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Minkyung Koo ^a, Gerald L. Clore ^b, Jongmin Kim ^c & Incheol Choi ^d

^a Department of Business Administration, University of Illinois at Urbana-Champaign, Champaign, IL, USA

^b Department of Psychology, University of Virginia, Charlottesville, VA, USA

^c Marketing Department, Yale University, New Haven, CT, USA

^d Department of Psychology, Seoul National University, Seoul, Republic of Korea

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Affective facilitation and inhibition of cultural influences on reasoning

Minkyung Koo¹, Gerald L. Clore², Jongmin Kim³, and Incheol Choi⁴

¹Department of Business Administration, University of Illinois at Urbana-Champaign, Champaign, IL, USA

²Department of Psychology, University of Virginia, Charlottesville, VA, USA

³Marketing Department, Yale University, New Haven, CT, USA

⁴Department of Psychology, Seoul National University, Seoul, Republic of Korea

Research in South Korea and the United States examined how affective states facilitate or inhibit culturally dominant styles of reasoning. According to the affect-as-information hypothesis, affective cues of mood influence judgements by serving as embodied information about the value of accessible inclinations and cognitions. Extending this line of research to culture, we hypothesised that positive affect should promote (and negative affect should inhibit) culturally normative reasoning. The results of two studies of causal reasoning supported this hypothesis. Positive and negative affect functioned like “go” and “stop” signals, respectively, for culturally typical reasoning styles. Thus, in happy (compared to sad) moods, Koreans engaged in more holistic reasoning, whereas Americans engaged in more analytic reasoning.

Keywords: Affect; Mood; Cognition; Culture; Analytic-holistic reasoning; Affect-as-information.

Emotions are generally thought to be universal across cultures (e.g., Ekman, Levenson, & Friesen, 1983). If that is the case, are the cognitive consequences of emotion also universal, or do they vary by culture? Evidence shows that the styles of reasoning that people adopt depend partly on their current emotion (e.g., Clore & Huntsinger, 2007) and partly on their cultural backgrounds (e.g., Nisbett, 2003). However, questions about how these forces interact with each other remain largely unexamined. Without relevant research, we have no way of knowing how emotion and culture fit jointly

into the puzzle of cognitive performance. A goal of the present research, therefore, is to address this question through collaborative research in Korea and in the United States.

Affect and cognitive processing

Past research has shown that positive mood is associated with a global focus and relational processing, whereas negative mood is associated with a local focus and item-specific processing (e.g., Gasper & Clore, 2002; Isen & Daubman, 1984; Mackie, Asuncion, & Rosselli, 1992). For

Correspondence should be addressed to: Minkyung Koo, Department of Business Administration, 350 Wohlers Hall, University of Illinois at Urbana-Champaign, Champaign, IL 61820, USA. E-mail: mkoo@illinois.edu

example, compared to negative mood, positive mood tends to promote global processing, as evident in the use of scripts, schemas, and stereotypes (e.g., Bless et al., 1996), and it promotes relational processing, as evident in the promotion of semantic priming and false memory effects (Storbeck & Clore, 2005, 2008). In contrast, negative affect tends to narrow peoples' scope of attention (Derryberry, & Reed, 1998) and inhibit relational processing.

Most explanations for such effects assume that positive and negative affect are linked to particular processing styles with positive affect activating substantive (Forgas, 2005) or relational processing (Clore & Storbeck, 2006), information assimilation (Fiedler, 2001), or the use of general knowledge structures (Bless, 2001). Another possibility is that affective reactions simply confer positive or negative value on whatever knowledge, beliefs, or inclinations are most accessible in a particular task (Clore et al., 2001; Clore & Huntsinger, 2007). Since many standard tasks in cognitive psychology elicit category-level, relational processing, positive affect may be associated with such processing simply because positive affect promotes (and negative affect inhibits) whatever cognitive orientation is dominant. As indicated in the next section, normative styles of reasoning appear to differ for East Asians and Westerners (Nisbett, Peng, Choi, & Norenzayan, 2001). As a result, the current experiments allowed us to assess whether positive affect, for example, promotes a particular cognitive orientation or whether, like reward, it confers value on whatever style is dominant in a given situation, which may vary with culture.

Culture and reasoning

A cornerstone of contemporary cultural psychology is the observation that Westerners tend to adopt an analytic thinking style emphasising the independence of individual objects from each other, whereas East Asians tend to adopt a holistic view emphasising that the world is composed of interrelated elements (e.g., Munro, 1985; Nisbett

et al., 2001). Attention in an analytic orientation is focused mainly on objects, whereas attention in a holistic view is directed to the relationship between objects and the field in which those objects are embedded (e.g., Ji, Peng, & Nisbett, 2000). As a result, in explaining the cause of a social event, Westerners tend to focus on the internal dispositions of an actor, whereas East Asians tend to consider a broader set of reasons (including both dispositional and contextual information). East Asians are therefore less likely to attribute an outcome to an actor's internal characteristics (see Nisbett et al., 2001, for a review), and to consider a larger amount of information before making a final judgement (Choi, Dalal, Kim-Prieto, & Park, 2003).

Present research

The current experiments were designed to ask how affect and culture jointly influence styles of reasoning. Before examining this question, it is important to distinguish analytic–holistic causal reasoning (Nisbett et al., 2001), which is the focus in this study, and global–local processing (Kimchi & Palmer, 1982), which past research has shown to be associated with mood. Prior research examining affective influences on global–local focus (Gasper & Clore, 2002) found that happy mood was associated with a global focus (Kimchi & Palmer, 1982). If holistic reasoning and global focus were similar, we should expect that among European Americans, happy moods would be associated with enhanced holistic rather than analytic reasoning.

To examine whether the distinction between global versus local perceptual focus (Kimchi & Palmer, 1982) maps onto the distinction between holistic versus analytic reasoning (Nisbett et al., 2001), we conducted a pilot study in which we asked participants to perform both a global–local processing task (Kimchi & Palmer, 1982) and the inclusion and exclusion tasks (Choi et al., 2003) in which greater inclusion of possible causes in a causal reasoning task represents holistic thinking, and greater exclusion of possible causes indicates

analytic thinking. The number of global and local choices in the categorisation task (Kimchi & Palmer, 1982) was not significantly correlated with the number of included or the number of excluded possible causes in a causal reasoning task (Choi et al., 2003). These results suggest that global–local attentional focus (Kimchi & Palmer, 1982) does not map onto holistic–analytic causal reasoning (Choi et al., 2003), and that they are different dimensions of processing. In particular, global–local focus (Gasper & Clore, 2002) pertains to *attention*, whereas holistic–analytic reasoning, examined in the present research, pertains to *causal reasoning*.

Prior research has also shown a relationship between positive mood and relational processing (Clore & Storbeck, 2006). For example, happy mood leads to relational processing on a false memory task among Western participants (Forgas, Vargas, & Laham, 2005; Storbeck & Clore, 2005). Although relational processing has been discussed as the adoption of a global focus, we are unaware of studies reporting a relationship between relational processing and holistic reasoning. In general, relational processing involves a tendency to assimilate incoming information to expectations, and it is unclear whether one should expect such tendencies to relate to styles of reasoning. Relational processing on the Deese–Roediger–McDermott false memory task, for example, involves the activation of a category in memory as a result of exposure to prototypical instances of that category. In contrast, holistic processing reflects a concern not to omit potentially relevant facts in reasoning tasks.

These findings are also in line with other research showing that a processing style in one domain is often not correlated with its use in another domain of cognitive processing (Davidoff, Fonteneau, & Fagot, 2008; Peterson & Deary, 2006). According to Ehrman and Leaver (2003), different measures of global–local or holistic–analytic processing should not be treated as interchangeable.

The present research asks whether moods influence causal reasoning and tests two alternative

hypotheses: That mood has a general influence on causal reasoning or that mood interacts with culture to influence causal reasoning. The data showing that positive affect often promotes both a global focus (Gasper & Clore, 2002) and relational processing (Storbeck & Clore, 2005) suggests that positive affect might produce holistic reasoning regardless of culture. In that view, positive affect and East Asian culture might each promote holistic reasoning independently. Alternatively, positive affect may not promote holistic reasoning generally, but rather promote whatever orientation happens to be most accessible, in which case affect and culture should interact, rather than combine additively.

Recent mood and perception studies that bear on this question took the unusual step of altering the relative accessibility of global and local focus through priming (Huntsinger, Clore, & Bar-Anan, 2010). The results were surprising. When a local focus was made most accessible, positive affect led to a greater local focus and negative affect led to a global focus. In two studies, the consequences of positive affect depended solely on what was made most accessible. Such reversals suggest that the usual association of positive affect with global focus may occur because it is generally the dominant tendency that people show regardless of mood, the global precedence effect (Navon, 1977). Perhaps the role of positive affect is simply to maintain this general default tendency. If so, in the current research, positive affect should also promote dominant or culturally normative reasoning styles, holistic reasoning in Korea and analytic reasoning in the United States.

The goal of the present research was to examine these possibilities for how affect and culture influence reasoning. Two studies examined holistic versus analytic causal reasoning; each was conducted both in the USA and in South Korea. An additional study, as mentioned above, was conducted to examine whether the global–local processing dimension assessed by perceptual tasks (e.g., Gasper & Clore, 2002) maps onto the holistic–analytic reasoning dimension studied here.

STUDY 1

The holistic orientation of East Asians assumes that each element in the world is somehow intertwined, so that an event or object can be understood only in the context of the whole set of relevant factors. In contrast, the analytic causal perception of Westerners reflects a view of the universe as comprising separate objects that exist independently from one another, and Westerners tend to base their explanations of events on a few causal possibilities. As a result, compared to Westerners, East Asians tend to consider more information when explaining events and making causal judgements (Choi et al., 2003).

Study 1 examined whether affect and culture combine additively or interactively to influence reasoning. That is, we asked whether positive moods make both European Americans and Koreans more holistic or whether positive moods enhance analytic causal reasoning for European Americans and holistic causal reasoning for Koreans.

Method

Participants. Sixty-nine (23 male, 46 female) European American and 41 (23 male, 18 female) Korean students participated in this study. For the Korean participants, all materials were presented in Korean.

Procedures. Participants were randomly assigned either to a happy or a sad mood condition. Two mood-induction methods were employed. First, participants listened to either Mozart's *Eine Kleine Nacht Musik* (happy condition) or Mahler's *Adagio* (sad condition) for six minutes each. In past research, these pieces of music have been used successfully to induce positive and negative mood (e.g., Niedenthal & Setterlund, 1994; Storbeck & Clore, 2005). After listening to the music, participants were given 10 minutes to write about an experience in which they felt especially happy or sad depending on the condition to which they were assigned (Schwarz & Clore, 1983).

Following the mood-manipulation procedure, participants performed an exclusion task adopted from Choi and his colleagues (Choi et al., 2003). Participants were provided with a hypothetical scenario about a murder case in which a graduate student killed his advisor. They also received a list of 97 items of information that might or might not be relevant to the explanation of the incident. Then, they were asked to check the information that they thought *irrelevant* to the murder case. Finally, participants completed the mood manipulation check questions. Happy and sad mood was measured separately (1 = *not at all*, 5 = *extremely*), and an overall positive mood score was computed by subtracting the sad mood measure from the happy mood measure.

Results and discussion

Mood manipulation check. Participants in the happy mood condition were reliably happier than those in sad mood condition among Koreans (happy mood $M = -0.38$, $SD = 1.12$; sad mood $M = -1.63$, $SD = 0.96$), $F(1, 39) = 15.88$, $p < .01$, and European Americans (happy mood $M = 2.03$, $SD = 1.18$; sad mood $M = 0.06$, $SD = 1.77$), $F(1, 67) = 29.99$, $p < .01$.

Exclusion task. The key dependent variable in this study was the number of items each participant judged to be irrelevant. Choi et al. (2003) found that East Asians excluded a smaller number of items than Westerners in the exclusion task because East Asians held more complex causal perceptions compared to Western participants. Thus, our primary interest in the analysis of the present data was whether mood influences on causal perception were similar or different in the two cultures. A univariate analysis showed an interaction effect between culture (American vs. Korean) and mood (happy vs. sad), $F(1, 106) = 4.74$, $p < .05$. Among European Americans, those in happy moods ($M = 55.25$, $SD = 12.04$) tended to exclude as irrelevant a greater number of items than those in sad moods ($M = 49.73$, $SD = 14.40$), $F(1, 67) = 3.00$, $p = .09$. In contrast, among Koreans, those in

happy moods ($M = 48.73$, $SD = 15.40$) tended to check as irrelevant a smaller number of items compared to those in sad moods ($M = 55.42$, $SD = 16.08$), $F(1, 39) = 1.85$, *ns*.

We expected that any interaction between culture and mood might be asymmetrical, which would be consistent with the hypothesis that positive affect promotes and negative affect inhibits dominant cognitive orientations, including those concerned with cultural norms about reasoning. As expected, cultural differences were more reliable in happy moods than in sad moods. Specifically, in happy moods, there was a trend for European Americans to exclude more possible causes than did Koreans, $F(1, 56) = 3.23$, $p = .08$. In contrast, the comparison between Koreans and European Americans was not significant in sad moods, $F(1, 50) = 1.73$, *ns*.

Given that the cultural comparisons within each mood condition were marginally significant and nonsignificant, caution should be taken in interpreting the results. However, this tendency toward asymmetrical effects (tendencies for group differences to appear in happy moods and not in sad moods) has also been obtained in other relevant research. For example, the same asymmetrical effects appeared in studies of mood and semantic priming (Storbeck & Clore, 2008), mood and persuasion (Briñol, Petty, & Barden, 2008), and mood and stereotyping (Huntsinger, Sinclair, Dunn, & Clore, 2010). Moreover, this is the expected pattern if positive affect essentially says "yes" and negative affect says "no" to group differences in the processing tendency that is dominant. That is, positive affect should increase and negative affect decrease or eliminate any group differences in the dominance of particular responses.

In sum, Study 1 found a significant interaction of affect and culture, indicating that the influence of emotion on causal reasoning depends on culture. That is, similar mood states resulted in contrasting patterns of reasoning for European Americans and Koreans. Moreover, internal comparisons showed expected patterns, in that happy but not sad moods created tendencies toward more analytic reasoning for European Americans

and more holistic reasoning among Koreans. Consistent with expectations, these effects involved a tendency toward exclusion of irrelevant causes among European Americans, for whom exclusion should be a well-practiced mode of reasoning. The results are consistent with the hypothesis that affect confers positive and negative value on culturally dominant modes of reasoning. However, an alternative hypothesis would be that happy mood simply led Americans to check more items, rather than promoting a culturally distinctive style of reasoning. Study 2 was conducted to test this alternative hypothesis.

STUDY 2

In Study 2, we again asked whether moods influence causal reasoning in the opposite directions for Koreans and Americans. We used the same paradigm but with instructions to include all potentially relevant facts in the case rather than to exclude all irrelevant facts. If happy mood enhances holistic reasoning for Koreans and analytic reasoning for European Americans, then Koreans should check more items in happy (vs. sad) moods and European Americans should check fewer items in happy (vs. sad) moods when they were asked to choose which items might be relevant.

Method

Participants. Participants were 134 (38 male, 96 female) European American and 68 (42 male, 26 female) Korean students.

Procedures. As in Study 1, participants were randomly assigned either to a positive or a negative mood condition. As a mood manipulation, they were asked to write a description of an experience in which they felt especially happy or sad, according to the condition to which they were assigned (Schwarz & Clore, 1983). We used only the writing task without music. In Study 1, Korean participants rated themselves rather low in happy mood. On the possibility that this effect was due to the distinctly Western music we used

(e.g., Mozart), we omitted the music in Experiment 2 and used only the writing task as a mood induction, which should be free of cultural bias.

After the writing task, participants performed the inclusion task as in Choi et al. (2003) in which they were provided with a hypothetical murder scenario and a list of 97 possible causal factors for the event. They were asked to check the items that they thought *relevant* to the case. Finally, a mood manipulation check question (1 = *very negative*, 9 = *very positive*) was presented at the end of the study with other demographic questions.

Results and discussion

Mood manipulation check. Participants in the happy mood condition were reliably happier than those in the sad mood condition among both Koreans (happy mood $M = 6.45$, $SD = 1.73$; sad mood $M = 3.64$, $SD = 1.47$), $F(1, 65) = 51.09$, $p < .01$, and European Americans (happy mood $M = 6.61$, $SD = 1.68$; sad mood $M = 4.00$, $SD = 1.84$), $F(1, 128) = 69.94$, $p < .01$.

Inclusion task. The main dependent variable was the number of checked items that participants considered as relevant to the murder case. Choi et al. (2003) showed that Koreans included a greater number of items than Americans. Hence, as in Study 1, we focused our analysis on whether there was an interaction between culture (American vs. Korean) and mood (happy vs. sad). A univariate analysis showed a significant interaction, $F(1, 198) = 3.98$, $p < .05$, indicating that the same kind of mood leads to different causal reasoning according to the culture. Specifically, among Koreans, happy mood ($M = 33.82$, $SD = 11.43$) led to perceptions of a greater number of items as relevant than sad mood ($M = 27.32$, $SD = 11.70$), $F(1, 66) = 5.37$, $p < .05$. In contrast, a nonsignificant trend to respond with the reverse pattern appeared for European Americans (happy mood $M = 26.34$, $SD = 16.87$; sad mood $M = 29.12$, $SD = 17.63$), $F(1, 132) = 0.87$, *ns*.

Consistent with expectations, the influence of affect on the inclusion of relevant causes appeared

more robust for Koreans, for whom inclusion is believed to be a well-practised mode of reasoning. In addition, as expected, the interaction was again asymmetrical so that the cultural differences were stronger in happy moods, believed to promote normative processing, than in sad moods, believed to inhibit normative processing. Thus, as predicted, and consistent with Study 1, Koreans showed significantly greater inclusion than European Americans in happy moods, $F(1, 94) = 5.33$, $p = .02$, and showed no significant cultural difference in reasoning in sad moods, $F(1, 104) < 1$, *ns*.

Ruling out the alternative hypothesis for the results of Study 1, the results of Study 2 showed that happy mood resulted in more holistic reasoning than sad mood for Koreans, and that happy mood tended to result in more analytic reasoning for European Americans than sad mood. Again, this result is consistent with the idea that relative to negative affect, positive affect confers positive value on culturally dominant modes of reasoning, rather than that positive affect activates one particular cognitive style regardless of culture.

Meta-analysis of Studies 1 & 2

We subtracted the number of included items in Study 2 from the total number of items presented (i.e., 97) and combined data from the two studies. Then, we created a new dependent variable that indicates the number of excluded items in Study 1 and the number of non-included items in Study 1, which overall represents analytical reasoning or the tendency toward exclusion rather than inclusion of marginally relevant factors. Consistent with the individual analyses from the two studies, European Americans ($M = 65.00$, $SD = 16.95$) showed greater exclusion (analytical reasoning) than Koreans ($M = 57.50$, $SD = 14.83$) in happy moods, $F(1, 152) = 7.63$, $p < .01$. Again, as expected, no significant cultural difference was found in sad moods between European Americans ($M = 62.17$, $SD = 18.65$) and Koreans ($M = 64.56$, $SD = 14.97$), $F(1, 156) = 0.66$, *ns*.

GENERAL DISCUSSION

The present research examined affective influences in the domain of causal reasoning. Although there were multiple patterns of possible outcomes, both studies converged on the same discovery, that relative to the negative affect from sad mood, the positive affect from happy mood promotes whatever reasoning style is normative in a particular culture. There was no tendency toward an additive or culturally independent influence of affect on holistic reasoning, which might have been expected from most prior theorising about mood effects on cognition. Thus, the same significant interaction in each case showed that relative to negative affect, positive affect promoted holistic causal reasoning among Koreans and analytic causal reasoning among European Americans. The two studies also replicated the finding of Choi et al. (2003) of cultural differences in reasoning. Across two studies, European Americans showed a relatively greater tendency to exclude and Koreans to include items than European Americans in happy moods. As predicted, no such difference appeared in sad moods.

The current results indicate that, contrary to what one might expect, the distinction between global versus local perceptual focus (Kimchi & Palmer, 1982) does not map onto the distinction between holistic versus analytic reasoning (Choi et al., 2003). If holistic reasoning and global focus were similar, we should have found that among European Americans, happy moods were associated with enhanced holistic rather than analytic reasoning. The tendency of positive affect to promote analytic rather than holistic reasoning among European Americans in the current data, suggests that global processing and holistic reasoning may be different kinds of processes.

In our pilot study, no relationship emerged between global–local focus and holistic–analytic reasoning. We are therefore not in a position to make strong inferences about whether similar or different effects might be found for global–local focus. It is quite possible that global focus may also be more dominant among East Asians than among European Americans. European Americans have

been found to focus on individual objects in a picture, whereas East Asians tend to pay attention to the whole picture, including the context in which objects appear (Nisbett et al., 2001). On the other hand, phenomena such as the word superiority effect (Cattell, 1886) and the global superiority effect (Navon, 1977) were established on Western participants. One might expect task-specific effects on the basis of a factor analytic study involving 14 different perceptual tasks (e.g., Navon task, hidden figures task, field dependence task), which found little evidence for an overall global–local factor (Milne & Szczerbinski, 2009). On the other hand, generality is suggested by the findings of Förster and Dannenberg (2010) who found that induced global versus local processing in one domain (e.g., auditory, haptic, gustatory or olfactory) carried over to content-unrelated visual tasks, and that conversely, global–local visual processing then influenced how people listened to a poem, or touched, tasted and smelled objects. The degree to which one should expect generality or specificity in findings of cultural and emotional effects on attention and processing, therefore, is a bit unclear. For the present, it seems wise to stick close to the data when attempting to generalise about the roles of culture and emotion in cognitive perceptual styles.

A different question of interest is whether mood at the chronic level would influence reasoning style in the same manner as transient mood. If that were the case, chronically happy people should also be more likely to evidence the reasoning style that is prevalent in their culture. In a separate study, we measured both participants' typical moods as well as their chronic happiness using the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). We found no effect of chronic mood or happiness on reasoning style. The fact that momentary, but not chronic, affect influenced reasoning is consistent with the hypothesis that affect influences processing when it is experienced as feedback about the task on which people are currently working, rather than that affect influences processing directly and unconditionally.

Affect and culture

Although an impressive amount of research has been done in the past concerning cultural differences, especially between East Asian and European American cultures (e.g., Heine, Lehman, Markus, & Kitayama, 1999; Markus & Kitayama, 1991), little research has explored how moods or emotions interact with cultural orientation. Indeed, research on affect and cognitive processing has been done predominantly within the European American cultural context. To our knowledge, the present research is the first to examine affective influences across cultures in reasoning.

One of the very few studies that has examined affect and culture, and the most relevant to the present research, is a study by Ashton-James and colleagues (Ashton-James, Maddux, Galinsky, & Chartrand, 2009). They found that negative rather than positive mood enhanced culturally dominant identities or self-construals. For example, when negative affect was induced, Western participants' self-construals on the Twenty Statements Test (TST; Kuhn & McPartland, 1954) became more independent, whereas East Asian participants' self-construals became more interdependent, each of which is the dominant self-construal in that culture. Individual self-expression is culturally dominant for Westerners to form and enhance self-identity. Ashton-James et al. also found that positive (vs. negative) affect led Western participants to endorse self-expression less, whereas the opposite was true for Asian participants.

These results at first seem to conflict with our own, which showed that positive rather than negative affect was associated with culturally dominant thinking styles. However, a closer examination of the key difference between the two studies suggests that they are complementary rather than contradictory. First, in Ashton-James et al. (2009), affect was experienced as people filled out the Twenty Statements Test on which they described their identities (Study 3). By implying that respondents had yet to achieve their culturally valued identities, negative affect should have increased motivation to reach these identity

goals. In the other studies reported by Ashton-James et al., participants completed tasks such as the Value of Expression Questionnaire (VEQ; Kim & Sherman, 2007), designed to measure self-expression. Their negative affect would therefore have been experienced as negative feedback about their self-identity, which should motivate identity enhancement by endorsing culturally dominant self-values. Thus, the impact of affect should have been quite different for such identity-relevant tasks than for the cognitive task examined in the current research, which did not involve a focus on self and identity.

Other relevant recent research (Eyal, Fishbach, & Labroo, 2007) has contrasted affect experienced as the value of a goal and affect experienced as progress toward a goal. Negative affect was found to decrease effort when it indicated that the value of the goal was low, but the same negative affect increased effort when it indicated inadequate progress toward the goal. In our data, affect should have been experienced as information about the value of culturally dominant responses, whereas in the studies by Ashton-James et al. affect seems likely to have been experienced as information about the adequacy of current efforts to achieve culturally valued identity goals. If so, then the two sets of data complement each other by finding that the influences of affect depend in part on the exact nature of the object about which it appears informative (Clore & Huntsinger, 2009).

Conclusions

We noted earlier that most explanations for affective influences on cognition, have assumed that particular affective states trigger particular cognitive orientations. In contrast, the current results suggest that positive and negative affect may essentially say "yes" or "no" to currently activated reasoning styles. In this view, one function of minimal affective reactions during cognitive tasks is to serve as information about the anticipated value of accessible cognitions and inclinations. The results are consistent with more general assumptions about cognition and

learning. Education, for example, requires experiencing a problem with one's current understanding in order to learn something new (Dewey, 1910; Piaget, 1953). In a similar manner, the current experiments show that positive affect made both Koreans and European Americans engage in their usual modes of thought, and negative affect was required to move them to engage in cognitive change and to adopt an unusual mode of thought. The data thus allow a glimpse of how affect provides feedback that regulates thinking and reasoning.

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