On the psychology of drinking: Being thirsty and perceptually ready

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The present research is concerned with cognitive effects of habitually regulated primary motives. Specifically, two experiments tested the idea that feelings of thirst enhance the cognitive accessibility of, or readiness to perceive, action-relevant stimuli. In a task allegedly designed to assess mouth-detection skills, some participants were made to feel thirsty, whereas others were not. Results showed that participants who were made thirsty responded faster to drinking-related items in a lexical decision task, and performed better on an incidental recall task of drinking-related items, relative to no-thirst control participants. These results suggest that basic needs and motives, such as thirst, causes a heightened perceptual readiness to environmental cues that are instrumental in satisfying these needs.

The concept of motivation is central to the understanding of why animals, humans included, initiate, select, and persist in specific actions. Researchers from various branches in psychology have examined the motives that instigate us to attend to, and interact with, our external environment (Bindra, 1974; Geen, 1995; Toates, 1986; Young, 1961). It is known that physical and social needs or motives point us to specified incentive stimuli (e.g. water, money, friends), and, as one possible criterion, it is the effort to explore these stimuli that qualifies the behaviour as motivational. For instance, the way we act on the primary motive of thirst nicely exemplifies the fundamental role of motivation in affecting the direction of subsequent behaviour. Out of several possible responses and stimuli that we have at our disposal, for example, we take a glass of water to quench our thirst.

In order to learn more about basic processes underlying the initiation of motivated human action, thirst and behaviour aimed at reducing thirst have been given much empirical attention (Fitzimons, 1972; Logue, 1991; Rolls & Rolls, 1982). Research

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aimed at understanding thirst itself has been largely concerned with the associated physiological changes. Cannon (1932), for instance, assumed that 'local body signs' play a role in thirst. Cannon conducted experiments on himself and observed an association between the sensation of a dry mouth and the experience of thirst. However, later research showed that a dry mouth is not normally the primary stimulus for thirst. Thus, wetting the mouth does not by itself reduce thirst (Bellows, 1939). Instead, thirst is also produced by general (instead of local) dehydration. That is, intracellular dehydration (e.g. caused by salt-intake), in which body fluid is lost from the cells, leads to thirst. Also, extracellular dehydration (e.g. due to loss of blood), in which fluid is lost from the compartments outside the cells, triggers thirst (Gilman, 1937; Stricker, 1966). Dehydration excites a complex pattern of neural activity in the hypothalamus and higher regions in the cortex (Grossman, 1979; Stellar, 1990) which in turn, lead to drinking and, in humans, reported thirst.

While the work alluded to above sheds light on the importance of physiological events (and mediating neural substrates) causing thirst and drinking, our present focus is on the psychology of thirst. We can all witness that thirst — defined in terms of physiological changes — results in behavioural changes such as drinking. The onset of drinking behaviour may result from various motivational and cognitive processes that can elicit these actions. Our goal here was to investigate whether inducing feelings of thirst increased cognitive accessibility of drinking-related cues.

The hypothesis that feelings of thirst leads to heightened accessibility of cues related to drinking is based on the following considerations. We assume that frequent and habitual implementation of a particular behaviour choice (e.g. taking a glass of water, drinking a bottle or can of soda) in order to regulate (the physiological changes that typify) thirst increases the strength of the association between these two elements. Once these associations have been developed, thirst can prime action-relevant stimuli, thereby increasing their availability as cues (cf. also Gallistel, 1990). That is, due to instrumental learning, thirst is able to enhance the cognitive accessibility of items (e.g. glass, bottle, and water) that are instrumental in the course of reducing the desire to drink. In a recent review of learning research on the role of internal and external factors in ingestive behaviour Mook (1996) argued that '...hunger and thirst enhance, or, as we say, potentiate, the responses to relevant stimuli. The more potentiation from inside, the less effective the external stimulus has to be to trigger ingestion' (p. 91). Thirst, then, is expected to lead to perceptual readiness (cf. Bruner, 1957) aimed at reducing this thirst.

The idea that thirst causes internal representations of instrumental stimuli to become more accessible is consistent with contemporary animal learning research on the relationship between motives and action (Bolles, 1972; Colwill & Rescota, 1986; Dickinson & Balleine, 1994). Studies with hungry and thirsty rats, for instance, suggest that after a period of training the performance of instrumental actions is mediated by knowledge of the contingency between the action (e.g. pressing a lever) and the outcome or goal (e.g. getting water). Goal-directed actions are thus said to correspond to internal representations of performing that action. Hence, the arousal of primary needs may prime these representations in the service of satisfying the needs.

Although there is no hard evidence pointing to the conclusion that thirst leads to perceptual readiness aimed at reducing this thirst, there is some earlier evidence suggesting that primary motives (such as hunger) are capable of affecting human
perception. In a test of the projective expression of needs, McClelland and Atkinson (1948) demonstrated that 16 hours of food deprivation activate eating-related thoughts. These researchers used an ostensibly subliminal perception task (they actually projected empty slides on a screen), and asked participants specific questions about the slides (e.g., 'What kind of things are on the table displayed on the slide?'). They established that hungry participants were more likely to 'see' objects (e.g. plates) that are instrumental in the goal of eating than did non-hungry participants. These effects may be explained by heightened accessibility of eating-related objects. On the other hand, these findings show projection and not increased accessibility or perceptual readiness per se. Perceptual readiness points to the amount of stimulus input that is needed to recognize an object. The more perceptually ready, the less input one needs to recognize an object. In the study done by McClelland and Atkinson (1948), participants received no relevant stimulus input at all (except for the specifically chosen questions that triggered imaginative thoughts of hunger or food-related items). Their measure of projection may reveal perceptual readiness, but it may also reveal other, related, processes (e.g. rumination about current concerns, cf. Klinger, 1975) or a combination of different processes. Indeed, it is a commonly reported fact that castaways or survivors start to fantasize about water and food after a period of extreme deprivation (Read, 1996; Wolf, 1958).

Accordingly, in recent years, several investigators have adapted paradigms from cognitive psychology, such as the Stroop (1953) colour-naming task, to examine effects of manipulated hunger (e.g. after a stringent food deprivation regime) and eating disorders (e.g. anorexia and bulimia nervosa) on information processing of food-relevant stimuli (Channon & Hayward, 1990; Green, McKenna, & de Silva, 1994; Green, Elliman, & Rogers, 1996; Mogg, Bradley, Hyare, & Lee, 1998; Ogden & Greville, 1993; Overduin, Jansen, & Louwerse, 1995; Stewart & Samoluk, 1997). By and large, subjective feelings of hunger and chronic thoughts about food habits and body weight have been shown to produce enhanced attention to food items, relative to control items. These findings are more convincing as to the idea that basic needs and motives are related to responsiveness of action-relevant cues.

The goal of the present research is to extend previous work on effects of primary motives on perception and information processing by scrutinizing the assumed relationship between feelings of thirst and perceptual readiness. In two experiments, we tested whether feelings of thirst (induced by tasting and swallowing salty candies) facilitated the ease with which relevant environmental cues were perceived. In Expt 1, some participants were made to feel thirsty, whereas others were not. Subsequently, we assessed the accessibility of drinking-related items by measuring the speed of responding to these items in a lexical decision task (see Neely, 1991). In the lexical decision task, participants were shown letter strings on a computer screen and were told to press a particular key if they thought the letter string was an existing word, or to press another key if they thought the letter string was a non-word. Some of the words designated drinking-related items. If thirst has the potential to prime drinking-related items, then these items should be more accessible as a result of feeling thirsty. As faster response latencies are indicative of enhanced accessibility of, or perceptual readiness to items related to drinking, it is predicted that participants who were made to feel thirsty will be faster in recognizing these items than those who were not made to feel thirsty.
EXPERIMENT 1

Method

Participants and design
A group of 58 undergraduates of various departments and disciplines (41 male, 17 female) participated in the experiment, receiving 5 Dutch Guilders in return. They were randomly assigned to either a thirst condition or one of two no-thirst control conditions.

Experimental task and procedure
As the manipulation of thirst consisted of the consumption of certain types of sweets, on arrival at the laboratory, participants were first interviewed on general health problems and prohibitions against consuming specific foods. Participants who were not allowed to consume certain types of food were excluded from further participation in the experiment. Next, participants were told that the study consisted of several separate tasks for which they expressed their consent.

Individual differences in word recognition speed. First, participants were placed in a cubicle and performed a lexical decision task on a computer. They were presented with 10 words that appeared one by one on a computer screen. Five of these words were existing words and the remaining five were nonsense words. For every word appearing on the screen they were asked to decide as quickly and as accurately as possible whether the word was a real word or not. Response latencies were measured in milliseconds (ms) from the onset of the words until participants pressed one of two keys on the PC’s keyboard marked ‘yes’ and ‘no’. The words were presented in random order, and preceded by six practice trials. The average response latency across the five existing words served as a covariate to control for between-participants variance in reaction time. Incorrect (‘no’) responses across these words were excluded from this measure (2.1% out of all responses).

Manipulation of thirst. Next, the test group of participants was confronted with the ‘mouth detection’ task. As a cover story, participants were told that we were interested in how well people could detect letters with their tongue under different taste conditions. For this task, participants were provided with three salty sweets. Those used here (made of natural liquorice, gum, starch, gelatine and dextrine) are common in The Netherlands. Each sweet weighs about 3 grams, and comprises an additional amount of 14% salt (product name: Bisal). The sweets were round and flat (like a coin) and had a letter (e.g. T, S) on one of the sides. Participants were asked to indicate which letter was marked on each one by using their tongue. They were given 1 minute to detect each letter and to consume the sweet. We assumed that the combined effects of the salty taste and post-ingestive effects of the salt would increase feelings of thirst, and hence, this condition is referred to as the thirst condition. It is important to note, however, that this treatment may have its effects through a number of possible mechanisms. We will return to this point in the discussion section.

We used two control conditions. As a first control condition (Control I) some of the participants were requested to carefully draw three figures. Similar to the thirst condition, participants were given 1 minute to draw each figure. As a second control condition (control II) a group of the participants followed the same procedure as described in the thirst condition, only this time three non-salty sweets were used (similar weight and shape, and also made of natural liquorice, gum, starch, gelatine and dextrine; product name: Tosca). This second control condition was used to rule out the possibility that the effects of the thirst condition were caused by the mere act of eating liquorice sweets.

1 Because salt-injections (even in small doses) and water deprivation both raise practical and ethical problems (e.g. Winer, 1971), we deemed it more appropriate to follow this alternative method of making participants feel thirsty.
Pilot study. Prior to the experiment we conducted pilot-tests to assess the effects of our treatments on self-reported measures of thirst and hunger. A total of 21 undergraduates (drawn from a different population than in the experiments) were assigned randomly to either the thirst or one of the two control (I and II) conditions. After 4 minutes, they responded to two items assessing the degree of thirst ('How thirsty do you feel right now?') and hunger ('How hungry do you feel right now?'). Unipolar 10-point answer scales ranging from 'not at all' (1) to 'very much' (10) accompanied both items. An ANOVA revealed a significant effect of the treatment on ratings of thirst, \( F(2, 18) = 4.72, p < .03 \), but no effect on ratings of hunger, \( F(2, 18) = 1.14 \), n.s. Contrast analyses showed that participants in the thirst condition (\( M = 7.86 \)) experienced substantially more thirst than in the control I condition (\( M = 3.86 \)), \( F(1, 18) = 8.30, p < .01 \). Furthermore, the difference between the thirst and the control II condition (\( M = 4.57 \)) was also significant, \( F(1, 18) = 5.60, p < .03 \). There was no reliable difference between the two control conditions, \( F < 1 \). Thus, the test sweet plus salt treatment increased rated thirst over 1 minute post-ingestion.

Word recognition speed of drinking-related items. Immediately after participants had been exposed to the experimental conditions, they were given a second lexical decision task. For this task participants responded to 48 words (different from those in the first task), 24 of which were existing words and 24 were nonsense words. The words were presented in random order, and were preceded by six practice trials. Among the existing words were eight words designated drinking-related items (glass, bottle, can, beaker, cup, water, soda, juice). The other 16 words designated furniture and interior items, and these words were presumed not to be associated with thirst and drinking (e.g. chair, table and lamp). The length of the type of words was controlled for. That is, the mean length of the drinking-related items and the non-drinking related items was equal (\( M = 5.3 \) letters). The drinking-related items were selected on the basis of a pre-test, in which 36 students indicated how strongly they associate several items with thirst and drinking on a 9-point scale that ranged from 'not at all' (1) to 'extremely strong' (9). The average association strength of the eight selected items was 6.80, and ranged across items from 5.62 to 8.34. Thus, these eight items comprise the experimental target words of the lexical decision task. The other 16 items served as controls.

After the lexical decision task, participants were thoroughly debriefed and paid. The debriefing indicated that participants were unaware of the hypotheses under investigation. None of the participants indicated suspicion as to the actual relationship between the tasks. In fact, most participants simply believed that the research was dealing with the issues stated in the cover story of each task.

Results and discussion

Incorrect ('no') responses to existing words were excluded from further analyses (0.8% out of all responses, which were evenly distributed across conditions). The average response latency across the drinking-related words and non-drinking related words served as the dependent variables. The response latencies were subjected to a 3 (Treatment: control I vs. control II vs. thirst) between-participants × 2 (Type of item: drinking-related vs. non-drinking related) within participants ANCOVA with the response latencies on the first lexical decision task as a covariate. The analysis revealed a non-significant main effect of Treatment, \( F(2, 54) = 1.37 \), n.s. Furthermore, the main effect of Type of item was non-significant, \( F(2, 54) = 1.75 \), n.s. However, the interaction between Treatment and Type of item was reliable, \( F(2, 54) = 3.45, p < .04 \). This indicates that Treatment evoked differential response latency effects across the two (drinking and non-drinking related) different types of items. The means for each cell in the design are displayed in Table 1.

Separate analyses for drinking and non-drinking related items yielded a significant main effect of Treatment on response latencies of drinking-related items, \( F(2, 54) = 3.93, p < .02 \), and a non-significant main effect of Treatment on response latencies of

\[\text{(2) Of course, in the lexical decision task, Dutch words were used. Here, we report the English translations of the original words.}\]
Table 1. Mean latencies (in ms) as a function of Treatment and Type of item

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<thead>
<tr>
<th>Type of item</th>
<th>Treatment</th>
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<tbody>
<tr>
<td></td>
<td>Control I</td>
</tr>
<tr>
<td>Drinking-related</td>
<td>623</td>
</tr>
<tr>
<td>Non-drinking related</td>
<td>630</td>
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</tbody>
</table>

non-drinking related items, $F < 1$, n.s. In other words, reliable differences between the Treatment conditions emerged for drinking-related items, but not for non-drinking related items. As can be seen in Table 1, participants' response latencies of drinking-related items in the thirst condition were reliably shorter than participants' response latencies in the control I condition, $F(1, 54) = 7.14, p < .01$. Furthermore, participants in the thirst condition responded faster to the drinking-related items than those in the control II condition, $F(1, 54) = 4.25, p < .05$, although the difference was smaller. There was no significant difference between the two control conditions, $F < 1$.

In short, participants who had taken in salty sweets during a mouth-detection skill task responded faster to drinking-related items than did participants who had not been exposed to such salt-intake conditions. These results are consistent with the idea that inducing feelings of thirst (or a desire to drink) significantly heightens the accessibility of drinking-related items.

EXPERIMENT 2

The aim of Expt 2 was to replicate the results of Expt 1 using a different paradigm in which the items had to be detected in the environment. As in Expt 1, some participants were made to feel thirsty, whereas others were not. Subsequently, the accessibility of drinking-related items was measured using an incidental recall task (Brewer & Treyns, 1981; Conforto & Gershman, 1985; Dijksterhuis, Bargh, & Miedema, 2000), in which participants were asked to wait in another office for 4 minutes. In addition to typical office items, several drinking-related items were placed in this room. Upon returning to the room where the experiment started, participants were asked to recall the items that were present in the office. Although previous studies using this paradigm suggest that participants may have difficulties in retrieving items to which they are previously exposed, the incidental recall task should produce sufficient variance on the number of recalled items to test differences between conditions. Based on the idea that more accessible information is more likely to be encoded and recalled (Carlston & Smith, 1996; Fiske & Taylor, 1991; Higgins, 1996), we expected feeling of thirst to enhance recollection of drinking-related items, relative to non-drinking related items.

Although the pattern of results in Expt 1 was in line with predictions, closer observation of the data suggests that, overall, there was somewhat more differentiation between the thirst and control I conditions, than between the thirst and control II conditions. That is, differences on self-reported feelings of thirst and response latencies
of drinking-related items were smaller between the thirst and control II conditions, than between the thirst and control I conditions. The less pronounced distinction between the thirst and control II conditions may have been caused by the fact that the control II group also had to eat liquorice sweets, which may have increased their feelings of thirst, or the desire to drink too (see Mogg et al., 1998, for a comparable effect on feelings of hunger as a result of different fasting conditions). Therefore, to differentiate more strongly between feelings and non-feelings of thirst, and thus to provide a more sensitive test to investigate effects of thirst on recollection of drinking-related items in the incidental recall task, only the thirst and control I conditions from Expt 1 were used.

Furthermore, in this second experiment we included a behavioural measure to assess whether our manipulation of thirst indeed made participants feel thirstier. For this additional purpose we observed participants' responses to an invitation to drink a glass of water at the end of the experimental session.

**Method**

**Participants and design**

A sample composed of 84 undergraduates of various departments and disciplines (53 male, 31 female) participated in the experiment, each receiving 5 Dutch guilders in return. They were randomly assigned to either the thirst or control I condition from Expt 1.

**Experimental task and procedure**

As in Expt 1, participants were first interviewed on general health problems and prohibitions against consuming specific foods. Subsequently, they were told that the study consisted of several separate tasks, and were seated in a room and exposed to the thirst or control I condition. Next, they filled out a short unrelated questionnaire (which took 1 minute) in another room that was described as the office of the experimenter. Participants were seated at a table facing the experimenter's desk containing a PC and typical office items (e.g. books, pencils). Additionally, eight drinking-related objects (e.g. glass, bottle) were placed on the desk. Participants were left alone in the office for 4 minutes. On their return, they were given a surprise free recall task in which they were asked to recall the objects present on the experimenter's desk in the room they had been in previously. The numbers of drinking-related and non-drinking related items correctly recalled were recorded.

After the recall task, participants were offered a glass of water to test whether the thirst condition did enhance the desire to drink. Finally, participants were thoroughly debriefed and paid. The debriefing revealed that participants were not aware of a possible effect of the mouth detection task on later performance, and that they were unaware of the hypotheses under investigation. However, two participants stated that they had tried to memorize all the items that were present in the other room (including the wallpaper). Hence, these two participants were excluded from further analyses.

**Results**

**Drinking test**

To check whether we succeeded in manipulating feelings of thirst we subjected participants' responses to drink (yes or no) to a Chi-squared test. In the thirst condition 34% (15/44) of the participants decided to take a drink, against 16% (6/38) in the control condition, $\chi^2(1) = 3.69, p < .06$. 
Recall of items

The mean number of recalled drinking-related items and non-drinking related items for both groups are presented in Table 2. Although the recall measures did not show normal distributions, the pattern of means suggests that participants in the thirst condition were better in recalling the drinking-related items than participants in the control condition, whereas differences between the two conditions did not emerge for the recall of non-drinking related items. In other words, feelings of thirst enhanced the recall of drinking-related items, relative to non-drinking related items. Indeed, the difference score [(number of drinking-related items) - (number of non-drinking related items)] was more positive in the thirst condition \(M = -0.14\) than in the control condition \(M = -0.68\), Mann-Whitney \(U = 659, p < .05\) (one-tailed). These results indicate that inducing feelings of thirst enhance the attention to, and recall of, drinking-related items.

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<tr>
<th>Type of item</th>
<th>Treatment</th>
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<tbody>
<tr>
<td></td>
<td>Control I</td>
<td>Thirst</td>
<td></td>
</tr>
<tr>
<td>Drinking-related</td>
<td>0.50</td>
<td>1.09</td>
<td></td>
</tr>
<tr>
<td>Non-drinking related</td>
<td>1.18</td>
<td>1.23</td>
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**GENERAL DISCUSSION**

The findings from two experiments supported the idea that thirst is capable of priming action-relevant cues. More specifically, the arousal of thirst increased the accessibility of drinking-related items, as was observed by faster responses to drinking-related items in a lexical decision task, and better memory for these items in an incidental recall task. In doing so, we demonstrated that thirst heightens the perceptual readiness of environmental stimuli instrumental in the goal of reducing thirst. The present data thus complement research that focuses on physiological causes of thirst and drinking (see also, Logue, 1991), in showing a possible intermediary route from thirst, via mental accessibility of action-relevant stimuli, to the initiation of drinking behaviour (Dickinson & Balleine, 1994; Gallistel, 1990).

The present results also extend research on the effects of feelings of hunger and eating disorders on selective information processing (Green et al., 1994; Ogden & Greville, 1993; Overduin et al., 1995). The most widely (and successfully) used paradigm in these studies to assess responsiveness to food stimuli is the Stroop colour-naming task (for a review on this task, see McLeod, 1991). In this task, participants are asked to name the colour of food words (e.g. chips printed in blue), and retardation of the responses is believed to provide evidence for selective processing or attentional biases of food words (but see Mogg et al., 1998; for a recent treatment of attentional bias effect of hunger in a probe detection task). More precisely, the colour of food items is named more slowly as the automatic activation of the food items interferes, and hence, requires active
suppression (which takes time and thus slows down the colour responses). Like the faster recognition, and superior recall of, drinking-related items observed in the present research, the interference of food items in a Stroop task may also be caused by enhanced perceptual readiness to, or mental accessibility of these items. Indeed, there is a growing amount of literature suggesting that accessibility of concepts increases the latencies of colour responses in a Stroop task (Jacoby, McElree, & Trainham, 1999; Johnston, Hudson, & Ward, 1997; Kawakami, Dovidio, Moll, Herrnson, & Russin, 2000; Lane & Wegner, 1995). Clearly, the paradigms available for studying the relation between motivational states and accessibility of action-relevant cues (e.g. lexical decision task, incidental recall task, Stroop task) focus on different aspects of information processing at the time of measurement (e.g. encoding, retrieval, controlling interfering responses). Given this diversity of potential accessibility measures, it would therefore seem useful for future research to examine the extent to which these measures covary and reveal differences in responses under different levels of various motivational states. Such an enterprise provides a more complete answer on the question of how accessibility affects cognitive biases for cues associated with the regulation of motives.

Furthermore, the present inquiry into situationally induced feelings of thirst may be relevant to research on differential effects of manipulated and chronic motives on accessibility of action-relevant stimuli. Experimental work on hunger suggests that this matter is rather complicated. For instance, Overduin et al. (1995) employed the Stroop task and established that ingestion of an appetizer evoked cognitive bias for food words in non-restrained eaters, whereas restrained eaters showed chronic cognitive bias. Their data suggest that only non-dieters respond to food manipulations by showing enhanced accessibility of food items. However, Ogden and Greville (1993) found that only (chronically) restrained eaters showed retardation in a Stroop task on food words after a high-calorie preload, suggesting that the consumption of a forbidden food may increase dieters’ concern about food and their weight. These findings indicate that situational and chronic motives do not have independent effects on accessibility of action-relevant cues. However, because these results do not provide a clear picture of how this interaction emerges, it still awaits further empirical testing. In this respect, the present analysis points to possible methods that may be helpful in studying the interplay of situationally induced, and more chronic, motivational states of thirst in humans.

Apart from the evidence obtained for increased accessibility of drinking-related items, we established that salt intake during a mouth-detection skill task aroused subjective experiences of thirst (Expt 1) and preferences for drinking (Expt 2). However, it should be noted that we did not measure the physiological changes typically associated with thirst and drinking as a function of our manipulations. Strictly speaking, then, the primary motive of thirst may not necessarily be the cause of the observed pattern of effects. In fact, the amount of salt load used in the thirst condition may have been insufficient to induce physiological thirst in humans. Therefore, this treatment may have produced the observed effects through a number of other possible mechanisms. For instance, it may be that the manipulation in the thirst condition left an unpleasant salty taste in participants’ mouths as the salt stimulated their tongues, and this was the motivation (e.g. need to rinse) behind the enhanced accessibility of drinking-related items. Moreover, on an even more fundamental level, the oral and pharyngeal recognition of the chemical structure of the salt might have been sufficient to produce a need for fluid (cf. Poothullil,
1995), and hence, subsequent heightened responsiveness to drinking-related cues. However, it should be noted that although these alternatives might account for the present findings, these accounts still support the notion that motivated affects perceptual readiness. On the other hand, in order to provide conclusive evidence on the question of how thirst-inducing stimuli heighten perceptual readiness to environmental cues that are instrumental in reducing thirst, these alternatives point to the need for further experimental scrutiny of cognitive effects of thirst.

In conclusion, the present research aimed to shed light on one of the mental processes that mediate the relationship between basic motives — such as thirst — and behaviour. Evidently, if we get thirsty enough — say, after walking around for many hours on a hot day without any water — the wish to drink will be predominant in our minds (the concept of full activation; see Wegner & Smart, 1997). Such conditions produce an intentional search in the environment to quench the excessive thirst. In normal daily life, however, we rarely put ourselves in the situation of experiencing such extreme dehydration. However, animals (or, expressed in more detailed physiology, their body and cells) inconspicuously lose fluid all the time, and are often confronted with oral stimulation increasing their desire to drink. Judged by the timing of their drinks, animals exhibit a capacity to anticipate a less extreme need for fluid (Rolls & Rolls, 1982; Toates, 1979). The mechanism of perceptual readiness may help to ‘recognise’ instrumental stimuli. Our cognitive system informs us about the conditions of the internal and external environment. It can foster the reduction of thirst by helping us to detect a can of coke or a cool glass of beer that would go unnoticed under other circumstances.

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