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Attention, Water Consumption, Water Appraisals and Nonconscious Affect

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Abstract
Relatively minimal work has examined the extent to which sad and happy emotional detectors nonconsciously influence executive processes and if these mechanisms affect water appraisal and water consumption behavior. This research studies if and the degrees to which sad and happy emotional detectors affect water appraisal, water consumption and attention. The participants were asked to locate and report an asterisk's location that was superimposed in subliminal pictures of happy or sad people presented on a computer, pour water from a 1000 mL container into a 473 mL cup, consume as much of the 1000 mL of water as desired, and provide ratings of the water on a questionnaire. The one tailed independent samples t-tests revealed that the participants in the "happy" condition detected more ($p<.05$) asterisks than the participants in the "sad" condition. The independent samples t-tests and linear regressions exposed insignificant ($p>.05$) causal relationships and interactions, respectively, between the experimental conditions and appraisal and behavioral processes regarding water. These findings suggest that humans may be unable to devote their full attention to a task when their "sad" emotional detectors are activated. Also, our "happy" and "sad" emotional detectors may not be able to influence water consumption or appraisals.

Introduction

The human brain consists of a currently inestimable amount of computational adaptations that were "designed" by natural selection to solve the recurring, adaptive problems our distant ancestors faced in the human environment of evolutionary adaptedness (EEA) (Cosmides and Tooby 2000, in press; Symons 1987, 1992). Cosmides and Tooby (in press) define the mind as the set of information processing devices embodied in the brain that are responsible for all conscious and nonconscious activity and that generate all behavior. Our gross blindness of the many nonconscious processes that arise as a result of our adaptive neural circuitry is theorized to be due to the combination of conscious experience and a highly efficient mind (Cosmides and Tooby in press).

Human psychological adaptations are theorized to be universally innate, function-specific, and complexly structured (Cosmides and Tooby 2000, in press; Symons 1987, 1992; Tooby and Cosmides 1990). One example of an adaptation is our emotions: they were so relatively efficient at solving specific ancestral problems that they now have a low or zero heritability—they are typical in the human species (Darwin 1872; Cosmides and Tooby 2000, in press; Tooby and Cosmides 1990). According to evolutionary theory, nearly every human is endowed with similar genetic copies of emotions but *most* of the phenotypic differences between us (i.e. in onset, duration, and/or intensity) are due to the matching, scaling, or tuning of our emotions to the constant, idiosyncratic environments we typically encounter—known as phenotypic plasticity (Ekman 2007; Darwin 1872; Krebs and Davies 1993a; Damasio 1994; Cosmides and Tooby 2000, in press). These as well as all of our adaptations, which theoretically arose from ancestrally lasting demands on differential reproductive success, allowed our ancestors to optimally avail the options afforded to them by their environments (Darwin 1872; Belsky et al. 1991; Cosmides and Tooby 2000 in press; Damasio 1994; Dunbar 1988; Irons 1979; Symons 1987, 1992; Tooby 1985; Tooby and Cosmides 1990). However, because our adaptations, including our emotional adaptations, arose in the EEA and produce behaviors that were adaptive to the environments encountered at that time, some theorists have proposed that in today's modern, industrial environments, our adaptations are generally maladaptive in maximizing fitness (Cosmides and Tooby in press; Symons 1987, 1992). On the contrary, other theorists have suggested that many of our universal neurological adaptations can be shaped by culture, such as by emotional signals, and learn how to produce intelligent, flexibly adaptive behavioral responses to novel, volatile environments (Damasio 1994; Greenspan and Shanker 2004).

Emotion and Affective Responses

Emotions are adaptations that have theoretically arisen in response to the arduous, adaptive problem of *mechanism orchestration* (Cosmides and Tooby 2000; Tooby 1985; Tooby and Cosmides 1990). This problem develops when, "Various programs that are individually designed to solve specific adaptive problems are simultaneously activated [and] deliver outputs that conflict with one another, interfering with or nullifying one another's functional products," (Cosmides and Tooby 2000). To obviate this problem, some researchers have proposed that emotions were selected to yoke together almost all of these domain-specific subprograms into a multitude of harmonious *configurations* (Greenspan and Shanker 2004; Cosmides and Tooby 2000). The emotions then activate, deactivate, or modify these configurations in patterns that functionally match every evolutionarily old as well as modern, recognizable circumstance (Cosmides and Tooby 2000; Damasio 1994). However, if a computational error in these superordinate programs—the emotions—was to occur and the wrong configuration was activated in a given circumstance, large costs in fitness may ensue, as seen in various mental disorders (Cosmides and Tooby 2000, in press; Symons 1987, 1992; Herpertz et al. 2001; Weissman et al. 1996).

Every emotion entrains a situation detector circuit or dispositional representation that receives sensory information from the early sensory cortices, plugs the data into a matching computation, and makes an inference that an ancestrally or modernly recurrent situation is present (Cosmides and Tooby 2000; Damasio 1994). After the emotions' situation detector circuitry algorithmically compute cues that lead to the recognition of an ancestral or modern situation, they ferry a signal that either directly activates a specific configuration of subprograms or informs a neighboring dispositional representation to trigger a configuration (Cosmides and Tooby 2000; Damasio 1994; Winkielman and Berridge 2004, 2005). Such signals are meant to elicit affective reactions that are supposed to solve or mitigate the types of ancestral or contemporary problems that are regularly embedded in the discerned situation (Cosmides and Tooby 2000; Damasio 1994). This response by the emotions' situation detector circuitry is what is typically referred to as *unconscious affect* (Winkielman and Berridge 2004, 2005).

Emotional expressions were theoretically selected to be perceivable by others via emotional detector circuitry (Darwin 1872; Ekman 1985, 2007; Cosmides and Tooby 2000; Greenspan and Shanker 2004; Zajonc 2000). These highly demanded adaptations were developed to solve ancestrally incessant problems (i.e. if a predator was spotted lurking and verbal communication was perilous) while our hunter-gatherer ancestors spent a large portion of time with relatives and close cooperators (Cosmides and Tooby 2000). As evidenced by the universality of our emotional detectors, the hunter-gatherers that lacked the neural circuitry to detect emotional states in others likely suffered large costs in fitness (Frijda 1999; Cosmides and Tooby 2000). For example, one plausibly recurrent problem faced by our hunter-gatherer ancestors was how to determine, whilst language was not available, when a relative or mate was experiencing sadness of depression—people that are sad or depressed are typically less fertile and perceived as less desirable (Wijngaards-de Meij et al. 2005). Any hunter-gatherers that could not perceive cues associated with when a relative or reproductive partner was feeling doldrums probably left fewer progeny, their progeny left fewer progeny, and ultimately their genes were likely to be selected out of the population; this is probably why most humans contain the adaptations for detecting emotional expressions, such as sadness, in others (Cosmides and Tooby 2000). Some of our circuitry may be faulty or may not reliably develop as seen in cases of people with autism or fetal alcohol syndrome, but most of us contain the genetic coding for these adaptations nonetheless (Lovaas 1979; Steinhausen et al. 1993; Cosmides and Tooby 2000, in press).

The present study investigates the influence of affective reactions to subliminally presented "sad" and "happy" facial expressions on water consumption behaviors, water appraisals, and executive processes. The findings will be compared with the results of Winkielman and Berridge (2004, 2005) who studied the influence of our "anger" and "happy" emotional detectors on water consumption behaviors and water appraisals. In addition to this comparison, the results will aim to augment our understanding of the degree to which our "sad" and "happy" emotional detectors influence our executive processes. Many studies and reviews have attempted to elucidate similar phenomena (Öhman et al. 2001; Compton 2003; Cosmides and Tooby 2000; Dolan 2002; Vuilleumier and Schwartz 2001).

Contemporary theories of motivation postulate that hedonic behavior toward a stimulus is largely determined by the stimulus' incentive value: whether the stimulus activates a positive-negative affective response and promotes approach-avoidance motivation (Winkielman 2004, 2005; Toates 1986). Water hypothetically holds a high incentive value and activates such responses because of its ability to quench thirst; this hypothesis may explain why we perceive the taste of water more favorably and crave it more when we are thirsty (Rolls, Rolls, and Rowe 1983). Accordingly, the relatively thirsty participants in this experiment will pour and consume significantly more water and state that they would pay more for the water than the relatively less thirsty participants.

A comprehensive understanding of the purpose of a neural mechanism typically involves knowing why a mechanism was naturally selected, or the problems it was "designed" to solve (Cosmides and Tooby in press). As proposed earlier, one function of our sad emotional detectors may be to elicit configurations that cause us to help a person—typically a relative or close cooperator—that is conspicuously sad in the immediate environment. Recurrently, people are often given water when they are crying by others that are presumably feeling sympathy. This helpful act may be performed in order to ameliorate the uncomfortable "choked up" and parched feeling a person experiences when they cry and, ultimately, help the sad person acquire control over their sad expressions. Thus, water may be highly valued by people that are sad and crying. Interestingly, water could also be of high value to the person that is experiencing sympathy: by helping the sad person calm down, we may actively mitigate and/or deactivate our own feelings that were triggered by their crying. In agreement with this reasoning, the participants in the "sad" condition will state that they would pay more for the water than the participants in the "happy" condition.

In comparison to "happy" facial expressions, "angry" facial expressions have been evidenced to temporarily decrease the incentive value of a beverage and suppress beverage consumption (Winkielman and Berridge 2004, 2005). "Sad" facial expressions may have the same effect on consumption, but perhaps for a different reason. When we give water to someone that is sad, the potential amount of water that is left for ourselves is decreased. In the EEA where water was probably not as plentiful and conveniently located as today, this supportive act may have had more significant and dire consequences on one's ability to survive and reproduce; thus, conserving water in such sad situations may have been a fitness-enhancing behavior. Accordingly, the relatively thirsty participants in the "happy" condition will pour and consume significantly more water than the comparatively thirsty participants in the "sad" condition.

Cosmides and Tooby (in press) state that neural mechanisms appropriate relatively more mental processes (i.e. attention) if they were selected to solve comparatively more difficult ancestral problems. Arguably, our sad emotional detectors were selected to solve relatively more arduous problems than our happy emotional detectors. Therefore, the participants in the "happy" condition will find a substantially greater percentage of asterisks than the participants in the "sad" condition.

This experiment may prove to be important for many reasons. A large motivation of this study is to augment the relative paucity of knowledge regarding the influence that our "sad" and "happy" affective reactions have on our water consumption behavior and water judgments. If this experiment yielded any significant results, they could indicate details of our human nature that have not been discovered thus far. In addition, this experiment may potentially advance emotion theory as well as social psychological research on attitudes, judgments, and persuasion. Furthermore, the value of water, for the most part, is intrinsically predetermined; thus, if affective reactions influence appraisals of water, this information may change the way we think about such reactions. Lastly, this study is important because it employs a novel method that has not been used thus far to study affective reactions; consequently, this method may help to uncover information about our human nature.

Materials and Methods

In the present experiment there were forty-seven participants (n=47). All participants were recruited from two lower-division undergraduate psychology classes at the University of California, Santa Barbara and were given class credit for their participation. This sample consisted of twenty-two females and twenty-five males. The participants were randomly selected into each of the two conditions, "happy" and "sad". Twenty-two of the participants were in the "happy" condition and twenty-five of the participants were in the "sad" condition. In the "happy" condition there were ten males and twelve females. In the "sad" condition there were fourteen males and eleven females.

The participants were preordained to be excluded from the statistical analysis of this study if they: (1) did not follow the directions, (2) did not take the experiment seriously, or (3) consumed an inordinate amount of water due to an excessive lack of hydration. Accordingly, three of the participants were excluded from the statistical analysis of this experiment: One male and one female from the "happy" condition for conspicuously rushing through the experiment and not taking it seriously and one male from the "sad" condition for consuming an exorbitant amount of water due to reportedly feeling hung-over from the previous night of binge drinking.

Both sets of stimuli ("happy" and "sad") were presented on a Toshiba laptop computer using the computer program Matlab. Matlab randomly placed the asterisks in the pictures. The asterisks were set at 50% opacity, were white to begin with but turned grayish after the opacity was established, and were twenty point Times New Roman font. There were forty pictures in all (twenty "happy" and twenty "sad") that were found on the Internet via the search engine Google. The "happy" pictures consisted of people laughing and smiling. The "sad" pictures contained people crying. Matlab randomly presented every picture in a set twice for five seconds. The water used in this experiment was purchased at the Isla Vista Food Coop for thirty-five cents per gallon. The water was filtered via reverse-osmosis.

In this study, a between subjects design was implemented. Before the experiment began, every participant was deceivingly told that the purpose of this experiment is to study our target-searching ability. The participants performed the task as follows: At the beginning of each of the forty trials, a fixation dot appeared in the center of the computer screen. The participants were instructed to steadily fixate their eyes on the dot and press the space bar on the keyboard to start the display, which consisted of one of the twenty pictures with a hidden asterisk embedded in it that the participants were told to find as fast as possible (so as to limit the amount of cognitive processes directed toward thinking about the pictures). If the participant located the asterisk, they were told to press the space bar whereupon they would be shown a grid that was the exact same size as every picture they saw previously. Using the mouse, the participants were requested to indicate on the part of the grid where they saw the asterisk. After the participants responded on the grid, they were shown the fixation dot again and pressed the space bar to start the next trial. However, if the participant did not find the asterisk after the allotted five seconds, they were told by Matlab that they missed the target and to press the space bar to begin the next trial. There was one practice trial where every participant was given an unlimited amount of time to find the asterisk embedded within a picture about stop lights on a sheet of computer paper as well as forty experimental trials.

After completing the computer trials, the participants were asked to consume water and provide responses to a questionnaire regarding the water. Specifically, they were asked to pour as much water as they liked from a pitcher containing 1000 mL of water into a 473-mL cup. The questionnaire that they filled out asked three questions: (1) To indicate how thirsty they presently are on a Likert scale (1=thirsty, 7=not thirsty); (2) to indicate on a Likert scale how much they like/dislike the water (1=like, 7=dislike); and (3) to state how much they would spend on a gallon of the water. After the participants finished consuming the water and filling out the questionnaire, they were given a debriefing form that explained the real purpose of the experiment. Following the departure of each participant, the experimenter measured how much water every participant poured and consumed in mL.

Statistical Package for the Social Sciences (SPSS) was used to analyze the data. A one-tailed independent samples t-test examined the differences between the "sad" and "happy" condition. The coding of the t-test analyses assumed equal intervals between the happy and sad conditions (0=happy and 1=sad). The data was also analyzed using linear regressions with pouring, consuming, and price as criterion variables, and the priming condition (sad, happy) and thirst level as predictor variables. The coding of the linear regression analyses assumed equal intervals between the happy and sad conditions (0=happy and 1=sad).

Results

Independent Samples T-Test

Significance for the t-tests was determined at an alpha level of $p<.05$. The participants in the "happy" condition stated on the Likert scale that they were thirstier (μ=3.95, σ=1.5) than the participants in the "sad" condition (μ=4.08, σ=1.6), $t(42)= -.28$, $p>.05$. The participants in the "happy" condition reported liking the water more (μ=3.05, σ=1.54) than the participants in the "sad" condition (μ=3.13, σ=1.91), $t(42)= -.18$, $p>.05$. The participants in the "happy" condition stated that they would pay more (μ=\$2.83, σ=1.6) for the water than the participants in the “sad” condition (μ=\$2.73, σ=1.04), t(42)= .24, p>.05. The participants in the “happy” condition poured more water (μ=163.36, σ=100.16) than the participants in the “sad” condition (μ=142.607, σ=71.98), t(42)=.78, p>.05. The participants in the “happy” condition consumed more water (μ=151.03, σ=107.39) than the participants in the “sad” condition (μ=116.394, σ=77.8), t(42)= 1.2, p>.05. The participants in the “happy” condition found more asterisks (μ=73.85%, σ=10.84) than the participants in the “sad” condition (μ=62.71%, σ=7.07), t(42)=4, p<.05.

Linear Regressions

Significance for the linear regressions was determined at an alpha level of p<.05. Figure 1 shows that the participants in the “happy”

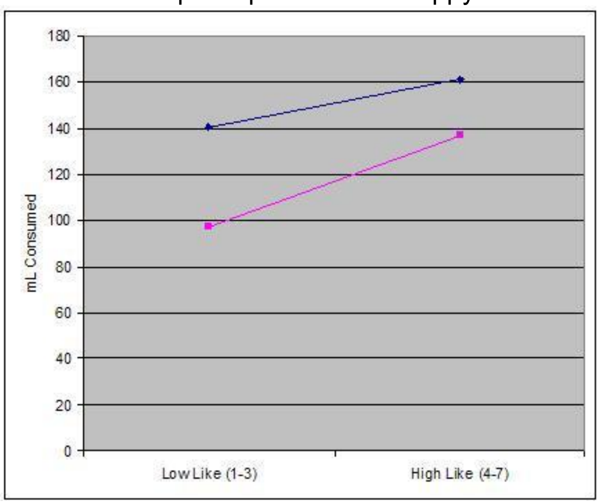

Figure 1: The participants in the happy condition consumed more water than the participants in the sad condition regardless of like.

condition consumed more water (β =3.03, p>.05) than the participants in the “sad” condition (β=5.64) regardless of how likeable the water was rated on the Likert scale. indicates that the participants in the “happy” condition that stated a relatively high like of the water poured more of it (β= 4.11, p>.05) than the participants in the “sad” condition (β= 3.72) that indicated a relatively high like. Similarly, the participants in the “happy” condition that indicated a relatively low like of the water poured more of it than the participants in the “sad” condition that stated a relatively low like (p>.05). specifies that the participants in the “happy” condition that indicated a relatively high like of the water stated that they would pay more for it (β=.13, p>.05) than the participants in the “sad” condition that stated a relatively high like of the water (β= -.06). Conversely, the participants in the “sad” condition that stated a relatively low like of the water indicated that they would pay

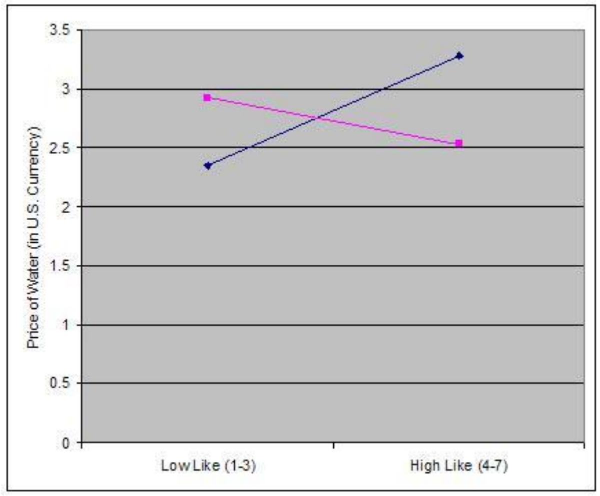

Figure 2: As like increased, the participants in the happy condition poured relatively more water.

more for it than the participants in the “happy” condition that provided a relatively low like of the water (p>.05). Figure 4 indicates that the relatively thirsty participants in the “happy” condition consumed more water (β= 8.95, p>.05) than the relatively thirsty participants in the “sad” condition (β= 4.96). Similarly, the relatively less thirsty participants in the “happy” condition consumed more than the relatively less thirsty participants in the “sad” condition (p>.05). As specified in Figure 5, the relatively less thirsty participants in the “sad”

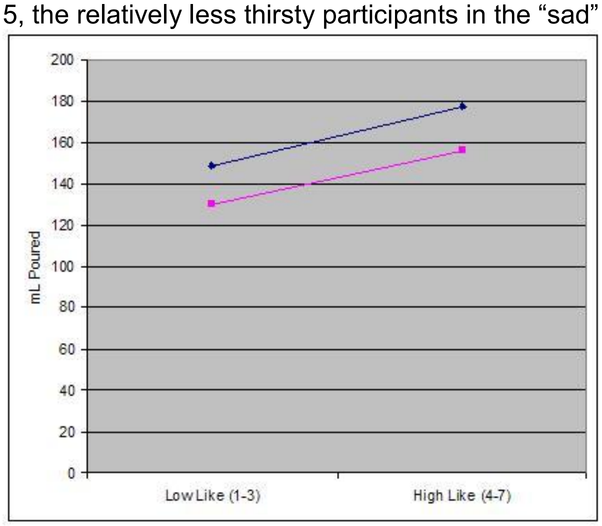

Figure 3: As like increased, the amount of money the participants in the happy condition were willing to spend on the water increased. The opposite trend was seen for the participants in the sad condition.

condition poured more water (β= 3.43, p>.05) than the participants in the "happy" condition (β= 11.39) that were relatively less thirsty. On the other hand, the relatively thirsty participants in the "happy" condition poured more water than the relatively thirsty participants in the "sad" condition (p>.05). As indicated in Figure 6, the relatively less thirsty participants in the "sad" condition stated that they would pay more money for the water (β= -.06, p>.05) than the relatively less thirsty participants in the "happy" condition (β= .05). In contrast, the relatively thirsty participants

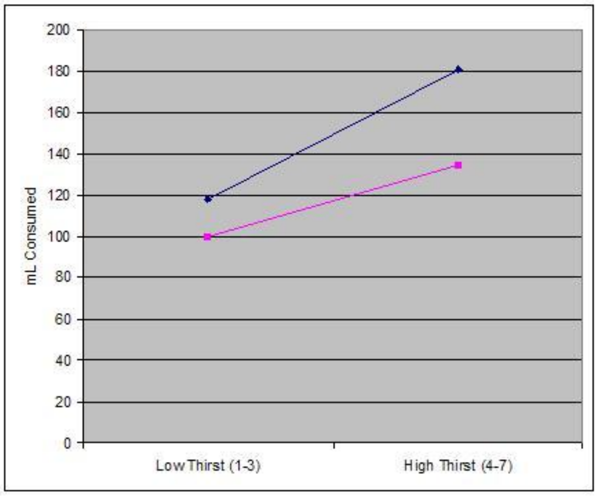

Figure 4: As thirst increased, the participants in the happy condition consumed relatively more water.

in the "happy" condition stated that they would pay more money for the water than the relatively thirsty participants in the "sad" condition (p>.05).

Discussion

Winkielman and Berridge (2004, 2005) found that their thirsty participants poured and consumed significantly more lime Kool-Aid and were willing to pay twice as much for the beverage after viewing happy faces than after angry faces. In the present study, results similar to those of Winkielman & Berridge were not revealed. The linear regressions indicated that the relatively thirsty participants in the "happy" condition did not pour and consume significantly more water than the relatively thirsty participants in the "sad" condition (Figures 4-6). They also did not state that they liked the water more or would pay more for it (Figures 1-3).

Rolls, Rolls, & Rowe (1983) provided evidence toward the common sense notion that people think that water tastes better and crave it more when they are thirsty. However, the present study did not provide support for this belief. The

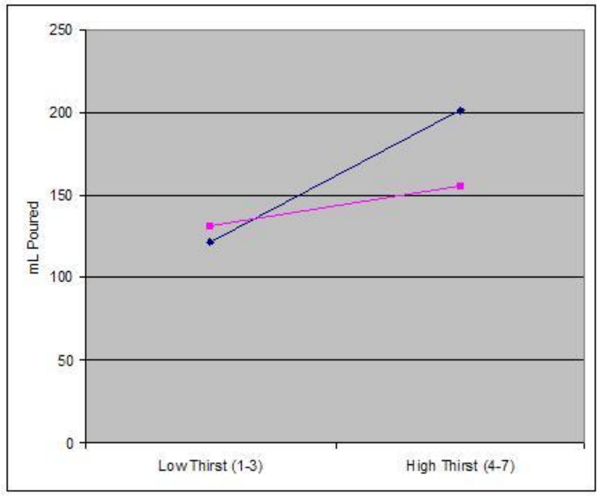

Figure 5: As thirst increased, the amount of water poured increased more rapidly for the participants in the happy condition than the participants in the sad condition.

linear regressions revealed that the thirsty participants in this experiment did not pour or consume significantly more water or state that they would pay more for it (Figures 4-6).

Cosmides and Tooby (in press) have found that certain neural mechanisms tendentiously appropriate more mental processes (i.e. executive processes) than others depending on the relative amount and difficulty of problems such mechanisms were "designed" to solve. Hypothetically, our "sad" emotional detectors were

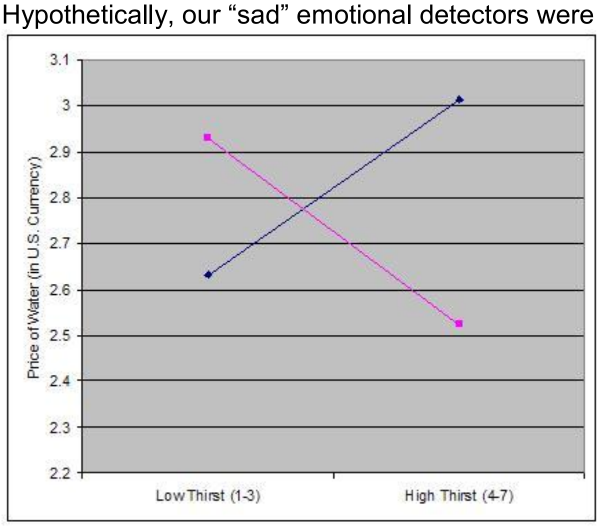

Figure 6: As thirst increased, the amount of money the participants in the happy condition were willing to spend increased. The opposite trend was seen for the participants in the sad condition.

selected to solve a host of relatively more difficult problems (i.e. giving emotional support to a loved one that is sad) than our “happy” emotional detectors. In support of this hypothesis, the independent t-tests of the present study revealed that the participants in the “happy” condition found significantly more asterisks than the participants in the “sad” condition.

The implications of the present study may find importance within the psychological areas of cognitive psychology, social psychology, and evolutionary psychology. (1) The distinct influences of our “happy” and “sad” emotional detectors on water consumption and water appraisal may not be significantly different from each other. (2) Our “happy” emotional detectors may have a higher threshold of activation than our “sad” emotional detectors. (3) Our “sad” emotional detectors may appropriate more of our executive processes than our “happy” emotional detectors. (4) Our “sad” and “happy” emotional detectors may not have direct or indirect access to configurations that influence water consumption and water appraisal. (5) Our “sad” situation detectors may be able to discriminate between a “sad” situation that is contrived and a “sad” situation that is veritable. (6) In situations where a researcher asks us to pour and consume water, even if we purport to be thirsty, we still may not follow our hedonic impulse to pour and consume significantly more water than others that claim to be relatively less thirsty.

Explanations

In order for a situation detector to ferry a signal to directly or indirectly activate, deactivate, or modify certain configurations, it theoretically must compute highly specific data from the environment that “convinces” it to do so (Damasio 1994; Cosmides and Tooby 2000, in press). If any of the environmental data is unrecognizable, the threshold of the situation detector may not be met and it probabilistically would not elicit or change a corresponding configuration; however, in some cases, it could activate a configuration that undermines fitness (Symons 1987, 1992; Cosmides and Tooby 2000; Cosmides and Tooby in press). This theory may explain why there was no significant difference seen between the “happy” and “sad” conditions regarding water consumption and water appraisals: computers could be too evolutionarily novel and, resultantly, may not contain the exact data our “sad” and/or “happy” situation detectors require to influence such thoughts and behaviors.

Activation theory states that every computational mechanism within our brain was naturally selected to have a particular threshold of activation: Each neural apparatus requires a certain amount and strength of cues to be activated (Krebs and Davies 1993a). A mechanism’s threshold should have theoretically been selected to correspond to how recurrent and serious the ancestral problems were that the mechanism was “designed” to solve (Cosmides and Tooby 2000, in press; Krebs and Davies 1993a). Essentially, some neural mechanisms have a high threshold—they require relatively more environmental input to be activated—while others maintain a relatively low threshold. Since the participants in the “sad” condition performed significantly worse on the task, this may indicate that the emotional detectors of the participants in the “happy” condition were not activated. If this were the case, then the participants in the “happy” condition were able to devote more of their attention to searching for the asterisks, rather than processing the “happy” stimuli. Arguably, these findings may suggest that our “happy” emotional detectors have a higher threshold of activation than our “sad” emotional detectors and, ultimately, that our “sad” emotional detectors were selected to solve a relatively greater amount of difficult ancestral problems.

Cosmides and Tooby (2000, in press) provide evidence that our neural mechanisms may appropriate more of our mental processes if they were selected to solve a relatively greater amount of difficult ancestral problems. The participants in the “sad” condition may have performed significantly worse on the task because a substantial amount of their attentional processes were directed away from searching for the asterisk after their sad-situation detectors activated corresponding configurations. However, the participants in the “happy” condition performed significantly better on the task because our “happy” emotional detectors may require a relatively smaller amount of attentional processes to operate. Therefore, our “happy” emotional detectors may have been selected to solve a fewer amount of difficult problems than our “sad” emotional detectors.

Most neural mechanisms have limited direct and indirect access to configurations that elicit certain behaviors and thoughts (Damasio 1994; Cosmides and Tooby 2000, in press). The findings of the present study may indicate that our “happy” and “sad” situation detectors may not be able to directly or indirectly activate configurations that cause us to pour or drink relatively more or less water or influence our judgments about water. If this were the case, then, ultimately, our “happy” and “sad” emotional detectors may not have been naturally selected to solve problems related to water.

By understanding why our "anger" emotional detectors were selected, an elucidation may be reached that explains why Winkielman and Berridge's (2004, 2005) results were different from those in the present study. In general, when someone is angry, they may be more inclined than usual to be violent and aggressive (Berkowitz 1993a, 1993b). In ancestral times when there were no policemen to arrest people and punish them, physical violence could have been an immensely huge recurrent problem, considering how big a problem it is today (Davis et al. 2002; Straus and Gelles 1986). Thus, one function of our angry-situation detector circuitry and corresponding configurations may be to prepare us for potential acts of violence from an angered person in the immediate environment. These programs may achieve this feat by entraining conscious and/or nonconsious wary affective responses and/or behaviors in *most* situations of anger (i.e. from different circumstances in the real world to seeing angry faces on a computer). This hypothesis is strengthened by the behavior observed by the *thirsty* participants in the "anger" condition that significantly consumed and poured less water and stated that they would pay less for the water than the participants in the "happy" condition (Winkielman and Berridge 2004, 2005). From an evolutionary perspective, the participants may not have unconsciously wanted to anger the people on the computer they just saw further: By not drinking as much water and saving more for the angry person who may be thirsty too, potential acts of violence and confrontations may be avoided. Thus, our "anger" emotional detectors may have a significant, unconscious relationship with water. On the other hand, as hypothesized earlier, a person whose "sympathy" mechanisms are activated may give a conspicuously sad (i.e. crying) person water in order to actively bring about a deactivation of their unpleasant sympathetic state; accordingly, such people may value water more than people detecting "happiness" and may be driven toward saving or consuming less water since they gave water to someone that was sad. Debatably, this did not occur because our sad emotional detectors may have evolved the ability to discriminate between a real situation of sadness and one that is contrived. Just think of the costs one would avoid by ignoring the person feigning sadness to easily fulfill a desire (Ekman, 1985; Cosmides and Tooby, 2000). So, our sad emotional detectors may have an association with water, as indicated when we give others water when they are crying, but they may not activate behavioral or cognitive configurations in artificially determined situations.

Researchers widely accept the theory that people behave differently in experiments than in real life contexts (Benz and Meier 2008; Damasio 1994). In the present experiment, the relatively thirsty participants did not consume significantly more water than the relatively less thirsty participants. Curiously, this finding seems both nonsensical and scientifically possible. It does not seem valid because people generally drink more water when they are thirsty compared to when they are hydrated (Saltmarsh 2001). However, it seems possible due to findings from researchers such as evolutionary psychologists that have shown that such behavior may occur if the specific contexts the mechanisms evolved to detect are absent (Cosmides and Tooby in press; Symons 1987, 1992). Thus, even though water was present, the thirsty participants' mechanisms that are responsible for water consumption may not have received enough relevant environmental stimulation and, resultantly, did not elicit the type of configurations that are responsible for quenching or significantly ameliorating thirst (Figures 4-5).

The linear regressions in the present study were underpowered. In general, at least sixty participants are required to have a sufficient amount of power while running regressions—this study had forty-four. Perhaps with a larger sample, the results would have been different.

Future Directions

Future research addressing the relationship between our sad emotional detectors and behaviors pertaining to water and water appraisal should attempt to create a more natural sad situation than the one used in this experiment. Neurological studies should observe whether our "happy" or "sad" emotional detectors are activated more easily as well as the specific configurations or brain areas these detectors may be associated with. Future studies investigating such phenomena should also use a greater number of participants.

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