

Exploring the relation between motivation and intuition

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In the fall of 2010, I was asked to contribute to a popular Dutch TV-program called "*Pavlov. Why am I like this?*" In each episode of this program, a famous Dutch person is scrutinized in a semi-scientific way with the help of a few Dutch academic psychologists. The makers of the program select the target people for the show carefully, the criterion being that he or she is extremely skilled in a certain domain or has achieved something remarkable. In the episode I contributed to, the target person was Stacey Rookhuizen, an attractive, well-known 24 year old Dutch businesswoman. The public knows her because she is member of the jury of "*X-Factor*", a wildly popular TV-program in which amateur musicians compete for the opportunity to record in a studio. However, what is remarkable about Stacey is that she already has a very impressive career in the music industry after having started her own record label (especially aimed at helping young pop and rock bands) at the age of 16. In other words, she started her business career at the age where her peers are in the midst of puberty, and now, at the age of just 24, she is famous and highly successful.

Asked by the makers of the TV program about her success, Stacey answered that she always works fast, using her intuition to make decisions, and that she never really thinks before she acts. Perhaps not surprisingly, this is where I came in as a psychologist. I had to evaluate and measure her proneness to rely on her intuition (using the PID scale by Betsch, 2004) and I was asked to explain, in front of the TV cameras of course, what intuition is, and why some people seem be able to rely almost exclusively on intuition, whereas others are not.

Stacey and the TV crew came over to my office one afternoon, and between the various shooting sessions, Stacey, the director of the program, and I chatted. We all conceived of intuition as a feeling, or at least a “feeling-like” sensation, often very subtle, directing a person to make a certain choice. Intuitions can steer you to choose A over B, to go left rather than right, or to mistrust a new acquaintance without knowing quite why. Importantly, we also agreed that the basis for such feelings are often difficult or even impossible to verbalize, at least the moment they manifest themselves. They can feel as if they come “out of the blue”.

I explained my personal view on intuition as the consequence of unconscious information processing (Dijksterhuis, 2007; Dijksterhuis & Nordgren, 2006). Resulting from unconscious processes, intuitions often feel as if they enter consciousness suddenly, but the preceding unconscious process does not have to be rapid. It can be, such as when you mistrust someone mere seconds after meeting him, but according to the definition used here, intuition can also be the consequence of a process of days, such as when you continue to have nagging but difficult-to-verbalize doubts about the purchase of a second-hand car.

At some point, our discussion moved towards why we have intuition – again, defined as above – and while we discussed various examples, it became more and more apparent that intuitions serve motivation, for instance in the form of goals and needs. You mistrust a person because you do not want to get hurt, you have doubts about a car because you do not want to be deceived, and you “fall in love” with a beautiful house because you know you will be very happy living there. We concluded our conversation with something that struck

me as important. If it is the case that intuitions are our needs and goals that tell us – after a largely unconscious assessment of a situation – what to do or what not to do, it follows that people with strong and clear goals have better intuitions. And to reverse the process, it could be that people who rely on their intuition (and who do so successfully) do so because they know what they want. That is, they have strong goals and/or dominant implicit motives.

In the current chapter, I would like to further explore the possibility that there is a relation between motivation – and even more specifically, motivational strength – and intuition. Before delving deeper into the relevant literature, it is important to qualify the hypothesis by stressing that its relevance as well as its tenability is dependent on the definition of intuition one favors. Epstein (2008; see also Betch & Glöckner, 2010) recently argued that intuition has been given so many different meanings that it runs the risk of not having any meaning at all. On the other hand, Hogarth (2010) recently concluded that although there are many different definitions of intuition (see for example Dane & Pratt, 2007), the similarities are more striking than the differences. The definition used in this chapter follows Hogarth's (2001, 2010) use of the term as a response that is "reached with little apparent effort, and typically without conscious awareness. [Intuitions] involve little or no conscious deliberation" (Hogarth, 2001, p. 14, see also Hogarth, 2010). For current purposes, the use of the term *apparent* is crucial. Intuition is not necessarily something quick and effortless, it merely seems that way because the preceding processes are largely or completely unconscious. Importantly, it should be noted that this definition diverges from

others, such as the definition in the Oxford Dictionary, in which intuition is seen as an immediate response to something.

In the remainder of the chapter, the proposed relation between motivation and intuition is further explored. The discussion that follows focuses largely on goals and not – with one or two exceptions – on other manifestations of motivation. Also, the discussion focuses largely on goals and not – with one or two exceptions – on other manifestations of motivation. Evidence for various proposed subprocesses is briefly reviewed. First, it is necessary for the hypothesized relation between goals and intuition to be tenable that goals can set unconscious processes in motion. Second, for goals to affect intuitive responses, goals have to be able to change the determinants of these intuitive responses. Specifically, goals have to be able to lead to shifts in attention and to changes in the accessibility of information relevant to goals. Third, goals should affect judgments and decisions in the absence of any apparent mediating conscious processes. Each of these necessary subprocesses is further explored below. Finally, some research on the effects on variations in motivational strength on judgment will be discussed and interpreted in the context of intuition.

Goal pursuit can operate unconsciously

Volitional behavior has long been associated with consciousness (see e.g., Custers & Aarts, 2010; Dijksterhuis & Aarts, 2010), in that goal pursuit was assumed to be the consequence of a conscious intention or a conscious decision to act in order to attain a goal. However, recent research has challenged this view. A myriad of recent experimental work shows that the mere activation of a

goal representation guides behavior and higher cognitive processes involved in goal-directed behavior without conscious awareness. The idea that goals can direct behavior unconsciously is based on the notion that goals are parts of knowledge networks that include representations of the goal itself, actions, procedures, and objects that help goal pursuit (Aarts & Dijksterhuis, 2000; 2003; Bargh & Gollwitzer, 1994; Cooper & Shallice, 2006; Custers & Aarts, 2010; Dijksterhuis & Aarts, 2010; Kruglanski et al., 2002). Such networks enable people to act on goals without intentional control or without explicit expectancies. Thus, goal-directed behavior can start outside of conscious awareness, because goal representations can be primed by, and interact with, behavioral and contextual information.

Perhaps the most well-known example is the series of experiments published by Bargh and colleagues (Bargh, Gollwitzer, Lee-Chai, Barndollar & Trötschl, 2001). They unobtrusively exposed participants to words such as “strive” and “succeed” to prime the achievement goal (a goal held by most students), and gave them the opportunity to achieve by giving them an anagram task. Participants primed with the achievement goal outperformed those who were not primed. Bargh et al. (2001) also demonstrated that such goal priming leads to qualities associated with motivational states or “goal-directedness”, such as persistence and increased effort in working towards the goal. These, and other recent experimental demonstrations (e.g., Aarts, Custers & Marien, 2008; Lakin & Chartrand, 2003; Shah, Friedman, & Kruglanski, 2002) indicate that the mere activation of a goal representation suffices to motivate people to work on the primed goal without any conscious awareness of the goal.

In another, imaginative demonstration of this idea, Holland, Hendriks, and Aarts (2005) examined whether the mere perception of odor is capable of directly activating goals. They exposed some participants to the scent of all-purpose cleaner without participants' conscious awareness of the presence of the scent. Because the scent of all-purpose cleaner was assumed to enhance the accessibility of the goal of cleaning, Holland et al. (2005) hypothesized that participants exposed to the scent would spontaneously start to be cleaner. Participants were requested to eat a very crumbly cookie in the lab, and indeed, participants exposed to the scent put in more effort to keep their environment clean and crumb-free, even though the task and situation in which they applied their skills of cleaning was novel. These results indicate that goal activation can encourage people to exploit new opportunities in novel settings without awareness of the operation of the goal.

To recapitulate, goals can set various unconscious processes in motion. In fact, goal activation itself can happen unconsciously.

Goals and attention

People are sometimes surprised to hear that goals can influence behavior without conscious awareness. This reaction is in part caused by the fact that many people equate consciousness with attention. However, attention should not be equated with conscious awareness. Although it is true that a stimulus that is attended to is more likely to enter consciousness than a stimulus that is not attended to, attention and consciousness are to some extent independent (e.g., Lamme, 2003). For instance, we know that subliminal priming of stimuli –

unconscious by definition – only has effects when attention is paid to the stimuli while they are presented (Koch & Tsuchiya, 2006). Rather than as a cause for conscious awareness, attention is better understood as the extent to which the brain processes an incoming stimulus, or perhaps as the effort the brain puts into processing a stimulus.

Attention is commonly referred to as the selective processing of one aspect while ignoring other irrelevant aspects. About one million fibers leave each human eye, and we have to deal with about one megabyte of raw data each second (Koch & Tsuchiya, 2006). It is impossible to process all this information thoroughly. Because information processing capacity involved in the control of higher level cognition and behavior is limited, attention determines which stimuli and actions get access to these capacity-limited processes. Therefore, attention must be flexibly applied to different processes (Kahneman, 1973; Moors & de Houwer, 2006). As Moors and De Houwer (2006) pointed out, early stages of information processing (sensory analysis) generally require no attention, whereas later stages require an increasing amount. Given that attention is a limited resource, some of these later processing do indeed continue because enough attention is devoted to them, whereas other processes are stopped by lack of attention.

Whether incoming information is attended to or not – that is, whether incoming information is processed by modules involved in higher cognition – is determined both by bottom-up and top-down processes (Corbetta & Shulman, 2002; Dehaene, Changeux, Naccache, Sackur & Sergent, 2006; Koch & Tsuchiya, 2006). Bottom-up (exogenous) attentive processes are involuntary and elicited

by stimulus saliency, such as brightness or speed of movement and stimuli that are of instinctive or learned biological importance (Koch & Ullman, 1985). However, most attentive processes are driven by top-down (endogenous) concerns, and this is where goals and needs come into play. Both the amount and duration of attention devoted to incoming information is determined by active goals: Incoming information that is relevant for goal attainment is attended to (much) more than information that is irrelevant.

Goals and accessibility

Judgments, also intuitive judgments, are often determined by differences in accessibility. When the concept of aggression is highly accessible, a person you meet will more likely to be judged as aggressive (e.g., Srull & Wyer, 1980). Do goals and needs lead to changes in accessibility that may affect intuition?

Investigations into goal-directed cognition provide clues as to the dynamic status of goal-related material in memory upon the instigation of a goal (Goschke & Kuhl, 1993). Specifically, it is demonstrated that a task goal causes persistent activation of the goal representation in memory – in comparison to the mere activation of semantic knowledge, which shows a rapid decay of activation in memory over very short periods of time (Higgins, Bargh, & Lombardi, 1985; McKone, 1995). For instance, Goschke and Kuhl (1993) instructed participants to either execute a certain behavior (e.g., arranging a diner table) or to merely observe the behavior at a later moment in the experimental session. Before this event occurred, they measured the accessibility of items related to the goal in a recognition task. They showed that a few minutes after the goal was given, the goal items were more accessible in memory in the

execution instruction group compared to the observation instruction group. This effect has been replicated with different paradigms and goals (Förster, Liberman & Higgins, 2005).

Research on thirst and drinking by Aarts and colleagues (2001) illustrates how the accessibility of drinking-related information emanating from the feeling of thirst can guide drinking goals. In a task allegedly designed to assess mouth-detection skills, some participants were made to feel thirsty, whereas others were not. Results revealed 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. This enhanced accessibility of goal-relevant material, then, guides the pursuit of one's goals and plans by changing judgments and decisions.

In a test of their Theory of Unconscious Thought (Dijksterhuis & Nordgren, 2006), Strick, Dijksterhuis and van Baaren (2010) found that unconscious goals could eliminate racial bias in a setting whereby participants actually had to choose between people. Undergraduate students were presented with information about four potential roommates with the goal to choose one. Two roommates had Black facial features, whereas the two others did not have such features. Participants who chose immediately after reading the information about the roommates showed racial bias, whereas participants who were given some time to consciously think did not. Interestingly, participants who thought unconsciously did not show bias either, and in their case the degree of bias correlated strongly with people's motivation to control prejudice (Plant & Devine, 1998). In a second study, these results were replicated – that is,

unconscious thinkers controlled racial bias – among participants for whom egalitarian goals were primed. It is important to realize that in these studies, the racial facial features were manipulated in a subtle way, and skin colour was not manipulated at all. Because of this, participants did not even realize the experiment was on racial bias. Still, goals led to the unconscious control of unconscious racial bias.

Such automatic control processes are not confined to the domain of prejudice. Fishbach and colleagues (e.g., Fishbach, Friedman & Kruglanski, 2003; Trope & Fishbach, 2000; Myrseth, Fishbach & Trope, 2009) proved that people can unconsciously resist the effects of temptations. In a series of studies, Fishbach and colleagues, selected participants for whom a particular goal, such as staying slim or getting high grades, was important, and people for whose these goals were less important. They found, in a sequential lexical decision task, that goals may activate temptations for people for whom the goal is not all that important. For instance, studying may automatically lead to activation of tempting alternative courses of action such as watching TV. More importantly, people with strong goals demonstrated the opposite. For them, temptations activated the goal. That is, people with the goal to stay slim automatically activated this goal when confronted with a piece of chocolate, thereby increasing the chance on regulatory success. People do not need to be aware of the temptations for this powerful regulatory mechanism to be launched.

Goals, needs, and intuition

Goals, then, change attentional processes and the accessibility of goal-relevant information. To what extent do we have evidence that goals, needs or

other motivational factors changes our (intuitive) judgments? The experiments by Strick and colleagues discussed above already suggested this influence, but there is more evidence. However, the evidence should be interpreted with some care, as it is debatable whether the judgments under consideration are intuitive. However, as we shall see, the judgments are at least a) subtle and most likely not accessible to consciousness, and b) the consequence of a preceding unconscious process.

Macrae and colleagues (Macrae, Alnwick, Milne, & Schloerscheidt, 2002) reported intriguing experiments on the relation between needs and person perception. Female participants in different phases of their menstrual cycle viewed photographs of men and women with the objective to classify the photos on the basis of gender as fast as possible. Most female participants were equally fast to classify male and female pictures, except participants who were in the phase of high conception risk. These women were faster to classify pictures of men. As it turned out, this was especially true for pictures of men that looked stereotypically masculine. In other words, menstrual cycle subtly affects female's (intuitive) evaluations of men.

In another experiment, Swami and Tovée (2006) showed male participants photographs of women and asked them to rate the attractiveness of each female. The experimenters were interested in men's judgments of attractiveness of women dependent on their BMI (Body Mass Index) and the faces of the women were obscured. The men were tested between 6 pm and 7 pm and each individual was asked to what extent he was hungry. Interestingly, satiated men had a preference for women that with a relatively lower BMI (that

is, women with less body weight) than men who reported being hungry. Here too, a need affected, in a subtle way, people's preference.

In a recent of studies, Bos and colleagues (Bos, Dijksterhuis & van Baaren, 2008) showed that goals influence choices in an experiment on decision making. In the experiments, participants were given information about a decision problem. All participants were distracted before they made a decision. However, one group was told that they would be asked some questions about the decision problem later on. This was communicated before they were distracted, just as unconscious-thought participants in previous experiments. The other group was instead told that they were done with the decision problem and that they would not be asked anything about it later on. In other words, one group had the goal to further process the information, whereas the other group had no such goal. Results showed that the former group made better decisions than the latter. This means that unconscious thought is a postconscious goal-dependent process, changing the unconscious thought process that followed.

In an additional experiment, Bos et al., showed that goals can have very specific effects on judgments. Participants were given information about two decision problems simultaneously. One decision pertained to a choice between three roommates, the other two a choice between three cars. After reading the decision information, some participants were told they later had to choose their favorite roommate, whereas others were asked to choose the best car. After a period of unconscious thought, all participants were asked to choose both among the roommates as well as among the cars. The results showed that participants who were told they had to choose between roommates were more sensitive to

the differences between the roommates than the participants who heard they were to choose between the cars, whereas the participants who had the goal to choose between the cars performed better on the decision problem pertaining to the cars.

Recently, Eitam, Hassin and Schul (2008) reported interesting work showing that implicit learning is influenced by goals. They primed half their participants with the goal to achieve, whereas the others were not primed. Participants then engaged in a dynamic, complex learning task, based on the research by Berry and Broadbent (1984). Their research clearly demonstrated that participants who were primed with achievement performed considerably better than control participants—that is, they implicitly learned more. However, the ability to consciously describe what they had learned was equally poor in both conditions. In other words, goals affected implicit learning without any improvement in conscious recognition of what was learned.

Goal strength and intuition

The hypothesis under consideration by logic also entails that the strength of a goal – or any motivational force for that matter – should affect intuitive judgments. That is, strong goals should, unconsciously, alter the kind of subtle judgments that we may designate with the term intuition. There is indeed research that suggests this possibility.

Pessiglione and colleagues (Pessiglione et al., 2007) showed that strength of motivation can be subliminally primed. Participants in their experiment did a task whereby they could win money on successive trials by squeezing a handgrip. The amount of money at stake (a pound versus a penny) was

subliminally primed during each trial, and it indeed affected force of handgrip, along with skin conductance and activation in the ventral palladium, an area known to be devoted to emotional and motivational output of the limbic system. Pushing the bar even higher, Bijleveld, Custers, and Aarts (2009) recently showed that people recruit more resources in response to high (as compared to low) subliminal reward cues, but only when the reward required considerable mental effort to obtain. This research demonstrates that people use reward information in a strategic manner to recruit resources, without this information ever reaching conscious awareness.

Other research that is relevant here was done by Gollwitzer and various fellow researchers. According to Gollwitzer, people can strategically employ automatic processes to pursue their goal by forming implementation intentions. Implementation intentions are plans in which behavior appropriate for goal pursuit is linked to critical situations (“When I am hungry and walk to the fridge, I’m going to grab a few carrots rather than cheese”). It may be noted that forming implementation intentions is more than just increasing the strength of a goal, nevertheless the effects of implementation intentions are reminiscent of the hypothesized effects of strong goals. Control of goal-directed behavior is delegated to the environment that automatically elicits appropriate responses.

The effects of implementation intentions can be huge. In one experiment, Gollwitzer and Brandstätter (1997) asked university students prior to their Christmas break to name something difficult they wanted to achieve during the break (writing a paper, solving a conflict, etc.). Some participants formed implementation intentions, whereas others did not. After the break, only one-fourth of the control participants reported to have achieved their goal.

Participants who formed implementation intentions however, were successful in two-thirds of the cases.

In another experiment, Aarts and colleagues (Aarts, Dijksterhuis & Midden, 1999) gave participants the goal to collect a coupon in an office halfway between the laboratory – where participants were at the time – and the cafeteria. Some participants planned this (“When I reached the swing doors, I go left”), whereas others did not. A little later, participants were asked to go to the cafeteria under the guise of doing something for an experiment on consumer behavior. The experimenters were interested in the number of participants who would forget to get the coupon along the way, and indeed control participants forgot this more often (50% of participants) than participants who carefully planned (20%). Moreover, this difference was mediated by the accessibility of subtle cues in the environment (such as the swing doors) that were used in the planning stage.

Conclusions

Although most (though not all) the research reviewed in this chapter was on goals, it is plausible that appropriate intuition is the consequence of motivation in general. Variations in strength of goals, needs and implicit motives should all affect subtle judgments. Future research may indeed uncover this relation.

If one maintains that intuition is the consequence of (largely) unconscious processes that are instigated by goals (or other motivational forces), it follows that variations in unconscious processes – for instance in the amount of time one

can devote to these processes – may well have an effect on intuition. This, again, provides an avenue for further research.

However, the contribution of the idea explored here is not so much that it helps us to better understand (the consequences of) goals. Rather, it is that it could partly demystify intuition. Intuition does not have to be this murky concept that lay-people like, but researchers find hard to incorporate in their work. Instead, intuition can be conceived of as the important interface motivation uses to influence overt behavior.

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