Automatic goal inference and contagion:

On pursuing goals one perceives in other people's behavior

Henk Aarts

Utrecht University

Ran R. Hassin

Hebrew University

Aarts, H., & Hassin, R. R. (2005). Automatic goal inference and contagion: On pursuing goals one perceives in other people's behavior. In S. M. Latham, J. P. Forgas & K. D. Williams (Eds.), ***Social motivation: Conscious and unconscious processes.*** **(pp. 153-167). New York: Cambridge University Press.**

Author's note: Henk Aarts is at Utrecht University, Psychology Department, PO BOX 80140, 3508 TC, Utrecht, The Netherlands; Ran Hassin is at The Hebrew University, Psychology Department, Mount Scopus, Jerusalem, Israel 91905. Correspondence may be sent to either author at h.aarts@fss.uu.nl or ran.hassin@huji.ac.il. The preparation of this chapter was supported by grants from the Netherlands Organization for Scientific Research (R 58-101; 452-02-047) to the first author.

The survival of social animals depends, amongst other things, on grasping and adopting each others' goals. For instance, in everyday social interactions an understanding of the goals motivating another person's behavior allows one to entertain alike goals and to subsequently perform specific actions to obtain these goals oneself for the sake of personal as well as social needs (e.g., Byrne & Russon, 1998; Tomasello, Kruger, & Ratner, 1993). One of the basic prerequisites for such an understanding is an ability to encode others' behavior in terms of the goals they desire to attain. Sometimes these goals are immediately available to the perceiver as they are communicated explicitly. More often than not, goals are not explicitly conveyed due to constraints that limit communication, or because the goals themselves operate non-consciously in people. As will be argued shortly, the ability to infer the goals from others' actions could then be advantageous for goal adoption and pursuit to occur.

The present chapter aims to further explore this conception by examining how goals spread -- without intention or awareness -- between people, that is: how goals can be automatically contagious. The framework consists of two key components. First, we propose that people can automatically infer other people's goals from behavioral information. Second, we suggest that these inferred goals can be automatically adopted and pursued by the perceiver. Accordingly, success at pursuing one's own goals may, at least partly, depend on a quick understanding of the goals that underlie or cause observable behaviors of others. Before moving on, it is appropriate to briefly address how goals are commonly conceptualized, and the positions that are taken to understand and examine the way people act on goals.

The concept of goals

Goals are desired states, describing an outcome or behavior an individual knows how and is able to produce. States are desired if attaining them yields pleasure, provides incentives, or satisfies needs (Bindra, 1974; Cabanac, 1971; Geen, 1995; Nuttin, 1980; Pervin, 1989). The notion that human behavior is animated by the search for desired states is, for instance,

emphasized in the expectancy-value approach to motivation (Atkinson, 1974; Dickinson & Balleine, 2002; Tolman, 1932), in which goal-directed activity is expected to arise if a person attaches positive valence to a goal, and thus desires or is motivated to obtain it. This hedonistic perspective on goals resembles Damasio's (1994) somatic marker hypothesis, stressing the (often preconscious) signal function of affect for motivated action ("it feels good, let's go for it"). Goals, then, are mentally represented desired states that guide organisms to select and persist in activity that is instrumental to obtaining them.

Most theories of goals emphasize the role of conscious choice in the adoption of goals and in guiding goal-directed behaviors (Ajzen, 1991; Bandura, 1986; Deci & Ryan, 1985; Locke & Latham, 1990; see for a review, Gollwitzer & Moskowitz, 1996). People consciously focus on goal-relevant information, and reflect on pros and cons to decide whether to adopt a specific goal in a particular social situation. Furthermore, people ponder on the means that aid goal attainment and formulate a plan of action to ensure that goal-directed behavior will occur. Thus, it is assumed that the mere activation of goals does not directly put the body into motion. Goal adoption needs to be accompanied by a conscious decision, and goal pursuit needs some form of "expressed mandate" to be initiated. According to these views, then, it is conscious awareness that allows people to get goals and start acting on them.

Recently, this conventional view of goals as conscious regulators of behavior has been disputed. Goals, it is argued, can be automatically put in place by situational cues, and goals can guide behavior without a person's awareness of the operation of these goals (Aarts & Dijksterhuis, 2000a; Bargh, 1997; Bargh & Gollwitzer, 1994). In several lab and field studies we have collected substantial evidence for the idea that the instigation of goals automatically causes attention to and processing of goal-relevant information, and allows individuals to adopt and act on goals without the need to consider pros and cons and to make a plan of action (Aarts & Dijksterhuis, 2000a, 2000b, 2003; Aarts, Dijksterhuis, & De Vries, 2001;

Aarts, Verplanken, & Van Knippenberg, 1997; 1998; Custers & Aarts, 2002; Sheeran & Aarts, 2002). In other words, human beings are capable of engaging in automatic goal pursuit.

Automatic goal pursuit

Central to the idea of automatic goal pursuit is the assumption that goals are mentally represented in hierarchically ordered knowledge structures, along with other schema-relevant materials (Aarts & Dijksterhuis, 2000a; Bargh & Gollwitzer, 1994; Kruglanski, Shah, Fishbach, Friedman, Chun, Sleeth-Keppler, 2002). These representations include the context, the goal and possible actions and means that may aid goal pursuit.

Given these mental representations there are two steps to the process by which automatic goal pursuit emerges. First, recurrent activation of a goal upon perception of a social situation substantiates the link between the situation and the goal. Second, repeated execution of similar actions to achieve a goal strengthens the association between that goal and these actions, and thus facilitates the effectuation of actions upon subsequent goal activation. As the representations of the situation, goal, and respective goal-directed actions are interconnected, perception of the situation may directly activate the representation of the related goal and actions. Thus, individuals can guide goal-directed behavior without awareness of the goal.

There is now some experimental work available that has directly tested the emergence of automatic goal pursuit by using conceptual priming procedures (e.g., Chartrand & Bargh, 1996; Bargh, Gollwitzer, LeeChai, Barndollar, & Trötschel, 2001). It is established that the activation of goals (e.g., high performance) via mere exposure to words that are closely related to, or synonyms of the goal concept (e.g., succeed, strive) exerts an unconscious influence on action in a subsequent goal-relevant task (e.g., a word puzzle task). Moreover, it is demonstrated that such primed goals persist over time and cause resumption of goal-related activities after task interruption, indicating that it is indeed a desired state that is primed.

However, although these data point to the possibility that goals (i.e., mentally represented desired states) and resultant goal-directed activity can be directly triggered by situational cues, it remains to be seen whether automatic goal pursuit also occurs upon perceiving other people's actions. We will now further advance this idea of goal contagion. We first briefly address work that scrutinizes automatic components of causal (social) inferences in general, and present experimental studies from our lab examining automatic goal inferences upon observing other persons' behavior in particular. Next, we report research that tested whether people automatically adopt and pursue inferred goals.

Automatic causal inferences

Originally, automatic processes were thought of as unintentional, non-conscious, ballistic and effortless. This monolithic approach, however, gave way to a more flexible view, according to which these characteristics do not always co-occur, and some automatic processes may exhibit only a subset of them (see e.g., Bargh, 1994). A large body of research in the social psychology of automatic inferences has focused on a specific collection of theses features, namely – spontaneity (e.g., Gilbert, 1989; Trope, 1986; Winter & Uleman, 1984). An inference is said to be spontaneous if (1) it does not require explicit instructions to do it, (2) people are usually unaware of their intentions to make it and (3) people are usually unaware of the inference itself. Basically this means that inferences can occur without conscious intent (cf. Uleman, Newman, & Moskowitz, 1996).

The work alluded to above has focused mainly on examining the automaticity of inferring one special kind of causes of behavior, that is – inferences of traits. In almost 2 decades of research we have learned an awful lot about the automaticity of trait inferences. Uleman and his colleagues (e.g., Uleman et al., 1996) have convincingly argued and shown that trait inferences can be spontaneous. Thus, upon reading the sentence "Peter interrupted the invited guest speaker about every 30 seconds" readers may think of "annoying". These trait

inferences do not require conscious intent: They occur when participants are instructed to memorize sentences, as well as when they are just asked to familiarize themselves with them, or judge how interesting they are. The only criterion for trait inferences to occur is the perception of the action at issue.

Recently it has been suggested that various types of spontaneous inferences described in the literature may be designated under the same conceptual umbrella, that of causal inferences (the SCI framework; Hassin, Bargh, & Uleman, 2002; see also Hassin & Aarts, 2003). That is, spontaneous inferences of traits (Winter & Uleman, 1984), and predictable events (Mckoon & Ratcliff, 1986) can be conceived of as instances of causal inferences -- the former in terms of possible reasons for behavior, and the latter in terms of it's expected states.

An interesting implication of the SCI framework suggested by Hassin and colleagues is that people should be able to automatically infer other social categories that serve a prominent role in the causal chain of behaviors[1]. One such category are goals. Unlike traits, that are relatively fixed mental characteristics, goals are more flexible and context-dependent. Realizing what the other person's goal is may serve to understand a variety of courses of action that can be taken by a person to reach the goal that seem inexplicable in terms of traits. In addition, thinking about behaviors in terms of the goals they serve allows an appreciation of how the same behavior (e.g. the student cycles to the campus), conducted in different contexts (e.g., in the morning or at night), may serve extremely divergent objectives (e.g., the goal to attend lectures or P.E. classes). Thus, others' behaviors may contain or imply information about the states they desire to attain, that is – their goals. But are we indeed able to infer goals from a person's behavior, and if so, do these inferences occur automatically?

Automatic goal inferences

The idea that behaviors, or patterns of actions, may be perceived in terms of goals has fascinated researchers in several areas in psychology. Classic work on causal perception in

adults, as well as more recent research with infants and monkeys on the ability to attribute mental states to others' behavior on the basis of one's own mental states (the so-called theory of mind, Leslie, 1987), suggests that primates, humans included, can encode animated behavior and self-propelled motion of objects in terms of goals (Gergely, Nadasdy, Csibra, & Biro, 1995; Hauser, 1999; Heider, 1958; Heider & Simmel, 1944; Michotte, 1963; Premack, 1990; Uller & Nichols, 2000). For example, Heider and Simmel (1944) showed that adults attribute causal mental properties (such as goals) to geometric shapes, as long as they move in a particular interactive "social" way. Most research in this area seems to assume that goal attributions are the natural default of our cognitive system. However, the empirical question as to whether these attributions occur automatically is not explicitly addressed.

Research on goal-based explanations of actions further shows that people perceive others' behaviors as goal-directed, and understand the underlying goals that are implied by actions (see review by McClure, 2002). A commonly used paradigm in this research is to present participants with everyday scripted behaviors, and then ask them to rate how likely certain goals are to explain the described actions. For example, it has been demonstrated that actions that are not too extreme or too difficult (e.g., Mary enters the kitchen and opens the heavy door of the refrigerator) are readily explained in terms of goals (e.g., wanting to eat food), rather than other social categories that may serve as explanatory causes of the actions, such as ability or traits (e.g., being strong). Although there is clear evidence that inferences of this sort can occur spontaneously (Gilbert, 1989; Uleman, 1999), it should be noted that participants in these kinds of studies exhibit intentional inferences as they are explicitly asked to provide goal ratings. Evidence gathered in these paradigms is thus not conclusive with regard to the automaticity of goal inferences upon exposure to behavior.

In a recent set of studies, Hassin and Aarts (2003) systematically examined whether people automatically infer the goals motivating other persons' everyday actions. In their research

program they adopted several paradigms that have been successfully used to assess automatic encoding processes during other causal inferences, such as traits and predictable events.

In a first study, they employed a surprise-cued recall paradigm to demonstrate the occurrence of automatic goal inferences. Participants read short sentences under instructions to rate "how interesting they are". These pilot-tested sentences described either a behavior performed to attain a goal (e.g., the student is riding his bicycle to the campus as fast as he can implies the goal to attend lectures), or a behavior that did not imply this goal (e.g., the student is riding his bicycle away from the campus as fast as he can). Thus, the behavior described in the goal-implying and control sentences referred to semantically similar concepts, but differed on whether a specific goal was implied or not. After reading the behavioral information, participants engaged in a filler task for 5 minutes. The purpose of the filler task was to remove all contents of the sentences from short term memory. Upon finishing the filler task, they were presented with a surprise cued-recall task for the sentences presented in the first part. The cue was either the implied goal (goal cue condition) or a word taken from the sentences (repetition condition). Results showed that goal cues helped retrieving goal-implying sentences more than control sentences, even though the two shared all the words that were semantically related to the cue. Of importance, no such effects were found with repetition cues. These findings are indicative of automatic encoding of goals upon perceiving goal-directed behavior.

It has been argued that the relative benefit created by the cue in surprise-cued-recall paradigms may result from retrieval processes, and not from inferences at encoding (e.g., McKoon & Ratcliff, 1986). The general argument is that upon encountering a cue one attempts to think of similar words, concepts and scripts. This focused effort leads to preferential recall of target sentences that are semantically related to the cue. Goal cues thus may be more strongly related to the goal sentences than to the control sentences. Hence, they

serve as better recall cues for the former. This is not the case with the repetition cues, that are similarly related to both kinds of sentences. The resulting pattern, then, is not due to inferences at encoding, but due to reasoning at retrieval.

One way to deal with this critique is to examine whether goal inferences occur on-line, at encoding. Hassin and Aarts (2003) took on this challenge, and designed a second study in which they used a probe recognition task to measure on-line inferences of goals. In this task, that was devised after Mckoon and Ratcliff (1986), participants read short sentences after which they see a probe word. The time allotted for reading each sentence was very short (2.5 s), and the probe word appears shortly thereafter. Participants' task was to decide whether the word had appeared in the previous sentence or not. As in the previous study, there were two kinds of sentences: Goal-implying sentences and control sentences. The probe word, in both cases, was the goal that pertained to (and thus was not explicitly mentioned in) the goal-implying sentence. To disguise the critical trials, the goal-implying and control trials (i.e., sentence and corresponding probe word) were embedded in a large number of fillers. If goals are automatically encoded, then their accessibility should increase after reading goal-implying sentences, thus rendering the judgment task more difficult. Hence, performance after goal implying sentences should be worse than performance after control sentences. This was exactly what they found. First, participants made only a very few mistakes on the probe words, and the number of errors did not differ between conditions. More important for the present line of argument, however, responses to the probe (goal) words were slower when preceded by the goal-implying sentences (829 ms) than when preceded by the control sentences (786 ms).

In a third study, Hassin and Aarts (2003) tried to put the bar for automatic goal inferences at encoding higher up by using a lexical decision paradigm. The structure of this study, and its target sentences, were identical to those in the probe recognition study. However, instead of

judging whether a test word had appeared in a previous sentence, participants in this study were asked to make a lexical decision, i.e., they were asked to decide whether a string of letters that appeared after a sentence is an existing word or not. Participants we instructed to merely read the sentence. The critical trials were embedded in a large number of fillers (including existing words unrelated to the preceding sentences). Thus, using this lexical decision task obscured even further the relation between the experimental sentences, their probes that follow them and the task. Indeed, in a thorough debriefing participants indicated no intention to infer goals, nor awareness of any such inferences (see also, Zarate, Uleman, & Voils, 2001). However, if goals are automatically encoded, then the accessibility of the goal representation should increase after reading goal-implying sentences, thus speeding up the lexical decision. As turned out, responses to the test (goal) words were faster when preceded by the goal-implying sentences (588 ms) than when preceded by the control sentences (612 ms). Errors were rare, and evenly distributed across conditions.

Taken together, the Hassin and Aarts (2003) studies indicate that goals motivating others' actions become accessible to perceivers very rapidly -- without conscious intent. This strongly supports the contention for automatic goal inferences upon perceiving others' behavior.

Goal contagion: From automatic goal inferences to automatic goal pursuit

Earlier we proposed that behaviors of others may activate goals, as well as means appropriate for their pursuit, in one's own mind. These activated mental representations, in turn, may lead to goal-directed behavior. The interconnected nature of goals and means allows for this process to go on automatically: This chain of events, we argued, need not be consciously controlled. Thus, we suggest that automatic processes that begin with the perception of another's behavior may lead to what we call goal contagion: The automatic adoption of goals from observing another person's goal pursuit. So, is there any evidence out there for our goal contagion hypothesis?

Recent advances in developmental psychology provide some initial support for our thesis (e.g., Meltzoff, 1995; Gattis, Bekkering, & Wohlschaleger, 2002). For instance, in a series of studies on the adoption of simple goal-directed action patterns, Meltzoff examined whether preverbal infants would re-enact what the adult actually did, or what she tried to do. So, for example, an adult demonstrated an act with a test object (e.g., she tried to put a ring over a stick, but never actually succeeded) and the 18-month-old participants were then given these objects. Of interest, the toddlers were as likely to complete the target action after seeing the adult 'trying', as they were after seeing a full demonstration that included the desired end-result itself. In other words, infants in the goal group did not go through a period of trial and error. Instead, they used their motor skills to directly produced the target action, just as those who observed the full target action. Although suggestive, these results are not conclusive in regards to goal contagion: the children in these studies used exactly the same objects, in the same setting, and hence a mere imitation or behavioral copying account cannot be completely ruled out (Chartrand & Bargh, 1999).

Circumstantial evidence supporting the suggestion that social goals may be taken on that one is currently perceiving in another person, was obtained by Chen, Schechter, and Chaiken (1996). In their research program on heuristic and systematic processing, Chen and colleagues examined whether goals that result from thinking about concrete behaviors can alter the expression of attitudes. Participants in their study engaged, for 12 minutes, in imagining themselves as being in a certain situation. In one condition the scenarios described behaviors related to accuracy goals (e.g., a reporter seeking the objective facts about a certain issue), whereas behaviors in the other condition were associated with the goal of providing a favorable impression of oneself (e.g., being on a blind date with a close friend's cousin). Next, participants were asked to engage in a discussion of a particular issue with another person. As predicted, participants who had been exposed to the accuracy goal scenarios were

less likely to express attitudes that were evaluatively consistent with the partner's opinion than those exposed to the impression goal scenarios. Suspicion probes showed that participants were not aware of these effects.

These results, like the ones described above, are highly suggestive of goal contagion. Although appealing to conclude, no unequivocal evidence was provided in support of the notion that the effects were produced by activated goals -- i.e., desired states. Furthermore, given the explicit nature of the perspective-taking instructions, as well as the relatively large amount of time devoted to imagining oneself in another's position, it is unclear whether these goal contagion effects occur upon the mere exposure to behavioral information, or whether they require a much more effortful process (see also Albrecht, O'Brien, Mason, & Myers, 1995). Aarts and colleagues (Aarts, Gollwitzer & Hassin, 2002; Aarts, Hassin, & Golwitzer, 2003) conducted a series of studies to be more conclusive about these issues.

In a first study, Aarts et al. (2003) investigated the potential effect of the implied goal to make money on subsequent goal-directed activity. Undergraduates were exposed to behavior of an actor that implied the goal to make money or not. To achieve this, they used a short behavioral script in which a student (after having planned a vacation with friends) goes either to a farm to work there as a manservant for a month (money goal condition) or to a community center to work as a volunteer for a month (control condition). Participants had to merely read the script within a short period of time (30 s). In an additional study, Aarts et al. (2003) asked participants to generate the goal implied by the two stories, and results of this inquiry clearly showed that the experimental story evokes the money goal. Participants then learned that the study was almost completed. They were told that they had to perform a mouse-click task and, if there was sufficient time left, a task in which they could earn an additional income. Participants' pace of removing this message from the computer screen to

move to the next task served as a measure of goal-directed activity. The faster they erase the message, the more strongly their motivation to start working on the goal-relevant task.

Result showed that participants who where exposed to the money goal implying behavior were faster in moving to the goal-relevant task than those in the control condition. However, these behavioral differences only emerged when participants had a high need or desire to earn an additional income (students that often lack income to run their daily life). This latter effect thus strongly suggests that it is indeed goals that were primed (cf. Spencer' work on the idea that goal-directed activity can only be primed if the goal is present as a desire state; this volume). Importantly, thorough debriefing indicated that participants were unaware of these effects. Thus the observed goal contagion effects seem to occur without conscious intent.

Another experiment (Aarts et al., 2003) replicated these effects in a different domain. Male participants read a short behavioral script that implied the goal of seeking an intimate (casual) relationship. Specifically, in the intimate goal implying condition a man asks a former female college friend (after having spent the evening at a bar) whether he can come up to her apartment (in the control goal condition the man only spent the evening at the bar with the female college friend). Additional research, using an explicit judgment task and the probe recognition task to establish intentional and automatic goal inferences, showed that male students encode this behavior in terms of the goal of seeking casual intimacy (Aarts et al., 2002; Studies 2 and 5; see also Clark & Hatfield, 1989). Also, there are substantial differences between male and female persons as to the desirability of this goal (e.g., Ganong & Coleman, 1992; Smith, 1990). Men perceive this goal more often and more readily as a desired state, and are thus more prone to be primed with the goal than women (see also the moderating role of desire to make money in the money goal study). Therefore, only heterosexual male student were considered in this study.

After exposure to the other male person's behavior participants learned that the study was almost completed. This time however, they were told that they would participate in a short interview with a (unknown) female undergraduate student if there was sufficient time left after the filler task. Again, the time was assessed that participants took to erase this message from the computer screen to move to the goal-relevant task (i.e., meeting the female student). Results showed that participants in the intimacy goal condition moved faster to the goal-relevant task than control participants. As in the previous study, debriefing revealed that none of the participants were aware of these behavioral effects. These findings indicate that the goal contagion effect is quite general, as it does not only pertain to monetary goals.

It could be argued that the results of the above presented studies demonstrate an automatic approach response to goal-relevant stimuli (e.g., money, women). This approach response may result from facilitated access to positively valenced stimuli used in the past to obtain the goal or temporarily enhanced value of the stimuli themselves. Although there is some dispute about the conditional role of goals in responses to affective laden stimuli (e.g., see Fazio, 2001), recently it has been suggested that goals enhance the value of stimuli in order to be more easily approached and utilized for effective goal attainment (Ferguson & Bargh, 2002; Seibt & Neumann, 2002; see also Lewin, 1951). For instance, Ferguson and Bargh (2002; Study 4) showed that goal-relevant stimuli that are otherwise rather neutral are automatically evaluated as positive when useful to ongoing goal pursuit.

According to the present perspective on automatic goal pursuit however, primed goals do not only render goal-relevant stimuli more valued and approachable; they also activate means appropriate for their pursuit. Hence, more compelling evidence for goal contagion would be provided if one could demonstrate that the primed goal (upon perception of others' actions) increases effort in performing a particular action that is instrumental to obtaining the goal. Aarts et al. (2002; Study 2) set out to test this.

Heterosexual male participants were exposed to the script used in the previous study to prime the intimacy goal. To assess the effects on subsequent goal-directed activity, they were requested to provide helpful feedback on a task designed by a female student they had performed earlier by typing text into the computer. Several studies report that heterosexual men know that offering help is instrumental to obtaining intimate relationships with women, and that men behave accordingly (Buss, 1988; Canary & Emmers-Sommer, 1997; Downey & Damhave, 1991). Hence, the amount of effort in helping was indexed as the number of words and seconds devoted by participants to provide feedback. Furthermore, to provide support for the idea that primed goals elicit goal-directed activity only when the target stimulus is applicable or relevant to the goal (Aarts et al., 2001; Hardin & Rothman, 1997; Higgins, 1996), it was told that the task was allegedly developed by either a female or a male student.

The results replicated and extended those of the previous studies. Male participants exerted more effort in helping a female when the goal to seek an intimate relationship was primed than when this goal was not primed. These behavioral changes did not ensue if participants had to provide feedback to a male student, indicating the applicability or relevance of the target stimulus to the intimate goal (cf. Neuberg, Kenrick, & Schaller, this volume).

Although impressive, the effects on the helping behavior measure are not free from concerns. For instance, it may be the case that reading the intimate goal pursuit script activated merely thoughts about "be nice to women". These thoughts caused participants to construe the experimental situation in these terms and to behave in line with this construal (see Bargh et al., 2001). However, if indeed the effects on helping behavior were due to such cognitive construal, and not goal activation, they should be rather short-lived, as effects of mere cognitive activation on subsequent judgment and behavior have been shown to decline rapidly (Higgins, 1996). In a study relevant for the present question, Wilson and Capitman (1982) asked male students to read a booklet containing 5 pages about a "boy-meets-girl"

script, designed to make friendly behavior toward females more accessible in memory. Next, they met an attractive female confederate, and several indices were assessed to observe whether they behaved more friendly than control participants. They found that experimental participants behaved in a more friendly manner toward the female confederate immediately after the reading task. However, a 4 minutes filler task wiped out this effect entirely.

Recent research on the accessibility of goal-directed activity however, shows that goals possess a large and constant amount of activation that do not need rehearsal to sustain accessibility. That is, the mental representation of goal-related material remains accessible until the goal is cued and completed or expressed (J.R. Anderson, 1983; Goschke & Kuhl; 1993; Marsh, Hicks, & Bink, 1998; see also Förster & Liberman, this volume). Bargh et al. (2001) stressed the importance of delay in ensuring that effects are caused by goals rather than by mere cognition. They showed that goal priming effects persisted over a period of 5 minutes. Accordingly, the previous findings of the emergence of goal contagion would be even further bolstered if one could establish this important property of goal activation.

To figure this out, Aarts et al. (2002; Study 3) asked male participants once more to read the behavioral script to prime the intimacy goal and to subsequently provide feedback about a earlier performed task designed by a female undergraduate. However, in addition to participants for whom immediate measurement of the dependent variable was performed, other participants took a 5 minutes filler task that was unrelated to the intimate goal, and were only then asked to provide feedback. If the previous effects on helping behavior are caused by differences in construal then, according to the line or argument presented above, the effects of the manipulation should decrease after a delay. If the perception of the behaviors indeed primed the respective goal, the argument continues, the time at which the effects are measured is expected to have no effect. It was indeed the latter expected effect that fitted the data. Male participants put more effort in helping a female experimenter irrespective of the moment help

was requested. These observations indicate that the effort in helping after exposure to the intimate pursuits of another person persisted over time, and thus strongly supports the contention that the goal contagion effect resulted from the activation of the mental representation of a goal. Further experimentation revealed that these effects are not conditional on whether one is imagining oneself in another's position or not (Aarts et al., 2002; Study 4). This suggests that goal activation upon perception of others' actions does not require a much effortful process.

Conclusion

Social animals are equipped with a highly sophisticated perceptual-cognitive system that renders others' behaviors very informative. Upon observing their movements, ways of talking, and utilization of objects in different settings we automatically perceive or infer a variety of causes that may account for their behaviors. These causal inferences we make can directly affect our own behaviors. Importantly, though, the precision of the behavioral implications depends on which type of cause is inferred. There is research to suggest that trait inferences can lead us to behave in line with the trait. Seeing someone overtaking several cars on the highway thus can make us 'being fast' too. This behavioral trait matching is also known as the perception-behavior link effect (see review by Dijksterhuis & Bargh, 2001). In these cases, a person only has to 'perceive' a particular behavioral trait or state (e.g., being fast) and to understand how that state results from an associated lower level (motor) action to produce it oneself. Interestingly, it is not necessary for the state to be desired, i.e., it does not have to be a goal. Activating the behavioral state suffices to increase the readiness to perform the associated action to effectuate that state, indicating a result from mere cognitive effects.

In this chapter we proposed and demonstrated that people also automatically infer goals from other persons' behavior, and that these inferred goals may be automatically adopted by the perceiver if they are represented as desired states. Thus, our own goal pursuits -- exerting

one's knowledge and skills to reach desired states -- can directly result from perceiving another's goal pursuits, a phenomenon we called goal contagion. Goal contagion should be conceived of as an event that occurs when people encode the behavior of others in terms of states they know how and desire to obtain. And, according to contemporary models of motivation, acting on these desired states yields pleasure, provides incentives, or satisfies needs. Human motivated behavior, then, can emanate from the mere perception of other people actions without much conscious thought.

Footnotes

1. Our focus here is not on the actual causal role, but on the perceived one. That is, what people perceive – with or without conscious intent – as a potential cause is of more importance to our discussion than whether this event actually plays a causal role.

References

Aarts, H., & Dijksterhuis, A. (2000a). Habits as knowledge structures: Automaticity in goal-directed behavior. Journal of Personality and Social Psychology, 78, 53-63.

Aarts, H, & Dijksterhuis, A. (2000). On the automatic activation of goal-directed behavior: The case of travel habit. Journal of Environmental Psychology, 20, 75-82.

Aarts, H., & Dijksterhuis, A. (2003). The silence of the library: Environment, Situational Norm and Social Behavior. Journal of Personality and Social Psychology (in press).

Aarts, H., Dijksterhuis, A., & De Vries, P. (2001). The psychology of drinking: Being thirsty and Perceptually Ready. British Journal of Psychology, 92, 631-642.

Aarts, H., Gollwitzer, P.M., & Hassin, R.R. (2002). Goal contagion: perceiving is for pursuing. (manuscript under review).

Aarts, H., Hassin, R.R., & Gollwitzer, P.M. (2003). Being keen on implied goals: Automatic goal pursuit upon perceiving another person's behavior. (manuscript in preparation).

Aarts, H., Verplanken, B., & Van Knippenberg, A. (1997). Habit and information use in travel mode choices. Acta Psychologica, 96, 1-14.

Aarts, H., Verplanken, B., & Van Knippenberg, A. (1998). Predicting behavior from actions in the past: Repeated decision making or a matter of habit? Journal of Applied Social Psychology, 28, 1356-1375.

Ajzen, I. (1991). The theory of planned behavior. Organizational Behavior and Human Decision Processes, 50, 179-211.

Albrecht, J.E., O'Brien, E.J., Mason, R.A., & Myers, J.L. (1995). The role of perspective in the accessibility of goals during reading. Journal of Experimental Psychology: Learning, Memory, and Cognition, 21, 364-372.

Anderson, J.R. (1983). On the architecture of cognition. Cambridge, MA: Harvard University Press.

Atkinson, J.W. (1974). Strength of motivation and efficiency of performance. In J.W. Atkinson & J.O. Raynor (Eds.), Motivation and achievement (pp. 193-218). Washington, DC: Winston.

Bandura, A. (1986). Social foundations of thought and action: A social-cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Bargh, J.A. (1994). The four horsemen of automaticity: Awareness, intention, efficiency and control in social cognition. In R.S Wyer Jr. and T.K. Srull (Eds.), Handbook of Social Cognition (2nd ed., pp. 1-40). Hillsdale, NJ: Erlbaum.

Bargh, J.A. (1997). The automaticity of everyday life. In R.S. Wyer (Ed.), Advances in Social Cognition (Vol. 10 pp. 1-61). Mahwah, NJ: Erlbaum.

Bargh, J.A., & Gollwitzer, P.M. (1994). Environmental control of goal-directed action: Automatic and strategic contingencies between situations and behavior. Nebraska Symposium on Motivation, 41, 71-124.

Bargh, J.A., Gollwitzer, P.M., LeeChai, A., Barndollar, K., & Trötschel, R. (2001). The automated will: Nonconscious activation and pursuit of behavioral goals. Journal of Personality and Social Psychology, 81, 1014-1027.

Bindra, D. (1974). Motivational view of learning, performance, and behavior modification. Psychological Review, 81, 199-213.

Buss, D.M. (1988). The evolution of human intra sexual competition: Tactics of mate Attraction. Journal of Personality and Social Psychology, 54, 616-628.

Byrne, R.W., & Russon, A.E. (1998). Learning by imitation : A hierarchical approach. Behavioral and Brain Science, 21, 667-721.

Cabanac, M. (1971). Physiological role of pleasure. Science, 173, 1103-1107.

Canary, D.J., & Emmers-Sommer, T.M. (1997). Sex and gender differences in personal relationships. New York: The Guilford.

Chartrand, T. L., & Bargh, J. A. (1996). Automatic activation of impression formation and memorization goals. Nonconscious goal priming reproduces effects of explicit task instructions. Journal of Personality and Social Psychology, 71, 464-478.

Chartrand, T.L., & Bargh, J.A. (1999). The chameleon effect: The perception-behavior link and social interaction. Journal of Personality and Social Psychology, 76, 893-910.

Chen, S., Schechter, D., & Chaiken, S. (1996). Getting at the truth or getting along: Accuracy- versus impression motivated heuristic and systematic processing. Journal of Personality and Social Psychology, 71, 262-275.

Clark, R.D., & Hatfield, E. (1989). Gender differences in receptivity to sexual offers. Journal of Personality and Human Sexuality, 2, 39-55.

Custers, R., & Aarts, H. (2002). On the role of processing goals in evaluative judgments of virtual environments: Effects on memory-judgment relations. Journal of Environmental Psychology (in press).

Damasio, A.R. (1994). Descartes' Error: Emotion, reason and the human brain. New York: Avon Books.

Deci, E.L., & Ryan, R.M. (1985). Intrinsic motivation and self-determination in human behavior. New York: Plenum.

Dickinson, A. & Balleine, B. (2002). The role of learning in the operation of motivational systems. In H. Pashler & R. Gallistel (Eds), Steven's handbook of experimental psychology (Vol. 3: Learning, motivation, and emotion, pp. 497-533). New York: John Wiley & Sons, Inc.

Dijksterhuis, A., & Bargh, J.A. (2001). The perception-behavior expressway: The automatic effects of social perception on social behavior. In M.P. Zanna (Ed.), Advances in Experimental Social Psychology, (Vol. 33, pp. 1-40). San Diego: Academic Press.

Downey, J.L. & Damhave, K.W. (1991). The effects of place, type of comment, and effort expanded on the perception of flirtation. Journal of Social Behavior and Personality, 6, 35-43.

Fazio, R. H. (2001). On the automatic activation of associated evaluations: An overview. Cognition and Emotion, 15, 115 - 141.

Ferguson, M.J., & Bargh, J.A. (2002). Markers of meaningfulness: A motivational perspective on automatic attitudes. (manuscript under review).

Ganong, L.H., & Coleman, M. (1992). Gender differences in expectations of self and future partner. Journal of Family Issues, 13, 55-64.

Gattis, M., Bekkering, H., & Wohlschaleger, A. (2002). Goal-directed imitation. In A. Meltzoff & W. Prinz (Eds.), The imitative mind: Development, evolution, and brain bases (pp. 183-205). Berlijn: Springer-Verlag.

Geen, R.G. (1995). Human Motivation: A social psychological approach. Pacific grove, CA: Brooks/Cole Publishing Company.

Gergely, G., Nadasdy, Z., Csibra, G., & Biro, S. (1995). Taking the intentional stance at 12 months of age. Cognition, 56, 165-193.

Gilbert, D.T. (1989). Thinking lightly about others: Automatic components of the social inference process. In J.S. Uleman & J.A. Bargh (Eds.), Unintended thought (pp. 189-211). New York: Guilford.

Gollwitzer, P.M., & Moskowitz, G.B. (1996). Goal effects on action and cognition. In E.T. Higgins & A.W. Kruglanski (Eds.), Social psychology: Handbook of basic principles. New York: Guilford.

Goschke, T., & Kuhl, J. (1993). Representation of intentions: Persisting activation in memory. Journal of Experimental Psychology: Learning, Memory, and Cognition, 19, 1211-1226.

Hardin, C.D., & Rothman, A.J. (1997). Rendering accessible information relevant: The applicability of everyday life. In R.S. Wyer (Ed.), Advances in Social Cognition (Vol. 10 pp. 143-156). Mahwah, NJ: Erlbaum.

Hassin, R.R., & Aarts, H. (2002). Automatic causal inferences: The case of goals. (manuscript under review).

Hassin R., Bargh, J. A., & Uleman, J. S. (2002). Spontaneous Causal Inferences. Journal of Experimental Social Psychology, 38, 515-522.

Hauser, M.D. (1999). Primate representations and expectations: Mental tools for navigating in a social world. In P.D. Zelazo, J.W. Astington & D.R. Olson (1999). Developing theories of intention: Social understanding and self-control (pp. 169-194). Mahwah, NJ: Lawrence Erlbaum.

Heider, F. (1958). The psychology of interpersonal relations. New York: Wiley

Heider, F., & Simmel, M. (1944). An experimental study of apparent behavior. American Journal of Psychology, 57, 243-259

Higgins, E.T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E.T. Higgins & A.W. Kruglanski (Eds.), Social psychology; Handbook of basic principles (pp. 133-168). New York: Guilford.

Kruglanski, A. W., Shah, J.Y., Fishbach, A., Friedman, R., Chun, W.Y., Sleeth-Keppler, D. (in press). A theory of goal systems. Advances in Experimental Social Psychology.

Leslie, A.M. (1987). Pretence and representation: the origins of theory of mind. Psychological Review, 94, 412-426.

Lewin, K. (1951). Field theory in social science. New York: Harper.

Locke, E.A., & Latham, G.P. (1990). A theory of goal-setting and task performance. Englewood Cliffs, NJ: Prentice-Hall.

Marsh, R.L., Hicks, J.L., & Bink, M.L. (1998). Activation of completed, uncompleted and partially completed intentions. Journal of Experimental Psychology: Learning, Memory, and Cognition, 24, 350-361.

McClure, J.L. (2002). Goal-based explanations of actions and outcomes. European Review of Social Psychology, 12, 201-236.

McKoon, G. & Ratcliff, R. (1986). Inferences about predictable events. Journal of Experimental Psychology; Learning, memory and cognition, 12, 82-91.

Meltzoff, A.N. (1995). Understanding the intentions of others: Re-enactment of intended acts by 18-months-old children. Developmental Psychology, 31, 838-850.

Michotte, A. (1963). The perception of causality. [T.R. Miles & E. Miles, Trans.]. New York: Basic Books.

Pervin, L.A. (1989). Goal concepts in personality and social psychology. Hillsdale: Erlbaum.

Nuttin, J. (1980). Motivation, planning, and action. Leuven, Belgium: Leuven University press.

Premack, D. (1990). The infant's theory of self-propelled objects. Cognition, 36, 1-16.

Seibt, B., & Neumann, R. (2002). Motivational influences on the IAT: Food deprivation predicts implicit attitudes toward food. Poster presented at general meeting of the EAESP; June 26-29, 2002; San Sebastian, Spain.

Sheeran, P., & Aarts, H. (2002). The goal-dependent automaticity of drinking habits. (manuscript under review).

Smith,T.W. (1990). A report: The sexual revolution. Public Opinion Quarterly, 54, 415-435.

Tolman, E.C. (1932). Purposive behavior in animals and men. New York: Appleton-Century-Crofts.

Tomasello, M., Kruger, A.C., & Ratner, H.H. (1993). Cultural learning. Behavioral and Brain Sciences,16, 495-552.

Trope, Y. (1986). Identification and inferential processes in dispositional attributions. Psychological Review, 93, 239-257.

Uleman, J.S., Newman, L.S., & Moskowitz, G.B. (1996). People as flexible interpreters: Evidence form spontaneous trait inferences. In M.P. Zanna (Ed.), Advances in Experimental Social Psychology, (Vol. 28, pp. 211-279). San Diego: Academic Press.

Uller, C., & Nichols, S. (2000). Goal attribution in chimpanzees. Cognition, 76, 27-34.

Wilson, T.D., & Capitman, J.A. (1982). Effects of script availability on social behavior. Personality and Social Psychology Bulletin, 8, 11-19.

Winter, L., & Uleman, J.S. (1984). When are social judgments made? Evidence fro the spontaneousness of trait inferences. Journal of Personality and Social Psychology, 47, 237-252.

Zarate, M.A., Uleman, J.S., & Voils, C, I. (2001). Effects of culture and processing goals on the activation and binding of trait concepts. Social Cognition, 19, 295-323.