and bad conditions (e.g., related to weather in the Mount Everest case, and to the economy in the financial examples) may be better able to distinguish elements of luck and skill resulting in favorable outcomes. Those efforts can reduce or eliminate hindsight effects. Groups of employees, while practicing team work, should still be rewarded to think independently about risks (unlike the experts at Long-Term Capital Management).

Consumers themselves should also be aware of hindsight distortion, and protect themselves against bias-prone service providers by screening those they hire. Finally, individuals should fight against their own tendency to show hindsight effects. For example, a rookie investor who strikes it rich should outline what he or she and what the environment contributed to that outcome. A businessman local to the region in which this study was conducted recently commented upon how his success in housing renovations was a combination of hard work and serendipitous economic growth in the area. His ability to see both factors helped him to think practically about his business, which enabled him to move on prior to the recent housing collapse. Although there is good and bad luck involved in many business decisions, had he taken all the credit for his success and assumed he knew it would continue, he might not have the options he does today.

The applied examples illustrate the potential risks involved in hindsight-biased thinking, which the monochronic participants in this study showed. Similarly, the polychronic perspective can also be deleterious. A lack of concern for completing tasks, such as the “mañana effect” whereby individuals put things off until tomorrow, can have equally disastrous results. Such an approach risks being unprepared for the future, or even for unexpected/emergency situations. It is clear that companies and consumers should take the time to find representatives who neither have hindsight-related hubris nor laissez-faire attitudes, perhaps especially for high risk physical or financial endeavors.

## **Limitations and Future Research**

All studies examining uncontrollable variables such as culture have limitations. In this research monochronic and polychronic groups were assigned based upon country-of-origin vernacular skills. Although this avoided the drawbacks of cross-university work, and although learned-from-birth language abilities presumably correlate with the maintenance of traditions and social norms, this did not allow for individual differences that occur for all traits across cultures. Future research could attempt to measure cultural effects as well as enculturation levels with preliminary surveys that measure attitudes about time, the number of years it has been since participants’ families left their country of origin, and the amount of schooling they have had in the United States.

Another concern is that those in the polychronic group are non-native English speakers who may have been confused by the postdiction instructions to ignore outcome information. While it is hoped that a sample consisting of college juniors and seniors would have strong language comprehension it is not possible to entirely rule out this possibility. Future research could ask participants to describe how long they have been speaking English, or how comfortable they are with the language. For this study, it may be helpful to know that (as shown in Table 2) the standard deviations for the hindsight estimates are very similar for each cultural group within outcome conditions. In fact there is a higher discrepancy across the outcome-last and outcome-first groups, which seems to reflect the higher complexity of making postdictions while ignoring outcome information. In short, while language ability may or may not be an issue in this work, it can be better controlled in future studies. More generally, attempts should be made to replicate the findings outside of university settings since a key concern with student-based cultural research is the level of generalizability (Bello et al., 2009).

The questions designed to ascertain attitudes towards task completion show a lack of statistical significance. That some effects were marginal suggests that a stronger form of measurement is needed. In particular, it may have been too much to ask participants to express their views about to-do list completion after seeing how many items they had actually finished. In future work it might be better to take such measures separately, or at least after a break from viewing attempted chores.

Despite the limitations of this study it is to our knowledge unique in that it attempts to examine how culture affects hindsight bias in personal settings applicable to everyday life. Many consumers and their families struggle with concerns related to money and time. While researchers have focused on the former via studies on cost and price (Obermiller et al., 2012), there is also ample room for the investigation of temporal constraints. It is hoped that this effort encourages future investigations and provides insights into coping with the ever-present responsibilities of task completion.

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