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# Implicit Goal Inference and Implicit Trait Inference: Two Ways of Understanding the Social World

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Implicit Goal Inference and Implicit Trait Inference:  
Two Ways of Understanding the Social World

by

Irmak Olcaysoy Okten

A Thesis

Presented to the Graduate and Research Committee

of Lehigh University

in Candidacy for the Degree of

Master of Science

in

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Irmak Olcaysoy Okten

Thesis is accepted and approved in partial fulfillment of the requirements for the  
Master of Science in Psychology.

Implicit Goal Inference and Implicit Trait Inference: Two Ways of Understanding the  
Social World

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## **Abstract**

Previous studies show that, when people learn about or observe behaviors of others, they tend to make implicit inferences from these behaviors (Uleman, Saribay, & Gonzalez, 2008). In the present research, we aimed to determine the conditions under which people are more likely to make implicit goal inferences vs. trait inferences. In Studies 1 and 2, we analyzed the role of behavioral information received in the type of inference made. Specifically, we manipulated consistency of the actors' behaviors as well as the distinctiveness of the actions (i.e., if the action is initiated towards a specific entity or not) in light of Kelley's (1967) covariation principle. Study 1 showed that people tend to implicitly infer goals more from behaviors that include low consistency and low distinctiveness information compared to behaviors that include high consistency and high distinctiveness information. Study 2 sought to replicate this finding using a separate paradigm. People were shown to make implicit goal inferences from behaviors with low consistency and low distinctiveness information. In Study 3, we analyzed inferences from simple behaviors (with no consistency or distinctiveness information) and the effect of perceivers' motives on the type of inference made. We showed that people engage in both types of inferences from reading simple behaviors but only when they are motivated to make goal or trait inference. We also showed that chronic goals (related to personal need for structure and conservative ideology) may determine the type of inference made (i.e., higher tendency to make trait than goal inferences). Taken together, the present research revealed that the type of inference made depends on the type of information received as well as the specific (temporary or chronic) motivation of the perceiver.

## Introduction

Being able to understand others' motivations as explanations for why they act and what they are likely to do next is critical for human beings (Heider & Simmel, 1944; Jones & Davis, 1965). Importantly, such inferences provide not merely a sense of meaning and predictability in a complex social world, but understanding the motivational factors underlying an actor's behavior may help the perceiver adjust his/her own attitudes and behavior towards this actor so that one may engage in appropriate behavior (Aarts, Gollwitzer, & Hassin, 2004; Gollwitzer & Moskowitz, 1996). Such tendency for an immediate causal explanation was discussed by Asch (1946):

We look at a person and immediately a certain impression of his character forms itself in us (...) such impressions form with remarkable rapidity and great ease. (...) we can no more prevent its rapid growth than we can avoid perceiving a given visual object or hearing a melody. (p. 258).

Recent research on social inferences shows that people have a tendency to make complex inferences such as inferences of intentionality from others' behaviors automatically (e.g., Ham & Vonk, 2011, Malle & Holbrook, 2012). In other words, people tend to infer goals from other's behaviors without necessarily having any intention or awareness. Even the earliest approaches in attribution research (which sow the seeds of folk psychology) indicated that people infer personal causalities (Heider, 1958, p. 100) as well as person-stimulus/situation interactions (McArthur, 1972). However, most of the research in the area was concentrated on how people infer *invariant personality traits* from behaviors (except for some attempts to show people's capability of capturing *intraindividual variability* or the interaction of behaviors with the stimuli and situations (Kammrath, Mendoza-Denton, & Mischel,

2005). More specifically, how people attribute others' (context-dependent) goals is a relatively understudied phenomenon compared to the extensive work on the attributions of (context-independent) traits from behaviors (Hassin, Aarts, & Ferguson, 2005). Despite the potential importance of understanding/making predictions about the goals of others, and the degree to which this happens spontaneously (e.g., Hassin, Aarts, & Ferguson, 2005, Van Overwalle, Van Duynslaeger, Coomans, Timmermans, 2012), it is still not clearly shown when people tend to make goal as opposed to trait inferences and vice versa. The present research is an attempt to illustrate the mechanisms that differentiate among different types of social inferences in this sense. Specifically, in the present study, we focused on how the type of information received as well as the perceiver's motives may affect the type of inference (goal vs. trait) made spontaneously about an actor.

### **Attributions of Invariant vs. Variant Characteristics from Behaviors**

How people evaluate the social behaviors of others is a critical question that has been investigated from various dimensions, and with different assumptions about the mechanism of social inference. What is common to most attribution research, however, is the focus on people's tendencies to infer stable characteristics from others' behaviors (Malle, 2008). Researchers suggested various explanations for why people tend to disregard information that would preclude making a dispositional inference. Heider (1958) stated that people usually don't have access to the information beyond the disposition-implicating behaviors of others. However, Jones and Nisbett (1971) went further and claimed that, even if the stimulus that might have affected the actor's behavior is accessible to the perceiver, the perceiver ignores it to some extent (p. 87). Specifically, they suggested that people are likely to make inferences that describe the behavior and the underlying factor in a "correspondent"

fashion (p. 223, Jones & Davis, 1965). According to this model, actor's actions are perceived as being correspondent to his/her stable disposition(s). For instance, one's "domineering action" is perceived as a reflection of the trait of being dominant (p. 224, Jones & Davis, 1965). However, that model does not account for alternative types of inferences one might make, such as engaging in a domineering action for some specific reasons about the situation or the stimulus the actor interacts with (i.e., actor's goals). Instead, the models which concentrate on the correspondence bias suggest that people usually sample biased information about others, focus on the consistency between the actor's traits and actions and thus have an illusory perception of predictability about the actor's future actions (Jones & Nisbett, 1971).

The question of how the role of actors' intentions and goals are inferred was incorporated in different ways into the early models of attribution. Heider's (1958) definition of an actor's intention as a disposition itself shows that he accepted intentions as an "inferential end" as Gilbert (1998) suggests. In other words, Heider (1958) seems to have a more *dynamic* understanding of "dispositions" which does not necessarily refer to invariant properties of the person per se. Nevertheless, as Malle (2008) also stated, attribution research that was influenced by Heider's ideas seems to have overrelied on his argument of "extraction of dispositional properties of behaviors", by misinterpreting his understanding of dispositions as well. Malle (2008) identified this tendency in attribution research as an "attribution error" in itself, due to overlooking Heider's insight regarding the inferences of intentionality of the actors.

Importantly, the tendency to extract dispositional properties from behaviors does not mean that Heider presupposes an "isomorphic relation" between these properties and behaviors, for two reasons (Gilbert, 1998, p. 94). First, Heider suggested that the perceived causes underlying behaviors are mostly ambiguous (e.g.,

two dispositions may lead to the same behavior and one disposition may be manifested in different behaviors) (Heider, 1958, p. 36). Second, he accepted that people have a tendency to make goal attributions by accounting for the interaction between the person and the situation. He suggested that, “If a person brings about a number of changes in the environment, and one of them is generally considered much more attractive than the others, we will assume that it was the person’s goal” (Heider, 1958, p. 115). That is to say, Heider (1958) does not seem to claim that these “extracted properties” of others have to be invariant personality characteristics as opposed to goals or intentions specific to certain circumstances. Similarly, we suggest that people should tend to make attributions of both variant and invariant properties of others from their behaviors, depending on the characteristics of the given information.

Despite such dynamic perspective of attribution seen in the earliest work of naive psychology, the approaches to examining human inference that followed tended to focus on attributions of invariant aspects of personality from behaviors, after factoring out possible situational effects (for a review see Moskowitz, 2005, pp. 233-266). Therefore, the phenomenon of intention attribution which should *interact* with situational effects is overshadowed by the studies embracing a dichotomy between personal and situational effects on behavior (Kammrath et al., 2005; Malle, 2008; Plaks, Shafer, & Shoda, 2003). Such a tendency started with Jones and Davis’ (1965) correspondent inference model’s focus on people’s inferences of invariant traits (rather than specific intentions) from others’ behaviors as mentioned above (Moskowitz, 2005). Attribution to intentions, on the other hand, was defined by Jones and Davis (1965) as “a necessary step in the assignment of more stable characteristics to the actor” (Jones & Davis, 1965, p.222). Thus, they suggested that actors’ intentions are merely perceived as mediating factors between one’s dispositions and

actions. If we go back to the previous example, even if the perceiver infers some specific intention of an actor to engage in a domineering action, s/he still uses this intention information to explain a stable disposition<sup>1</sup> of the actor, in this view (Jones & Davis, 1965, p.224). In this sense, this approach assumes that perceivers should be motivated to extract information which differentiates that actor from another *across different situations*. Thus, the question, “how people do represent the intention of the actor in a given situation?”, seems to be engulfed by the question, “how do people represent the actor him/herself?”.

A closer look at the theory of correspondent inferences, however, together with Kelley’s (1967) covariation model, provides some important insights for different types of causal explanations, depending on the information provided to the perceiver. In the correspondent inferences model, how unique the consequences of an actor’s action/choice is (noncommon effects principle) and how it differs from others’ possible actions/choices (social desirability principle) under given circumstances determine the type of inference a perceiver makes (Jones & Nisbett, 1971). More specifically, according to the noncommon effects principle, in order to understand the cause of an actor’s particular action, people compare the possible effects of the chosen and nonchosen actions of the actor (Jones & Davis, 1965). The effects of an actor’s action which differ from the effects of alternative (nonchosen) actions are called “noncommon effects” and these effects play a critical role in inference making. If these effects are few, they become more distinctive and more useful for making correspondent inferences about the actor (Jones & Davis, 1965). For example, if engaging in domineering action indicates a noncommon effect (e.g., making people recognize one’s authority) compared to other types of possible actions the actor can

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<sup>1</sup> Unlike Heider’s (1958) approach, in Jones and Davis’ (1965) model, dispositions are accepted as the stable properties that are specific to the actor and differentiated from the actor intentions (p. 222).

potentially engage in (e.g., yielding or leaving alone), people become likely to attribute the disposition of “authoritarian” to the actor. However, if it is possible to consider other noncommon effects of this action (e.g., to be able to get a quick result), it becomes harder to make a correspondent trait inference about the actor (as being impatient becomes an alternative trait to being authoritarian). Therefore, Jones and Davis (1965) suggested that “distinctiveness of the effect” is an important factor in making correspondent disposition inferences. The social desirability principle, on the other hand, indicates that, as the consequence of an actor’s action is socially desirable (i.e., something that any person would want), it becomes less informative about the person’s disposition (Jones & Davis, 1965). For instance, if the domineering action is not desirable in a particular context, one should be comfortable making a correspondent trait inference about the actor compared to the situation in which it might be desirable. In other words, the more extraordinary one’s action is, the more possible the correspondent trait inference becomes.

As exemplified above, Jones and Davis (1965) used their model to explain trait inferences. Moreover, they accepted intention attribution as an instrument for attributing traits to the actor, rather than an end in itself:

The assignment of intention, (...), is a precondition for inferences concerning those underlying stable characteristics toward which the perceiver presses in attaching significance to action. As Heider (1958) argued, the perceiver ordinarily strives to discover the invariances which underlie manifest actions in order to stabilize the environment and render it more predictable. (p. 222).

Importantly however, we suggest that their principles may also be utilized to describe how people infer potential goals or intentions of others from their behaviors *without necessarily making trait inferences* (Moskowitz, 2005). For instance, if

engaging in a domineering action (as opposed to yielding or leaving alone) allows one to gain the recognition of others, it is possible to attribute the goal of gaining the recognition of others to the actor without necessarily attributing him/her with the trait of being authoritarian. Again, engaging in an action which is not necessarily socially desirable rather than engaging in a desirable action may tell us about the specific goal (which allows the actor to deviate from others) as well as the trait of the actor. In this sense, we suggest that noncommon effect and social desirability principles of correspondent inferences (Jones & Davis, 1965) may explain both trait and goal attributions. Therefore, the correspondent inference model's exclusive focus on the trait attributions does not mean that this model is incompatible with or may not be used to explain goal attributions (Moskowitz, 2005).

### **Kelley's (1967) Covariation Model and the Role of Information Received in the Type of Inference Made**

The principles of noncommon effects and social desirability were embraced by Kelley's (1967) model as well (for a review see, Gilbert, 1998). Importantly however, the focus on the analysis of the *effects* of actions in Jones and Davis' approach evolved into the focus on the analysis of the *possible cause* of actions in Kelley's approach (Moskowitz, 2005). For instance, according to Kelley, people evaluate the possible causes of behaviors like a scientist and the possibility of a factor's producing a behavior is discounted when other possible alternative causes are detected (discounting effect) (Kelly, 1972). Kelley's (1967) model relies on the metaphor of Analysis of Variance (ANOVA), in that a perceiver engages in an analysis of a set of variables that contribute to the occurrence of the observed behavior. The person can be seen as belonging to one of several possible levels of each variable, yielding a perceived cause for the behavior that corresponds to the specific cell in this ANOVA



in which the person's behavior would fall. In this analysis, perceivers rely on the covariation of the possible cause and the behavior observed, by taking into consideration 1) how consistently the actor engages in this same behavior in the same situations over time (consistency), 2) how specific the behavior is to one entity or situation for the actor (distinctiveness), and 3) how likely that other people would respond in a similar way under the same circumstances in the same situation (consensus) (Kelley, 1967). So in order to make a dispositional attribution such as "authoritarian", a perceiver should evaluate whether the actor *always* engages in a domineering action or not, whether the actor engages in a domineering action while interacting with *any* group or not, and whether *other people* engage in a similar domineering action in this condition or not. Although, on the surface, Kelley's covariation approach seems to target internal (dispositional) and external (situational) attributions for the causes of actors' behaviors, these three factors of information he identifies can explain causal attributions beyond such a dichotomy, as the present research aims to show. That is to say, research which was influenced by the theory of correspondent inferences and the model of covariance mostly relied on the disposition-situation dichotomy in explaining inference making processes (Malle, 2008). However, a closer look at the model may provide us insight about how people make inferences without separating or "factoring out" situation effects necessarily, rather, by accounting for the situational effects on dispositions in a more complex schema (Kammrath et al., 2005).

Research on the attribution of invariant characteristics mostly adopted the assumption that people extract person and situation information separately and add them up in making inferences (Kammrath et al., 2005). In the classic stage theories of attribution, trait attribution is conceptualized as an earlier step than the situational

attribution, which is referred to as a *correction* process in that it modifies the already-formed dispositional inference to take into account or correct for the influence of the situation (e.g., Gilbert, Pelham, & Krull, 1988; Gilbert, Krull, & Pelham, 1988). For example, even if the perceiver knows that the actor was threatened to act in a domineering way (such as a hypothetical policeman following orders from superiors to domineer the protesters of the government), such situational information of “the policeman being threatened” would be used to “correct” the fast inference of a domineering disposition. Jones (1979) described this as akin to an anchoring effect, in which the trait serves as the anchor for subsequent judgment, which when adjusted use the anchor as the base. In these “correction” models, disposition attribution is defined as a cognitively efficient way of making judgments of others while one’s consideration of situational constraints is related to a perceiver’s motivation and capacity to engaging in such inferences (Gilbert, 1998). Further research showed that situational attribution sometimes may happen earlier than dispositional attribution/correction, when one is specifically motivated to process situational more than the dispositional information implied in the behavior (Krull & Erickson, 1995; Lupfer, Clark, & Hutcherson, 1990). However, what was common in all these studies, together with the assumption of “factoring out” the situational information in the earlier works elaborated above, is the tendency to disregard the potential inferences people make about an *actor interacting with a specific context or stimuli*. Specifically, the prevalent approach in the area which embraces a person-situation dichotomy in attribution underestimated that perceivers may make attributions about the actor by evaluating his/her actions with regard to the situation s/he is in or to the stimuli s/he interacts with. For example, if the actor engages in a domineering action when s/he interacts with a certain group of people or in a job context only, the perceiver may

evaluate the action with regard to the entity or situation information provided and conclude that, this actor wants to control this certain group or follow his/her boss' instructions. Namely, the perceiver may make inferences about the goals of the actor rather than traits, if s/he processes the actor's action as being dependent on certain entity(s) or situation(s) (i.e., variant characteristics of the person).

More recent research showed that, in addition to (and sometimes even before) traits, people may infer both the situation and the intention of the actor from the given information (Ham & Vonk, 2003; Todd, Molden, Ham, & Vonk, 2011; Reeder et al., 2004). For instance, when the behavior information tentatively implies both the actor's trait and the situation properties as is the case in "Will talks during the lecture" (trait: impolite, situation: boring), people are equally likely to make such inferences in an automatic way (Ham & Vonk, 2003). Besides such evidence on the co-occurrence of different types of inferences, the multiple inference model (MIM) suggested by Reeder and his colleagues (2001) pointed out that situation information can be used by the perceiver to make inferences about the actors' motivation (e.g. actors were inferred as having lower motivation to kick a ball in a situation that potentially inhibits the performance). Inferred intentions, in turn, are used to make further trait attributions about the actor (e.g., attribution of higher motivation predicted attribution of less ability). Thus, overreliance on the situation-disposition dichotomy in attribution research seems to be undermined by such alternative perspectives which define attributions as "multifaceted, composed of inferences about goals, motives, and traits" (Reeder et al., 2004, p. 541). It is critical, in this sense, to determine the characteristics of the behaviors that facilitate certain types of inferences.

### **Trait vs. Goals: Two Ways of Understanding Others' Actions**

Traits are broadly defined as the categories which inform people about an actor's personality and, more specifically behaviors, attributes and feelings across different contexts (Cantor & Mischel, 1977, 1979). Traits, therefore, are especially useful in order to be able to make predictions about an actor's behavior in a totally new context (Hoffman, Mischel, & Mazze, 1981; Uleman, Newman, & Moskowitz, 1996). Winter and his colleagues (1998) summarize the common description of this concept in different approaches as "referring to people's stylistic and habitual patterns of cognition, affect and behavior rather than to their wishes, desires, and goals" (p. 232). All trait measures, they point out, target at measuring internal tendencies that are consistent across situations and are temporally stable.

Goals, on the other hand, can be defined as the end-states people desire to reach or avoid (Gollwitzer & Moskowitz, 1996; Winter et al., 1998). In this sense, goals can be differentiated from traits conceptually. First, they can be differentiated in terms of the malleability of and controllability by the actor and second, in terms of the actor's interaction with an entity or a situation.

Unlike traits, goals are dynamic. Kruglanski and his colleagues (2002) refer to this characteristic of goals:

(...) a static depiction does miss something important about motivation, namely its malleability and dynamism: Our wishes, interests, desires are rarely so steadfast or constant. Often, they fluctuate from one moment to the next as we succumb to an assortment of distractions, temptations, and digressions." (pp. 332-333).

Due to their flexibility, goals can account for the intraindividual variability in people's behaviors mentioned in the previous section. They are hardly stable, as they represent an endeavor to reduce the discrepancy between one's current state and the

end state (Moskowitz, 2012). The strength of this endeavor depends on various factors such as the environmental opportunities that allows for the goal attainment (Bargh et al., 2001; Förster, Liberman, & Friedman, 2007;) and the obstacles to goal pursuit (Moskowitz, Gollwitzer, Wasel, & Schaal, 1999). The strength of the goal increases when one has an opportunity to attain the goal and is blocked from attaining it (Kruglanski et al., 2002; Moskowitz, 2012), unlike a personality characteristic which is supposed to reflect a person's temporally stable dispositions.

Another factor which provides goals such flexibility is their controllability by the actor. That is to say, goals should be regularly chosen by the actor to some extent and attained by her/his commitment to specific strategies either explicitly or implicitly (Bargh, 1990; Gollwitzer, 1993; Moskowitz, 2012). Traits, however, are perceived as including features that are beyond being controllable by the actor (Winter et al., 1998). Consistent with that suggestion, people may be more likely to explain *others'* behaviors with reference to traits than their own behaviors, as Jones and Nisbett (1971) stated, "traits exist more in the eye of the beholder than in the psyche of the actor" (p. 89). Indeed, classic work on the actor-observer difference reveals people use situations as the context through which they understand their own behavior, but less so for understanding others (where a correspondence bias has been the more traditional effect; Jones & Nisbett, 1971).

Another characteristic of goals that may differentiate them from traits is their strong association with a "goal object" which can be "an entity, event, experience, characteristic and so on (...)" (Elliot & Fryer, 2008, p. 245). Bargh (1990) specified in his auto-motive model that goals are strongly linked to the representations of environmental properties. That is to say, when an environmental feature is triggered, a goal associated with that feature in the memory is automatically activated and guides

the behavior (Bargh, 1990). For instance, Aarts and Dijksterhuis (2003) showed that priming people with the context of library increases the accessibility of the goal-directed behavior of being silent. Such association between the goal and the situation can either be established by previous co-occurrences as in the library example, or it can be formulated as an implementation intention in a single occurrence (Förster, Liberman, & Friedman, 2007). Specifically in implementation intention work, Gollwitzer (1993) suggested that a formulation of an action as “doing x when encountering situation y” facilitates the initiation of such goal-directed behavior. Goals can also be associated with any other entity, such as other individuals in the actor’s life. For instance, partners of different types of relationship (e.g., mother, spouse, friend) were shown to prime different types of relationship goals (Fitzsimons & Bargh, 2003; Shah, 2003). All in all, goal-directed actions are accepted as being necessarily associated with a goal-object (Elliot & Fryer, 2008; Moskowitz & Gesundheit, 2009), unlike traits which are defined as rather abstract concepts that are not *necessarily* bound to an entity or situation (Winter et al., 1998).

Traits should be represented more abstractly and broadly than goals, although they can be associated with multiple goals of the actor (e.g., Read, Jones, & Miller, 1990). Supporting that suggestion, for example, it was shown that categorization of behaviors in terms of actors’ goals provides a better memory of these behaviors than categorization of these behaviors in terms of actor’s traits (Hoffman, Mischel, & Mazze, 1981). Hoffman et al. (1981) suggested that traits may not be the best tools to organize behavioral information due to their “intrusive, nondistinctive nature” as opposed to goals’ “cohesive, rule-guided” nature (p. 223). That is not to say, however, that traits do not include goal-directed actions (Read, Jones, & Miller, 1990). For example, a person who is identified as being gregarious can be expected to have the

goal of socializing with people -as Read et al. (1990) showed-, yet, the goal of socializing should not be enough by itself to identify a person as “gregarious”. Again, taking into account Hoffman and his colleagues’ (1981) findings, the behavior of “talking a lot with the people in a party” may be better coded in memory in terms of a goal of “socializing” than the trait of “gregariousness”. This should be observed especially when the situation information such as “party” is available to the perceiver, as goals are contingent on the actor-situation interactions.

Despite such potential differences between traits and goals, these constructs are not easy to tease apart (Kammrath et al., 2005; Read et al., 1990; & Trope, 1989). One reason is the differential meanings attributed to these concepts by different models which aim to highlight certain features of the personality systems. Particularly, the cognitive-affective system theory of personality referred to traits as dynamic units, after conceptualizing them as general structures of personality which consist of actor’s beliefs, values and goals (cognitive-affective units: CAU) (Mischel & Shoda, 1995; Mischel, Mendoza-Denton, & Shoda, 2002). Therefore, the situation-behavior interactions that we will call implications of an actor’s goal in the present study are referred as traits or personality characteristics by the scholars of CAU due to such difference in the conceptualization. Notwithstanding such differences in conceptualization, this model is in parallel with the present study’s focus on perceivers’ capacity and tendency to have regard for variability of actors’ behaviors across different situations and entities. More specifically, according to the CAU model, perceivers use a *complex* rather than an *additive* schema of the actor’s trait and the situation in which behavior is initiated (Kammrath et al., 2005). Kammrath and her colleagues (2005) made people rate the likelihood of an actor’s behaving in a “trait-consistent” way in their interactions with different entities and showed that

people expect variability in such behaviors. Namely, for example, a person who is a “kiss-up” was expected to behave more warmly to people of a higher status than to people with a lower status. Importantly however, the concepts they used as traits such as “kiss-up” can be imagined to differ across situations by nature, which render them closer to our definition of goals.<sup>2</sup> All in all, it is important to keep in mind such differences in conceptualizations which do not necessarily lead to contradictions between these existing models and our suggestions about making inferences of variable characteristics of others.

### **Goal Inferences: Evidence from Attribution and Multiple Inferences Research**

Research on social inferences has mostly relied on the attribution theories reviewed in the first section. Namely, people’s inferences of actor’s dispositions and the situation were interpreted either within stage models (which suggest that people identify and add up dispositional and situational information separately) or complex schema models (which suggest that people perceive dispositions in an interaction with the situation/entity) (Gilbert, 1998; Kammrath et al., 2005; Plaks et al., 2003). Despite the extensive work which provides evidence for both intentional and spontaneous forms of trait and situation inferences, inferences for intentions and goals of the actor are relatively understudied. In this section, I will briefly review the research on people’s tendency to infer goals and intentions from others’ behaviors either explicitly or implicitly.

Some early work on social inference depicted a trade-off between inferences of ulterior motives and the traits of the actors (Fein, Hilton, & Miller, 1990; Jones, Davis, & Gergen, 1961). Jones, Davis, and Gergen (1961), for instance, showed that

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<sup>2</sup> They also showed in the same study that these trait constructs are strongly related to certain goals (e.g., kiss-up: goal to impress). Therefore, it looks like the concepts which imply such variability in behavior come from the goal-subset of the traits in their model.



perceivers are more reluctant to make trait inferences about actors whose self-descriptions are consistent with the requirements of a job description (i.e., indicating an ulterior motive of self-presentation) than those whose self-descriptions were inconsistent with the requirements. That is to say, it becomes harder for the perceiver to differentiate the actor's trait from his/her ulterior motive when behaviors meet the expectations of a situation (i.e., job requirement). However, when behavior deviates from the expectations, people become more likely to make trait attributions, as motive attributions no longer make sense. Another support for this inverse relationship between trait and motive attribution came from the research by Fein, Hilton, and Miller (1990). They applied a twist on the classic correspondence bias paradigm in which people read the essays written by actors under free-choice or constraint (no choice) conditions. Previous research repeatedly showed that people tend to associate actors' dispositions with the position they held in this essay, even if they had no choice in selecting that position (Jones & Harris, 1967; Snyder & Jones, 1974). However, Fein, Hilton, and Miller (1990) demonstrated that people's attribution bias disappears when they receive information implying the actor's ulterior motive (i.e., ingratiating himself to a professor) in taking a specific position in the essay. This means that, as long as the motive-implying information is provided, people tend to infer ulterior motives of actors from their behaviors, which in turn reduces their tendency to make trait attributions.

Research on multiple inferences, on the other hand, showed that people can infer both motives and traits of an actor simultaneously but the former (motive attribution) should be the priority as it is also necessary for the latter (trait attribution) (Reeder, 2005). Reeder and his colleagues (2004) showed that people infer actors' ulterior motives implicitly, and such inference predicts their related trait attributions

about the actor. Furthermore, Malle and Holbrook (2012) compared people's likelihood and speed of making inferences about the actor's intentionality, belief, desire, and personality. They showed that people are both more likely to make and faster at making judgments of intentionality and desire of the actor rather than belief and (especially) personality judgments (even for trait-implicating behaviors). Results both from Reeder and Malle's labs supported their common claim that personality inferences should come *after* goal inferences. In other words, as goals provide more concrete and less ambiguous schemas about the actor, they should be the priority in the eye of the perceiver (Malle & Holbrook, 2012; Read, Jones, & Miller, 1990; Reeder, 2009; Reeder & Trafimow, 2005).

Nevertheless, these studies do not provide us information about how people switch from making goal inferences to trait inferences. Reeder and his colleagues (2004), for example, manipulated the ulterior motive of the actor and made people rate the possibility that the actor had a related trait in a forced response format. They found a strong relation between motive and trait attribution as a result. Malle and Holbrook (2012) used different behaviors implicating either actors' goals or traits, which makes it hard to interpret how people infer goals and traits from behaviors which are not tailored to goals or imply traits specifically. Therefore, neither of these procedures provides an answer to the question of when people's goal inferences do or do *not* lead to trait inferences.

Relevant to this question, Plaks and his colleagues (2003) showed that people tend to make goal inferences when they learn about an actor's behavior which systematically varies across different contexts. For example, an actor who is highly conscientious about getting good grades but not conscientious in other domains (i.e., being fit or independent) was rated as having a goal-directed behavior for getting

good grades. Nevertheless, the perceived trait of “conscientiousness” was pre-measured and kept constant across different domains in this research. Therefore, the question, how likely people are to judge this actor in terms of his goal (i.e., having the goal of getting good grades) rather than trait (i.e., being conscientious) is still left unanswered in this study.

### **Implicit Social Inferences: Are Goal Inferences Implicit / Automatic?**

Following the general approach to social inferences, research on implicit inferences also mostly concentrated on inferences on actors’ traits (for a review see, Uleman, Newman, & Moskowitz, 1996). After Smith and Miller’s (1983) demonstration of people’s speed at answering questions about the actor (e.g., intentionality, trait), research started to accumulate on social inferences that occur outside of the perceiver’s awareness. However this research focused on Spontaneous Trait Inferences (STIs) only (Uleman, Rim, Saribay, & Kressel, 2012). Generally in these studies, people are instructed to memorize actors’ behavior sentences, and their tendency of associating such behavior with a specific trait of the actor in memory was measured. For instance, in the false recognition paradigm, people are asked to learn behavior descriptions of actors matched with the actor photos for a later memory task (Todorov & Uleman, 2002). In the recognition phase, they are asked whether they remember seeing a given word in this actor's behavior description. Comparison of false recognition for the critical trials (in which a trait was not included but implied) with the control trials (in which the trait word did appear) informs the experimenters about participants’ likelihood of binding a trait automatically with a specific actor based on his/her given behavior information. Using this and similar memory paradigms, such as cued recall, probed recall/recognition, savings in relearning, and lexical decision, researchers were able to conclude that STIs are unintentional, fast

(i.e., occur at an early stage of memory formation) and linked to the actors (i.e., they are not just behavior summaries) (Carlston & Skowronski, 1994; Moskowitz, 1993a; Moskowitz, 1993b; Todorov & Uleman, 2002; Uleman, Newman, & Moskowitz, 1996; Zarate, Uleman, & Voils, 2001).<sup>3</sup>

On the other hand, there is only a handful of research on automatic goal inferences within the literature of social inferences, despite various supporting evidence for the spontaneity of goal inferences in other subfields of psychology. Developmental research, for instance, highlighted the importance of identifying actors' goals by showing that this ability is intact as early as 2 years of age (Gergely, Nádasdy, Csibra, & Bíró, 1995). Research with adult chimpanzees also verified goal attribution, indicating that such inferences may not require humans' capacity of cognitive regulation (Uller & Nichols, 2000). Furthermore, research on text comprehension also supported perceivers' automatic tendency to infer protagonist's goals, as they both focus on goal-implying behaviors more and also tend to reread actions which imply goals inconsistent with the protagonist's (Poynor & Morris, 2003). All these findings suggest that goal inferences people make should be as automatic as trait inferences.

One of the studies which directly measured automaticity of goal inferences was conducted by Hassin, Aarts and Ferguson (2005). They applied a cued-recall procedure for behaviors which either implied the actor's goal or not (Study 1). Results showed that, although people were not instructed to form any kind of impressions

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<sup>3</sup> In the present research, we use the term automatic and implicit to refer to the perceivers' no specific intention in and awareness of making such social inferences. Perceivers may not have an intention to engage in these social inferences as the task explicitly demands another cognitive activity (memorization) than inference formation (Winter & Uleman, 1984). Also, they may or may not be aware of having conducted such inferences. As indicated by Bargh (1994) social cognitive processes vary in terms of the level of automaticity and only a few of these processes has all the features of fully automatic processes (no control, intention or awareness of the actor as well as efficiency in processing). Therefore, even though people are aware of making these inferences at some level, these processes may still be referred as automatic as they do not require intention of the perceiver and they occur as fast as encoding the behavioral information.

about the actor, they automatically make goal inferences, as goal-cues helped them better recall such scenarios. In order to test that such inferences are beyond just being inferences about “predicted actions”, in the second study, they used behaviors implying “blocked goals” (as goals should become stronger once blocked), and thus the actions were not predicted by the behaviors. They replicated the results with this manipulation. In the third and fourth studies, they showed that people make goal inferences at the encoding stage of memory formation (i.e., just like they make trait inferences) and they replicated the findings through a different paradigm (i.e., the lexical decision task).

After Hassin and his colleagues’ (2005) work on Spontaneous Goal Inferences (SGIs), a few studies attempted to uncover the extent of such inferences. Dik and Aarts (2008), for example, showed that, perceived effort of the actor mediates SGIs, suggesting that an actor’s higher effort in goal-directed behavior makes that goal more interesting to discover and thus easier to infer. Other studies compared STIs and SGIs by analyzing perceiver’s speed of identifying the goals vs. traits in behavior descriptions. Neuroscientific evidence suggested that people are faster at making SGIs as they identify a trait-inconsistent word in a behavior after about 600 ms and goal-inconsistent word within 200 ms of exposure (as supported by the activation in temporo-parietal junction) (Van der Cruyssen, Van Duynslaeger, Cortoos & Van Overwalle, 2009; Van Duynslaeger, Sterken, Van Overwalle, & Verstraeten, 2008; Van Duynslaeger, Van Overwalle, & Verstraeten, 2007). Further research also showed that people are even faster (at about 150 ms) at detecting the words that may imply both a goal and a trait (Van Overwalle, Van den Eede, Baetens, & Vandekerckhove, 2009). These scholars made some speculations on the heightened diagnosticity of the behaviors which allow multiple inferences. However, it still looks

unclear what type of inference people actually make from such behaviors. Do they prefer one over the other, and what kind of behavioral information allows the transition between different inferences?

Most relevant to the purpose of the present study, Van Overwalle and his colleagues (2012) compared SGIs with STIs within a false recognition paradigm. Specifically, participants were asked to read behavior sentences that either imply goals or traits (single inference), or imply both goals and traits (multiple inference). After each behavior, they were asked to report (within a specific deadline) whether they saw a trait or goal word in the behavior sentence they just read. People falsely recognized goal words in the behavior sentences in both the single-inference and multiple-inference sentences (verifying SGI) while they falsely recognized the trait words only in the multiple-inference sentences with no deadline of response. Van Overwalle et al. (2012) concluded that, people infer goals faster than traits, based on the evidence showing that SGIs are made as early as 350 ms of exposure but STIs are made only if SGIs are also made, and only when there is no time limit of response. These findings suggest that SGIs are necessary but not sufficient for STIs.

Despite being informative about SGIs and STIs in this sense, we suggest that this study has some limitations in terms of the comparison of the two processes. First and foremost, the goal-implying sentences they used imply very low level goals which are simply the expected results of given behaviors (e.g., action: jumping into the water, goal: swimming) (these sentences are also very similar to McKoon and Ratcliff's (1986) sentences for predictable actions). In other words, such results do not inform us whether people are likely to make implicit inferences of more abstract goals which should require referring to others' mental states rather than predicting the natural result of their action (e.g. action: swimming, trait: athletic, goal: losing

weight). Moreover, as with much of the other existing research on goal inferences, this study falls short of explaining when people infer a characteristic as a goal or as a trait. Taking into account both the neuroscientific evidence on the activation of similar pathways (but at different speeds) and the behavioral evidence on the necessity of SGIs for making STIs, it becomes tricky but especially important to figure out when people become more likely to make goal or trait inferences and what kind of behavioral information facilitates a specific type of inference.

### **Covariation Principle Revisited: Differentiating Trait and Goal Inferences**

Kelley (1967) proposed that people interpret behaviors in terms of the variations between three pieces of information; information about entities, persons and time/modalities. As mentioned above, in order to obtain these pieces of information, people rely on the cues which are informative about the distinctiveness, consensus and consistency dimensions of the behavior. Some research has analyzed the causal attributions people make for the behaviors with various combinations of these dimensions. Importantly, most of the research on covariation-based models has focused on the below-defined “prototypical configurations” of these dimensions (LLH: low consensus, low distinctiveness, high consistency; HHH: high consensus, high distinctiveness, high consistency; HLL: high consensus, low distinctiveness, low consistency) which predict person, stimulus and situation attributions respectively (e.g., Cheng & Novick, 1990; Hilton, Smith, & Kim, 1995). Nevertheless, we suggest that people should be capable of making attributions about the interactions of these units (i.e., person, stimulus and situation) implicitly, and alternative configurations of Kelley’s dimensions (e.g., LHH: low consensus, high distinctiveness, high consistency; LLL: low consensus, low distinctiveness, low consistency) account for such sophisticated attributions.

Empirical research revealed that dispositional attributions are predicted by the combination of low consensus, low distinctiveness and high consistency (LLH) pattern in the actor's behavior. McArthur (1972) showed that an attribution to the person is mostly affected by the information of whether the actor gives the same response for different entities or not. The behaviors which occur similarly for various entities (i.e., low distinctiveness) were interpreted as being informative about the actor. In addition to distinctiveness, the information of whether the actor engages in a similar behavior all the time under similar circumstances (i.e., high consistency) predicted the likelihood of person attribution. Consensus information was also found to be a predictor of person attribution (despite being the one with least importance among the three), as the deviance of an actor's action from others' actions reduces the likelihood of "social desirability" in the eye of the perceiver, and in turn facilitates causal attributions to the actor (see Jones & Davis, 1965). In addition to these studies which show people think that the behaviors with LLH combination say "something about the person", later studies specified that these behaviors are believed to say something about the "traits" of the person (Bassili, 1989; Hilton, Smith, & Kim, 1995; Van Overwalle 1997a, 1997b).<sup>4</sup> Other than person attributions, scholars mostly focused on stimulus and situation attributions by utilizing Kelley's formulation. People were found to make attributions to the stimulus more frequently when such behavior occurs *every time* (high consistency) one interacts with *this* stimulus but not with the others (high distinctiveness) and everybody acts the same under similar circumstances (high consensus) (HHH) (McArthur, 1972; Trope, 1986). On the other hand, results varied when it comes to which combination of these dimensions

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<sup>4</sup> Important to mention here, these studies showing the relationship between LLH pattern and person attribution used traits to measure person attributions and they also talked about the concepts of person/disposition attribution and trait attribution interchangeably. So this conceptualization of person/disposition attribution diverges from Heider's approach to disposition as a dynamic and variable (which can define person's goals).



facilitate people's attributions to the situation or occasion<sup>5</sup>. McArthur (1972) found that, people make attributions to the situation or occasion when behavior occurs with a specific entity only (high distinctiveness) and for the first time (low consistency) and such attribution is not affected much by consensus information. Van Overwalle (1997a, 1997b), on the other hand, showed that low consistency information was the only predictor of situation attribution and other dimensions were not that critical to this kind of attribution.

Previous research also showed that people sometimes report the cause of the behavior as “something about the interaction of person and stimulus”, although these researches did not make any further attempt to interpret what such an interaction might mean. McArthur (1972) mentioned that an interaction-attribution occurs when an actor (unlike others) behaves repeatedly in a certain way but only with a certain entity (LHH: low consensus, high distinctiveness and high consistency) or when an actor (as well as others) behaves repeatedly in a certain way for different entities (HLH: high consensus, low distinctiveness and high consistency). However, MacArthur suggested that while the former combination (LHH) indicates a true interaction between the person and the stimulus, the latter combination (HLH) indicates a “dual causality” meaning that both the person and the stimulus may be responsible for the occurrence of this action. Further studies replicated attribution to person-stimulus interaction for only behaviors with a LHH pattern (Hilton, Smith, & Kim, 1995; Jaspars, Hewstone, & Fincham, 1983; Van Overwalle, 1997a, 1997b). It is important to keep in mind that in all these studies participants selected the option of “something about the combination of person and stimulus” as the best explanation of such behavior among the other options provided by the experimenters. In the present

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<sup>5</sup> Van Overwalle (1997a, 1997b ) uses the word occasion as synonym of situation.

study we suggest that this “something” can be the goal of the actor by taking into account the characteristics of the goals reviewed in the section of Traits vs. Goals.

In addition to the interaction between person and stimulus, goals are suggested to be represented in terms of an interaction between person and situation as well (e.g., Bargh, 1990). Research based on Kelley’s covariation principle revealed a tendency to make attributions to person-situation interactions for the behaviors with an LLL pattern (low consensus, low distinctiveness, low consistency) (Hilton, Smith, & Kim, 1995; Van Overwalle, 1997a, 1997b). Therefore, such a pattern can also imply the goals of the actor. Nevertheless, as the low consistency in a behavior is the strong and only predictor of situational attributions (Van Overwalle, 1997a, 1997b), we suggested that situational attributions may still engulf the attributions to goal of the actor in this scenario. For example, take the behavior, “Anna never dusts and vacuums her room but she always does before her boyfriend stops by.” This behavior is an example of high consistency and high distinctiveness, as Anna always cleans her room but only when she is going to interact with a certain entity (her boyfriend). With low consistency and low distinctiveness, it becomes “Anna never dusts and vacuums her room but she once did in case anyone stops by.” Here, we suggest that, although this pattern may imply a goal as well, it should be a more short-term one than the one implied by a LHH pattern. As the behavior occurs for the first time (low consistency), it should not imply a long-term goal of the actor but rather possibly imply a goal initiated by a specific situation for a limited period of time (e.g., her room is so dirty that she feels like she has to clean it up). Also, this behavior does not occur as a reaction to a specific entity but rather occurs in the same way for every entity the actor interacts with (low distinctiveness). For those reasons, behaviors with LHH and

LLL patterns should imply goals, yet, potentially different types of goals of the actors (long-term vs. short-term).

### **The Role of Motivation in Implicit Inferences**

In addition to the role of received information on the type of inference one might engage in, people's specific (chronic as well as manipulated) goals might have an effect on the type of inference made from behaviors of others. In the present study, we also explored the effect of chronic as well as situationally imposed goals on forming goal vs. trait inferences.

Despite the abundance of research on implicit inferences, to our knowledge, there is only one published study focusing on the effect of perceivers' chronic goals on their tendency to make implicit trait inferences. In this study, Moskowitz (1993) analyzed personal need for structure (PNS) as a factor that may result in higher STIs overall due to high PNS people's higher motivation to engage in categorical thinking and heuristic processing. His findings supported this hypothesis; people with high PNS were found to be more likely to form spontaneous trait inferences from others' behaviors compared to people with low PNS. Taking this into account, in the present study, we explored the effect of PNS on implicit trait and goal inferences.

Another factor that may be related to the motivation of engaging in inference making is political ideology. Previous research found that conservatives tend to rely on dispositional factors whereas liberals rely on rather situation factors in explaining the cause of homelessness (Pellegrini et al., 1997), poverty (Zucker & Weiner, 1993), crime (Carroll, Perkowski, Lurigo, & Weaver, 1987), unemployment (Feather, 1985). Nevertheless, the existing literature does not provide us much information to understand to what extent this differentiation of liberals and conservatives in terms of dispositional attributions is a result of the differentiation in implicit attributions. In

other words, although the findings of various studies suggest that liberals and conservatives differ in dispositional attributions (Eidelman, Crandall, Goodman, & Blanchar, 2012; Skitka et al., 2002), to our knowledge, there is not yet evidence on whether such difference emerges in the early level of information processing or not. Also, to our knowledge, there is no previous study which has focused on potential ideological differences in making implicit or explicit goal inferences. Still, we suggest that even among sentences with no political implication, we should see a processing difference in which conservatives infer traits more than goals of the actors whereas liberals infer goals more than the traits of the actors.<sup>6</sup> More specifically, liberals' taking situational factors into consideration should be a critical step in the formation of goal inferences, as goals are characterized by actor-situation interactions as mentioned above. All in all, ideological factors may work in parallel with people's chronic motivations to engage in one type of inference more than the other.

There is also limited amount of research providing support for the effect of temporarily activated goals of the perceiver on his/her formation of implicit trait inferences from others' behaviors. Rim, Uleman and Trope (2009) showed that inducing a mind-set of high level construal on the perceiver increases his/her likelihood of forming STIs. Crawford and his colleagues (2013), on the other hand, found that priming approach/avoidance goals through related bodily responses results in formation of corresponding (positive/negative) STIs. Rim and her colleagues (2013) also showed that when people are primed with affiliation goals, they become more likely to form positive STIs. All these research suggests that, both the tendency to make implicit inferences as well as the type of inference made might be contingent

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<sup>6</sup> However, if the behaviors were politicized or actors were political figures, we would expect a process of motivated inference. In this case, it is possible to expect both types of inferences by people of either political ideology as long as inferred characteristics can be used to justify the political concerns of the perceivers (see Kunda, 1987).

on the temporarily activated goals of the perceiver. In the present research, we used a social inference goal manipulation procedure as a tool to disentangle trait and goal inferences from others' complex or simple behaviors.

### **The Present Research**

The main aim of the present research is twofold. First, we would like to determine the type of information which differentiates people's tendencies to make trait and goal inferences. Actor behaviors that have been used in past social inference research (e.g., STI research) have not specified which dimensions should affect the type of inferences one could make in significant ways. This lack of information is usually compensated for by the perceivers through making *assumptions* about the actor behaviors; experimenters do not know much about such assumptions made by their participants if the assumptions are not manipulated or measured in some way (Cheng & Novick, 1990). Therefore, it is critical to manipulate the behavioral information and analyze the change in the explicit inferences people make for the actors described in the sentences. Based on previous research on the implications of the specific configurations of consensus, distinctiveness, and consistency dimensions of behaviors (Hilton, Smith, & Kim, 1995; McArthur, 1972; Van Overwalle, 1997a, 1997b), we suggest that it is possible to differentiate behaviors which imply traits from behaviors which imply goals of the actors. Specifically, we hypothesized that people should be more likely to infer traits from the behaviors with an LLH pattern (low consensus, low distinctiveness and high consistency) and goals for the behaviors with an LHH (low consensus, high distinctiveness and high consistency) or LLL (low consensus, low distinctiveness and low consistency) pattern. Also, people's tendencies to make goal inferences from LHH and LLL behaviors may differ, mainly due to the difference in the consistency of the behavior. As LHH behaviors include

high consistency, these behaviors may be perceived as implying long-term goals whereas LLL behaviors, which include one-time only actions, may be perceived as short-term goals. In this sense, LLL behaviors may be less informative about the actor's future actions and therefore may elicit less motivation in the perceiver to make an inference. In order to test these hypotheses, in the first two studies we examined the likelihood and speed of goal versus trait inferences made from behaviors manipulated in terms of the three dimensions of consistency, distinctiveness, and consensus.

The second aim of the present study is to analyze implicit goal inferences. There is an extensive amount of research on the implicit trait inferences. However, there is only a handful of research which shows directly that people infer goals of others automatically (e.g., Hassin, Aarts, & Ferguson, 2005, Van Overwalle et al., 2012). This existing research also falls short of differentiating goals from “predicted actions” of the actors. We suggest that, while goal inference requires inferring the mental state of the actor (who moves toward a desired end-state in a rule-guided fashion), the latter is simply about inferring the natural outcomes of the behaviors. In the present study, we suggest that people should be able to infer higher level goals of others as automatically as traits. Therefore, we tested the automaticity (i.e., spontaneity) of goal inferences with a paradigm used in previous STI research. In the first two studies, we analyzed the implicit inferences for the behaviors with covariation information. In a third study, we focused on behaviors which do not provide such information. Specifically, in the third study, we aimed to examine people's tendency to make trait or goal inferences from behaviors that do not provide explicit covariance information. Previous research showed that trait inferences are very fast and unintentional, however, they did not focus on the possibility that people

may be equally likely and fast to infer goals from the same behaviors. In fact, it is even possible that the body of evidence purportedly in support of trait inference is instead an illustration of goal inference. Such research finds that qualities such as “rude”, “kind”, “lazy”, and “generous” are implicitly inferred about an actor, but these qualities can be referring to goals just as easily as the assumed reference to traits. Therefore, study 3 attempts to clearly dissociate trait and goal inference, allowing for a comparison of people’s tendency to infer goals and traits from simple behaviors. It also examines the effect of perceivers’ temporarily activated goals on the experience of inference-making – whether trait or goal inferences occur.

### **Pilot Study: Intentional Inferences for Traits and Goals**

Before starting our studies, we conducted a pilot study in order to select the traits and the goals of the actors which will be used as test words in our studies.

#### **Method**

**Participants.** 337 participants (68% female;  $M_{age} = 36.18$ ,  $SD_{age} = 12.75$ ) were recruited and tested through Amazon’s Mechanical Turk. They received \$1 for their participation in a study which took 25-30 minutes in total.

**Materials and Procedure.** Participants received behavior sentences of different actors and were asked to write about 1) what the given behavior makes them think the person is like 2) what goal they believe the person has (what he/she is trying to do) (by filling out sentences starting with the phrases of “He is...” and “His goal is...” in a semi-structured format). These behavior sentences have been used many times in STI research (e.g., Uleman, Hon, Roman, & Moskowitz, 1996), yet, for the

purpose of this study, we integrated consensus, distinctiveness and consistency information into each behavior.<sup>7</sup>

These sentences were specifically manipulated in terms of these three dimensions with an aim of generating LHH, LLH and LLL configurations (see Appendix A for the complete list of items). Thus, 37 behaviors, each expressed in an LHH, LLH, and LLL configuration were finalized. Three stimulus sets of the sentences were created with each set of sentences containing equal representation of each configuration type. Participants randomly received one of these three versions of each of the 37 behaviors. After the phase of behavior judgment, they answered some demographic questions about their gender, occupation, education, English proficiency, age, ethnicity and ideology. Lastly, they received a debriefing about the general purpose of the study.

## **Results**

First, we constructed categories of the expressed traits and goals for each behavior. For example, for the behavior “She dusted and vacuumed her home office every day. She does not do this to other rooms in her home. Nobody else dusts or vacuums their office every day”, the expressed traits (and constructed categories) were “clean, neat/tidy/organized, OCD, focused/work-oriented, concerned” and “allergic”; and the expressed goals were “to be clean” and “to appear clean”. For each category a frequency count was performed, and we selected the most frequently verbalized traits and goals (e.g., clean as the trait and to be clean as the goal) for further analyses (in which we used implicit measures of inference). In 18 of the 37

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<sup>7</sup> This covariance information appeared with the same order (consistency, distinctiveness and consensus) in all sentences. The logic was to keep the first sentence (which mostly included the consistency information anyway) close to the original sentences used in the previous STI studies as much as possible. We decided to leave the consensus information to the end as it was the least critical dimension for the purpose of the present study (as low consensus was preserved in all sentences, the possibility of decreased attention at the end of the behaviors would disturb the effect of this dimension the least among the three covariance dimensions).



behaviors, participants provided similar concepts as goals and traits for all three versions of the behaviors (with LHH, LLH and LLL configurations; see Appendix A for these behaviors specified with an asterisk). These behaviors were used in Study 1 and Study 2.

### **Study 1. Implicit Inferences for Traits and Goals: Goal Manipulation**

Previous research showed that people tend to infer traits of actors from their single behaviors in a mostly unintentional and fast fashion (Carlston & Skowronski, 1994; Todorov & Uleman, 2002; Uleman, Newman, & Moskowitz, 1996). There is also a limited amount of research showing that people can infer actor goals and intentions even faster than actor traits (Hassin, Aarts and Ferguson, 2005; Malle & Holbrook, 2012; Van Overwalle et al., 2012). However, these studies either focused on behaviors which imply either traits or goals of the actor (Malle & Holbrook, 2012) (i.e., they did not determine the conditions in which a behavior could imply both a trait and a goal) or compared the tendency to make goal or trait inference for the same behavior but by focusing on predictable actions rather than high-level goals of the actors (Hassin, Aarts and Ferguson, 2005; Van Overwalle et al., 2012). In other words, they compared people's responses to the words defining the action that is supposed to follow the actor's behavior (e.g., swim) with their responses to the words defining the trait of the actor (e.g. athletic). What was not clear in these studies is, whether these "trait words" actually map on to the trait concept which was defined previously; a personality characteristic which is assumed to be consistent across situation and time. Our pilot study reviewed above showed that, people often tend to use the same words or word clusters to define actor goals and traits. All things considered, our concern here was to understand, 1) when do people tend to infer actor goals rather than traits for the same behaviors by comparing three different

information configurations in actor behaviors (LHH, LLH, LLL), and 2) whether people infer traits or goals of the actor when they use the same word linguistically for inferring traits and goals (e.g., an honest type vs. trying to be honest).

If behaviors with LHH and LLL configurations imply goals while those with LLH imply traits, we hypothesized that manipulation of the goal of making goal vs. trait inferences should differentially affect inferences from these behaviors. Previous research showed that inferential goals can be manipulated both explicitly and implicitly. Krull (1993), for example manipulated inferential goals of the perceivers in an explicit fashion (by making them focus on certain aspects of the given behavior) and such a manipulation affected the type of social inference (dispositional vs. situational) people engaged in. Chartrand and Bargh (1996), on the other hand, demonstrated that inferential goals can be manipulated implicitly, namely, as a part of an independent task and by being outside of the perceivers' awareness. In the present research, we employed a relatively implicit procedure (in the sense that it was part of an independent task) to manipulate people's inferential goals in order to capture different tendencies to make inferences from behaviors with different configurations.

Specifically, we suggest that manipulation of inferential goals should affect the type of inference participants make when processing a behavior presented in a sentence. Inference is assessed by whether participants falsely remember having seen the concepts implied by the behaviors (since the concepts are not actually presented as part of the behavior, merely implied). Also, this manipulation should differentially affect the confidence in correctly rejecting a concept as having not been in the sentence, which would be characterized by response time. More specifically, there were three goal conditions comprising the goal manipulation. Some participants performed a first task in which they were trained to make goal inferences, and this

goal of inferring goals was hypothesized to remain accessible and impact the subsequent processing of the stimulus sentences. This goal was hypothesized to trigger inferences from LHH and LLL behaviors (that would be characterized by higher false recognitions and/or slower correct rejections for the implied concepts) to a greater degree than LLH behaviors. Another group of participants performed a first task in which they were trained to make trait inferences, and this goal of inferring traits was hypothesized to remain accessible and impact the subsequent processing of the stimulus sentences. This goal was hypothesized to trigger inferences from LLH behaviors.

## **Method**

**Participants.** 93 undergraduate university students (61 females,  $M_{age} = 19.02$ ,  $SD_{age} = 1.23$ ) from Lehigh University were recruited and tested in the lab. They received course credit in return for their participation.

### **Materials and Procedure.**

**Goal manipulation.** After arriving to the lab, participants were first exposed to a goal or trait inference manipulation (or control condition). In both goal manipulation conditions (goal of inferring goals versus goal of inferring traits), they worked on a set of behaviors which were found to imply both goals and traits of the actors in a previous study (van Overwalle et al., 2012; see Appendix B). Their task in this phase was to either infer traits, goals or other characteristics of the actors (e.g., gender, occupation) from given behaviors.

This manipulation was administered through a computer task similar to the one used by Malle and Holbrook (2012) in order to measure different social inferences. The task (as well as the following probe-recognition task) was programmed through E-Prime software (Schneider, Eschman, & Zuccolotto, 2002).

Specifically, participants saw each behavior sentence for 5000 ms on the screen followed by a probe for certain inferences such as GOAL?, TRAIT?, GENDER?, OCCUPATION?. The probe stayed on the screen until the response was registered. Participants were asked to respond as quickly as possible if they think that they can make the inference probed by the cue from this sentence or not by pressing a Yes (“A” or “L”) or No (“L” or “A”) key. If they answered Yes, they saw an instruction of “what GOAL (TRAIT) was revealed” on the screen and were also asked to type in their specific inference.

Importantly, in the goal inference manipulation condition, in most of the trials (10/16) participants were asked whether they can infer a goal from the behavior they saw previously. In the trait inference manipulation condition they mostly (10/16) responded to the question of whether they can infer a trait from the behavior. In both conditions, the remaining trials (6/16) asked about inferences for characteristics other than goals and traits, namely gender and occupation. In the control condition, participants were asked to respond to trait and goal inference questions in equal numbers (5/16 each) as well as other characteristics of the actors.

***Probe-Recognition Task.*** Following the goal manipulation, participants engaged in a probe recognition task in which implicit inferences were measured. Participants in all goal manipulation conditions went through the same procedure in this phase, except for a subliminal priming manipulation. In order to make sure that the effect of the goal manipulation did not wear off quickly, we subliminally primed the concept they should focus on in between the trials in this phase. So in the goal inference goal condition, participants were primed with the word GOAL and in the trait inference goal condition, they were primed with the word TRAIT for 15 ms. In the control condition, a series of Xs (XXXX) were shown for 15 ms instead.

In this phase, participants were told that they will engage in an independent memory task. Specifically, they would learn about a behavior and after each behavior, they would be shown a word. Their task was to remember if that specific word was in the behavior that immediately preceded it, or not. The behaviors (selected from the pilot study mentioned above) appeared on the screen for 10 seconds each. Following each sentence, they saw a word on the screen which may imply both a goal and a trait conceptually (as observed in the pilot study). Participants' task was to answer if they remember having seen the word in the previous sentence or not, by pressing the assigned Yes ("A" or "L") or No ("L" or "A") buttons as quickly as possible.<sup>8</sup>

Our behavior list included 12 type of behaviors<sup>9</sup> with 3 configurations of consensus, consistency and distinctiveness information (i.e., LHH, LLH, LLL) for each behavior. Each participant saw 12 behaviors with one of these 3 configurations. In order to make sure that people see only one of these configurations for each behavior as well as they see an equal number of different combinations in total (4 behaviors for each configuration of LHH, LLH or LLL), we created 3 different lists and randomly assigned participants to see one of these lists (see Appendix C). In the end, each participant saw 12 behaviors which imply (but does not include) the following word and 8 behaviors (controls) which include the word. The main focus of analyses was the implied behavior sentences so the role of the control behaviors was to ensure the participants that these words do sometimes actually appear on the screen and to check if participants attended to the stimuli or not.

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<sup>8</sup> The keys which were assigned for Yes and No responses stayed the same throughout the task, meaning that, if the participant used the "A" key to respond as Yes in the training session, s/he used the "A" key to respond as Yes (I saw the word) in the memory task as well.

<sup>9</sup> The pilot study with 37 behaviors showed that people tend use similar words to describe traits and goals in 18 of these behaviors. However, 4 of these trait/goals (safe, honest, generous, helpful) were commonly used in 2 or 3 different behaviors. Therefore, we ended up having 13 behaviors implying independent goals/traits from one another.

**Measures of Individual Difference.** In order to explore possible differences in the tendency to make implicit inferences, after the false recognition task, we asked participants to fill out a survey on Qualtrics. This survey included measures of Need for Cognition (NC; Cacioppo et al., 1984), Personal Need for Structure (PNS; Neuberg & Newsom, 1993)<sup>10</sup> as well as demographics.

**Design.** A 3 (goal manipulation: goal, trait, control) x 3 (behavior configuration: LHH, LLH, LLL) x 3 (behavior list) x 2 (key: A= yes, L= no; L= yes, A= no) mixed design was administered. The last two factors were added for the purpose of controlling for possible list and key effects on responses. All factors were between-subjects except for the information configuration.

## Results

**False Recognition.** The overall accuracy of recognition for both critical and control trials was quite high (the error ratios for each behavior type;  $M_{LHH} = .13$ ,  $SD_{LHH} = .21$ ;  $M_{LLH} = .17$ ,  $SD_{LLH} = .25$ ;  $M_{LLL} = .15$ ,  $SD_{LLL} = .24$ ;  $M_{filler} = .20$ ,  $SD_{filler} = .23$ ) (see Figure 1)<sup>11</sup>. A 3 x 3 mixed factorial ANOVA was conducted to analyze the effect of goal manipulation and behavior configuration on false recognition. There was not a main effect of behavior on false recognition, meaning that, overall, people were equally likely to falsely recognize words in different behavior configurations,  $F(2,180) = 1.69$ ,  $p = .19$ ,  $\eta_p^2 = .02$ . There was also not a significant main effect of goal manipulation on false recognition,  $F(2,90) = .02$ ,  $p = .98$ ,  $\eta_p^2 = .001$ , showing that making people think of traits, goals or both did not affect their overall performance in

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<sup>10</sup> Previous research indicated some individual differences in terms of STI. Specifically, Moskowitz (1993) found that, people with high PNS are more likely to engage in STIs compared to low PNS people. Based on that, we included this and some relevant measures in our procedure, in order to explore potential differences in the tendencies to make implicit goal and trait inferences.

<sup>11</sup> Uleman and his colleagues (1996) mentioned that, in the probe recognition paradigm, it is possible to expect differences either in terms of accuracy or RT. They suggest that whether the effect will be observed in accuracy or RT depends on the specific strategy participants engaged in while responding. Participants' overall high accuracy here suggests that they prioritized correct responses at the expense of RT during this task. In this case, it may be more reasonable to rely on differences in RT for the hypothesis testing.

the memory task. Importantly, the interaction of behavior configuration and goal manipulation was also not significant,  $F(4,180) = 1.56, p=.19, \eta_p^2 = .03$ . In other words, being in a certain goal manipulation condition did not affect people's tendency to falsely recognize goal/trait implying words differentially for different behavior configurations. When the list type was entered as a covariate into this analysis, it did not change the results in significant ways (the nonsignificant findings for the interaction of goal manipulation and behavior configuration on false recognition were similar across different list conditions;  $F(8, 168) = 1.12, p=.35, \eta_p^2 = .05$ ).

Still, an interesting pattern of results were observed for LHH and LLL behaviors. Contrary to expectations that these two types of configurations would yield similar patterns in terms of false recognition after the goal inference goal manipulation, the patterns turned out to be almost the opposite for these two types of behavior configurations, as displayed in Figure 1. While in the goal inference goal condition, people were more likely to make false recognitions for LLL ( $M=.19, SD=.27$ ) than LHH ( $M=.11, SD=.22$ ) behaviors, in the control condition where people were asked to think about both goal and trait inferences, the opposite pattern was observed (LLL:  $M=.11, SD=.19$ ; LHH:  $M=.16, SD=.20$ ). In order to further analyze this pattern, we reran the mixed factorial ANOVA by dropping LLH behaviors. This analysis yielded a significant interaction between goal manipulation and configuration,  $F(2, 90) = 3.06, p=.05, \eta_p^2 = .06$ . The interaction was characterized by marginally different false recognition for LHH and LLL behaviors under the goal inference goal condition. Participants were more likely to falsely recognize words when they saw LLL behaviors compared to LHH behaviors when they were in the goal inference goal condition,  $F(1, 90) = 3.73, p=.06, \eta_p^2 = .04$ . None of the other effects were significant. Also, none of the individual difference variables (PNS, NC,

and ideology) had any effect on false recognition when they were added to the 3 x 3 ANOVA as a covariate.

Considering the advantage of mixed effect models in procedures where variability both within participants and within stimuli can be accounted as random factors (Judd, Westfall, & Kenny, 2012), we also conducted a general linear mixed model analysis using the GLIMMIX procedure in SAS by entering subject intercept as a random factor and using the binary response accuracy (1= correct, 0= incorrect) for each specific critical behavior as the dependent variable in our model.<sup>12</sup> The solutions for the fixed effects of goal manipulation and behavior configuration showed similar results, neither the main effect of goal manipulation,  $F(2,1017) = .03$ ,  $p=.97$ , nor the main effect of behavior configuration,  $F(2,1017) = 1.78$ ,  $p=.17$  was significant. The interaction was also not significant,  $F(2,1017) = 1.56$ ,  $p=.18$ . Consistent with the mixed factorial ANOVA, the solutions for the fixed effects indicated a significant difference of false recognition in LHH and LLL sentences across goal inference goal vs. control conditions,  $t(1017)= 2.29$ ,  $p= .02$ . Tukey-adjusted simple effect comparisons failed to show any significant difference between LHH and LLL within the goal inference goal condition  $t(1017)= 1.88$ ,  $p= .14$ .

**RTs.** Participants received 1116 trials in which they were asked about a trait/goal word that was implied by (but not included in) the sentence and they rejected 947 of these trials (85%) in total. Among these correct rejections, an outlier analysis revealed 27 (1.7 %) data points in which participants' responses were 3SD above the mean RT. These data points were dropped and average RTs for each

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<sup>12</sup> All proc glimmix analyses in all three studies in the present research were conducted with 3 other alternative models as well. In these models, the fixed factors were kept constant while random variables were entered as 1) subject intercept and stimuli intercept, 2) subject intercept and behavior type slope 3) subject intercept and condition slope. In all the analyses, the model reported above (subject intercept only as a random factor) provided the best fit (in this model Gen Chi-Square/DF ratio was closer to 1 compared to other models and we took that as a standard as suggested by Barbu, 2012).



behavior configuration were recalculated. As 2 participant's responses to all LLH and 1 participant's to all LLL behaviors were 3 SD above the mean, these two participants were excluded and 90 participants were included in the RT analyses.

In order to analyze the effect of goal manipulation and behavior configuration on RT for correct rejections, A 3 x 3 mixed factorial ANOVA was conducted (see Figure 2). The main effect of behavior type turned out to be nonsignificant,  $F(2, 174) = .62, p=.54, \eta_p^2 =.007$ . Namely, people were equally fast in correctly rejecting the implied goal/trait words across different types of behavior configurations. Main effect of goal manipulation was also not significant,  $F(2, 87) = 2.22, p= .11, \eta_p^2 =.05$ , showing that people were equally fast at correctly rejecting critical words in different goal manipulation conditions.

Contrary to our expectation, RTs in correctly rejecting words in behaviors with different configurations did not differ across different goal manipulation conditions, as the interaction was also not significant,  $F(4, 174) = .63, p= .64, \eta_p^2 =.01$ . When the effect of different list conditions (that were administered for counterbalancing purposes) was controlled by entering this factor as a covariate into the analysis, the results did not change in significant ways. Moreover, when the effects of individual difference variables (i.e., PNS, NC, and political ideology) were analyzed as covariates, none of these variables made any remarkable changes in the results as well.

Importantly, ANOVA deals with missing values by eliminating these participants from the analysis completely. As this RT analysis relies on correct rejections only, it becomes especially likely to lose data due to a participant's lacking correct rejections for one type of behavior configuration only. In this case it is especially critical to conduct a PROC MIXED analysis on SAS with a long data

format to be able to use all RT data available. Moreover, it is quite likely to see variability across subjects in terms of RT; some participants' overall RTs may be shorter /longer than others for different reasons. We were able to account for this variability in this analysis by including a participant-level random intercept in the model.<sup>13</sup> Goal manipulation, behavior configuration and the interaction of these two factors were entered as fixed factors predicting the response time as in ANOVA.

The covariance parameter estimates revealed a significant effect of participants showing a significant variability in RTs across different participants,  $z=5.17, p<.0001$ . When this variability was accounted for, the results for the fixed effects remained the same with the ANOVA. RTs did not differ across responses for behaviors with different configurations,  $F(2, 832) = .26, p=.71$ . RTs also did not differ across three goal manipulation conditions,  $F(2, 832) = 2.35, p=.10$ . The interaction between configuration type and condition was also found to be not significant,  $F(4, 832) = .49, p=.74$

## **Discussion**

This experiment did not reveal any support for the hypothesis that people tend to make inferences for LHH and LLL behaviors under a goal inference goal, and they also failed to make inferences for LLH behaviors under a trait inference goal. Still, there was an interesting pattern for LLL and LHH behaviors, such that, people tended to make more false recognitions for LLL behaviors than LHH behaviors under the goal inference goal. This was contrary to expectations as we suggested that both LHH

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<sup>13</sup> Considering that some behavior sentences may elicit shorter/longer RTs than others and following Judd, Westfall and Kenny's (2012) suggestions, the intercept for the stimuli was also included with participant intercept as random factors in another model (all 36 behavior sentences were entered as unique stimuli into the data in this analysis). This model provided a poorer fit (characterized by a higher AIC value) than the reported model. In a different model, the slope for the condition effect (which may potentially vary across participants) was also considered as a random factor. This strategy also did not improve the reported model.

and LLL behaviors should imply goals. This finding suggests that, even if both LHH and LLL behaviors might imply goals (although not captured in this study), these goals should differ in quality (such as the level of abstractness or strength). Further studies should focus on these possibilities.

One limitation of this study was not having appropriate control trials in the probe recognition task, in other words, a baseline measure of people's tendency of correctly rejecting having seen a word that was not implied by the behavior. Instead of a baseline measure, our analyses relied on a relative tendency to make false recognitions or slowing down in correct rejections for goal/trait implying words across different goal manipulation conditions. In the following studies, we added these control trials into the paradigms we used. Another limitation (or artifact) of this study was the control condition for the goal manipulation. In order to control for the effect of having a goal of making goal or trait inferences only, we made participants think of both goals and traits in the control condition. Although this manipulation would be strong to catch inferences for clearly dissociable concepts (e.g., situation vs. disposition attributions), it may not create an appropriate framework to differentiate concepts that can easily trigger one another, such as goals and traits. The results of this study became hard to interpret in this sense. Possibly, this control condition may have facilitated both goal and trait inferences equally, trait inferences mostly or goal inferences mostly, depending on either people's tendencies to engage in these inferences or some differential qualities of these inferences (e.g., if thinking of traits is a stronger manipulation than goals, people may have even started to interpret the goals of the actors in terms of traits or vice versa). In this sense, this condition may have actually created an *additive* effect of goal and trait inferences, instead of creating a neutral condition compared to other goal manipulation conditions. Such possibility

is supported by a general slowdown of responses under this control condition (although not significant).

Taking these concerns into consideration, in the second experiment, we administered a more fine-grained measure (i.e., probe recognition with categorization task) to capture goal vs. trait inferences for behaviors with LHH, LLH and LLL configurations.

### **Study 2. Implicit Inferences for Traits and Goals: Categorization Task**

In the first experiment participants held implicit goals to infer either traits or goals, and we examined if this differentially facilitated their likelihood of forming inferences from behavioral stimuli that differed in how strongly they implied traits versus goals. This approach to dissociating goal and trait inference was not successful. Another way to determine whether perceivers implicitly refer to the characteristics of others in terms of a goal vs. a trait is to shift from examining goals to instead examining response tendencies. When explicit trait inference is trained to be associated with a particular response (pulling a lever toward the self, pressing a particular button, etc.), then if an implicit inference requires the same response it should be facilitated if the inference is also referencing a trait, but we should see no facilitation if it is some other type of inference (such as a goal). In this experiment we analyzed the impact of a specific behavioral response in a forced categorization task (goal vs. trait) to see if it facilitated (vs. interfered with) subsequent inference-making on a task assessing implicit inferences that called for a similar behavioral response as that used in the forced categorization task. Once again, a probe recognition task served as the measure of implicit inference, with pressing buttons marked “yes” and “no” to indicate if the probe word had been in the sentence serving as the behavioral response in question.

According to embodiment theory, cognitive processing of certain stimuli should be facilitated by related/associated bodily actions (Niedenthal et al., 2005). If this is the case, then it should be possible to associate certain body responses (e.g., responding with one hand or the other) with certain categories (traits vs. goals) and then to expect these body responses to either facilitate or hinder related responses. The implicit association test (Greenwald et al., 1998) makes use of this logic. When people use the left hand to indicate they have seen a positive word (e.g., flower) it is easier for them to use the same hand to make an inference about category membership if the category shares a positive valence (e.g., a name that indicates the category “white”) relative to using that hand to categorize an item with negative valence (e.g., a name that indicates the category “black”). Such use of response tendencies allows us to infer that if an inhibited response time is observed it indicates an implicit association between the category “black” and negative affect. Facilitated times indicate an implicit association between the category “white” and positive affect. Can such logic be applied to examining whether people implicitly associate a trait or a goal with a behavior?

For example, suppose that people automatically infer a goal when they read about an actor’s behavior. In this case, previous body responses associated with the category of goal -such as responding with left hand - should facilitate their goal detection with a correspondent body response – by using the left hand. Another way to think of it is that a response switch (responding with left hand for the goal category but making a response to a goal implying sentence with the right hand) should be costly to the participant as it requires an extra cognitive step of the suppression of an automatic response (to respond to goal words with the left hand). Using this theoretical framework, in this study we utilized bodily states’ facilitation/interference

of cognitive processing and response to associated concepts in order to examine our questions of how information relating to consistency, consensus, and distinctiveness impacts the type of inference people form.

Specifically, we predicted that, when participants use the same hand (i.e., key) to respond to “goal” categories in the categorization task and to respond with “Yes” (admitting having seen the word) in a subsequent memory task that assesses inference formation, their inference type can be identified. If they are slower to correctly reject having seen the word by making a response switch (i.e., disengaging attention from Goal/Yes response) to press the No key, then it suggests they have made a goal inference from the sentence. If sentences with LHH and LLL configurations imply goals rather than traits, this cost in RT should be observed for these behaviors specifically. On the other hand, when a “Yes” response is paired with a key press that matches with the key press for indicating a “trait” category, a cost for response switch should be observed only if the person had inferred a trait. If our prediction about implicit trait inference for sentences with LLH configurations is correct, this cost should be observed for these sentences only.

Based on the previous research showing high accuracy overall in a probe recognition task (McKoon & Ratcliff, 1986; Uleman et al., 1996), it may not be possible to observe enough variation in accuracy to capture potential differences for different behavior configurations.<sup>14</sup> Still, if enough variation in accuracy is captured, higher false recognition rates should be observed for LHH and LLL sentences when the goal key (on the explicit categorization task) and the yes key (on the implicit inference task) match due to the facilitation of yes responses as a result of implicitly

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<sup>14</sup> We used probe recognition paradigm instead of other paradigms (e.g., cued recall, false recognition) that elicit more variation in accuracy mainly because of the complexity of sentences. More specifically, it was possible to observe a floor effect in terms of accurately remembering these complex sentences if we used other paradigms that require recall or recognition of critical words after the exposure of *all* behaviors.

inferring a goal. For the LLH sentences, on the other hand, false recognition rates should be higher in the condition where trait and yes keys match.

## **Method**

**Participants.** 79 Lehigh University students from an introductory psychology course (2 with missing demographic information, 33 females,  $M_{age}= 18.93$ ,  $SD_{age}= 1.02$ ) were recruited to participate in a 20 minute study in a lab. They received partial credit toward their introduction to psychology course in return for their participation.

### **Materials and Procedure.**

**Training Session.** In the first part of the study, participants engaged in a training session in which they learned to associate certain buttons (and, thus, using a certain hand) with the categories of goal and trait. Participants were shown 20 simple goal-implying or trait-implying sentences that were previously used to analyze goal and trait inferences by van Overwalle et al. (2012). These sentences were different from the ones used in Study 1 in the sense that they were shown to be *either goal or trait implying* by these scholars; no sentence implied both a goal and a trait by relying on the same concept for both (Appendix D). Although we think that most of the goal-implying behaviors they used imply very low level goals (to swim, to play, etc.) as discussed before, for the purpose of this training (category-response association), the sentences and inferences needed to be overly simple, so as not to interfere with the social inferences we measure in the experimental phase that followed.

The study was completely computerized and programmed using E-Prime software. In this first phase, participants received an instruction explaining the “categorization task” they would engage in. Specifically, they were asked to press a certain button (A or L) if they think the behavior on the screen implies a goal and to press another button (L or A) if they think this behavior implies a trait of the actor

(the assigned buttons were counterbalanced between participants). Also, after each response, participants saw a box on the screen asking about the specific goal/trait (the wording was matched with the participant's answer) that was implied by the behavior. This procedure aimed to make participants think deeper about their categorization responses.

***Probe Recognition Task with Repeated Categorization.*** Following the training session (i.e., categorization task), participants were told that we are interested in people's dual-task capabilities, namely their performance in a memory task when they engage in an independent categorization task at the same time. So in this task, participants saw behaviors with LHH, LLH and LLL configurations (the same behaviors used in the previous study) but this time with pictures of the actors engaging in the behaviors. Sentences and pictures were presented simultaneously on a black background. Pictures included actor faces with a neutral expression on a plain background. After each behavior-picture pair that was presented for 10 seconds, a different behavior sentence that was shown in the categorization task appeared on the screen and participants were asked to make the same categorization they previously made by using the same assigned keys. The participants were reminded of the assigned keys by the cues which stayed on the screen until the response is made. So for example, if the "A" key was assigned for responding a goal category and the "L" key was assigned for responding a trait category, a "goal" cue appeared at the left top corner of the screen and a "trait" cue appeared at the right top corner of the screen (i.e., the cue location on the screen corresponded to the required hand to respond). Also, during categorization, the background color of the screen was changed into white (and it was changed back into black in the memory task) to make it easier for the participants to distinguish categorization and memory tasks. After categorization,



participants saw a word along with the actor's picture that they saw 2-slides-back. They were asked to answer as quickly as possible if they remember having seen this word in this actor's behavior or not. The word they saw was either implied by but not included in the behavior (critical trials), was not implied by and not included in the behavior (control) or was actually included in the behavior (filler). The same buttons with the categorization task (A and L) were used to make yes and no responses. In the goal-yes match condition, participants used the same button they used in categorizing goals (in the categorization task) to say Yes (I saw the word). In the trait-yes match condition, they used the same key they used in categorizing traits to say Yes. Goal-Yes and Trait-Yes conditions were manipulated within subjects in two blocks. Specifically, participants used the same keys for categorization throughout the task but Yes-No buttons were switched in the second block. So for example, if participants used the same key to respond with "goal" and "yes" (I saw the word) in the first block, they switched the "yes" key in the second block so that it matched with a "trait" response this time.

As this was a more demanding task than the one used in the first study, participants engaged in 4 practice trials in which they were also walked through every step of the task with explanations (Slide 1: Behavior 1: Memorize the behavior with this face; Slide 2: Behavior 2: Categorize that; Slide 3: Was this word included in the first behavior?). In two of these practice trials the correct answer was yes and in the other two the correct answer was no. Participants also received feedback for their responses in this practice phase.

For this probe recognition (memory/inference) task, we used the same behavior list as in Study 1. Again, for the critical trials, participants were randomly assigned to one of the 3 lists that were created by selecting one of the three

configurations for each of the 12 behaviors. Thus, the task consisted of 12 critical trials with 4 LHH, 4 LLH and 4 LLL behaviors (implying but not actually including the word being asked). In addition, there were 4 control trials (not including or implying the word being asked) and 8 filler trials (including the word being asked) adding up to 24 trials. For each individual, half of each type of the behaviors were randomly selected and shown in the first block and the other half were shown in the second block. Which picture would be matched with a certain behavior was individually randomized (male pictures were randomized within behaviors initiated by males and vice versa). Other than that, both the order of memory behaviors and categorization behaviors were individually randomized.

After this task, participants were asked to recall as many sentences as possible that they were asked to memorize. This procedure was administered to check for people's tendency to integrate implied trait/goal words into the recalled behaviors.

*Measures of Individual Difference.* The same individual differences measures from Study 1 were employed. This time, however, the survey was programmed on E-Prime (instead of Qualtrics).

**Design.** A 4 (behavior configuration: LHH, LLH, LLL, Control) x 2 (match type: goal-yes match, trait-yes match) x 2 (categorization key: goal A, trait L; goal L, trait A) x 3 (behavior list) within-subjects design was administered with the last two factors being between-subjects counterbalancing conditions.

## **Results**

**False Recognition.** A 2 x 4 repeated measures ANOVA was conducted in order to analyze people's tendency to falsely recognize the words implied in the critical sentences across different key match conditions (see Figure 3). The analysis

yielded a main effect of behavior configuration,  $F(3, 234) = 16.65, p < .001, \eta_p^2 = .18$ , characterized by significantly less false recognitions for control trials in which the word being asked was not implied by the behavior ( $M=.03, SD=.15$ ) compared to LHH ( $M= .18, SD=.31$ ), LLH ( $M=.20, SD=.34$ ) and LLL ( $M= .17, SD= .32$ ) behavior in which the word being asked was implied,  $ps < .001$  (Bonferroni corrected). As can be observed from the mean false recognitions, participants' accuracy was quite high overall.

The main effect of match type was not significant,  $F(1, 78) = .30, p=.58, \eta_p^2 = .004$ , indicating that overall accuracy did not differ across the two match type conditions (i.e., switching the key did not make participants less accurate in the second block). Importantly though, the interaction between the match type and behavior configuration also did not turn out to be significant,  $F(3, 234) = .30, p=.82, \eta_p^2 = .004$ . This result may stem from restricted variability (in these highly accurate responses) to be able to observe more/less false recognitions as a function of a key match between the yes response and goal/trait category response.

When the list type was added as a between-subjects variable into this 2 x 4 ANOVA, an interaction between behavior configuration and list emerged,  $F(6,228)= 3.02, p=.007, \eta_p^2 = .07$ . Further simple effect analyses with Bonferroni correction showed that this interaction stems from higher false recognition for the LLL behaviors in List 2 ( $M=.26, SD=.37$ ) than List 1 ( $M=.08, SD=.25$ ),  $p=.03$ . However, the three-way interaction between configuration, match type condition and list type did not turn out to be significant  $F(6,228)= .53, p=.79, \eta_p^2 = .02$ . None of the other main effects or

interactions were found to be significant. When individual difference variables were controlled as possible covariates, results stayed the same as well.<sup>15</sup>

In addition, a PROC GLIMMIX analysis was conducted in SAS with the long data where accuracy for each response (instead of the average of responses within each behavior type) were entered into the datasheet in a binary format (1= correct, 0= incorrect). As in the analysis for the Study 1, subject intercept was entered as the random variable into the model. The solutions for the fixed effects were consistent with the ANOVA. The only significant effect was the main effect of behavior configuration,  $F(3, 1173) = 13.82, p < .001$ , which stemmed from higher accuracy for control compared to critical trials. Neither the main effect of match type nor the interaction between behavior configuration was significant,  $F_s < 1$ .

**RTs.** Participants responded to 948 trait/goal implying trials in total and 775 of these trials (82%) were correctly rejected. On the other hand, among 316 control trials, 306 were correctly rejected (97%). Among all correct rejections, an outlier analysis revealed 26 (2.06 %) data points in which participants' RTs were 3SD above the mean RT. Also, one participant's response time did not seem to indicate that the participant had processed the word (14ms). These data points were dropped and average RTs for each behavior configuration were recalculated.

A 2 x 4 repeated measures ANOVA was conducted in order to compare the RTs for correct rejections among different match type conditions and behavior types (see Figure 4). Again as expected, match type condition did not indicate a main effect,

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<sup>15</sup> When PNS was added as a categorical variable (high vs. low) into this analysis, a marginally significant three-way interaction between PNS, match type and behavior configuration emerged,  $F(3,225) = 2.56, p = .06, \eta_p^2 = .03$ . This interaction was characterized by differential performance of high PNS people in the goal-yes key match condition. Participants' false recognitions were significantly greater for all three types of behavior configurations compared to control behaviors in both low PNS people and high PNS people when they responded in the trait-yes match type condition,  $p < .05$ . However, false recognitions did not differ across these critical and control behaviors when high PNS people used the goal keys to respond.

$F(1, 57)=.00, p=.99$ . Still, a significant main effect of behavior configuration emerged,  $F(3, 171)=3.61, p=.02$ . Pairwise comparisons with Bonferroni correction showed that this main effect was characterized by faster responses to control trials ( $M= 1480.85, SD= 460.62$ ) compared to LHH ( $M= 1608.55, SD=536.21$ ),  $p=.06$ , and LLL ( $M= 1640.65, SD=512.72$ ) behaviors,  $p=.03$ , (and not to LLH ( $M=1582.38, SD=536.04$ ) behaviors). There were no significant RT differences across critical trials.

Importantly, a significant interaction between match type and behavior type was observed,  $F(3, 171)= 3.51, p= .02, \eta_p^2 =.06$ . Pairwise analyses showed that, as expected, in the goal-yes match type condition, participants were significantly slower for correctly rejecting the implied words in LLL behaviors compared to the words in control behaviors,  $p=.002$ . This difference in response latency for critical compared to control behaviors in the goal-yes match type condition indicates a goal inference. Another significant effect emerged when RTs for LLL behaviors across goal-yes and trait-yes conditions were compared,  $p=.03$ , showing that participants were faster at correctly rejecting the implied words in LLL sentences in trait-yes condition compared to goal-yes condition. Interestingly, an opposite pattern was observed for the LHH behaviors. Although the RTs for correct rejections of the implied words in LHH and control behaviors did not differ in goal-yes match or trait-yes match conditions (indicating no goal or trait inference),  $ps> .1$ , correct rejections for LHH behaviors were almost slower when the yes key was matched with trait response than with goal response,  $p=.08$ .<sup>16</sup> On the other hand, RTs of correct rejections of the implied words in LLH behaviors did not differ from RTs of correct rejections of the words in control behaviors, both in goal-yes and trait-yes match conditions, again

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<sup>16</sup> All the analyses reported were also conducted by eliminating 4 participants whose performance in the categorization task was below chance level. The significant differences became more pronounced and RT difference for LHH behaviors across 2 key match conditions became significant,  $p=.04$ . Also conducting log transformation for the RTs did not change the results in any way.

indicating no goal or trait inference ( $p=1$  and  $p=.1$  respectively). The effects stayed the same across different list conditions (three-way interaction between the key match, behavior type and list was not significant:  $F(6,165)= .32, p=.92, \eta_p^2 =.01$ ).

When the variables measuring individual differences (i.e., ideology, PNS and NC) that can potentially affect the tendency to make implicit inferences were added as covariates into this 2 x 4 repeated measures ANOVA, an interesting effect of political ideology was observed. The significant interaction between the behavior type and match type turned out to be nonsignificant when the effect of ideology was controlled for,  $F(3,162)= 1.19, p=.32, \eta_p^2 =.02$ .<sup>17</sup> When the analysis was conducted by adding ideology as a categorical variable (1-3: liberal, 4-7: conservative) into the 2 x 4 ANOVA, a significant three-way interaction was observed,  $F(3,162)= 2.64, p=.05, \eta_p^2 =.05$ . Pairwise comparisons with Bonferroni correction showed that the effect that was observed for the LLL behaviors (slowing down for the goal-yes key match condition only) was valid only for the conservative participants. When the effect of PNS (instead of ideology) was analyzed by adding this factor as a categorical variable, the three-way interaction between match type, behavior type and PNS turned out to be nonsignificant,  $F(3,162)= 1.61, p=.19, \eta_p^2 =.03$ . However, pairwise comparisons with Bonferroni correction comparing RTs for critical and control trials revealed that people with low PNS were slower in their correct rejections for both LLL and LHH behaviors compared to control behaviors in the goal-yes match condition ( $p<.001$  and  $p=.03$ , respectively for LLL and LHH behaviors), supporting goal inference.<sup>18</sup> No other significant difference in RTs for critical vs. control behaviors was observed for people with low or high PNS. When the pairwise

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<sup>17</sup> The three way interaction between these factors was not significant  $F(3,162)= 1.99, p=.12, \eta_p^2 =.04$

<sup>18</sup> The pairwise comparisons in terms of PNS should be interpreted with caution as the three-way interaction between match type, behavior type and PNS was not significant.

comparisons were conducted by comparing different match type conditions, the following pattern was observed; while low PNS people were slower for LLL behaviors in the goal-yes match compared to trait-yes match condition (showing a tendency for goal inference),  $p < .05$ , high PNS people were slower for LHH behaviors in trait-yes match compared to goal-yes match condition (showing a tendency for trait inference),  $p < .01$ .<sup>19</sup> No other effects of individual difference were found.

In order to deal with missing values and control for intra-individual variability in RTs, a PROC MIXED procedure was conducted in SAS software. As in the ANOVA, behavior type and match type were entered as the fixed factors while participant was entered as a random factor<sup>20</sup>. The results were similar with ANOVA. A significant main effect for behavior type emerged,  $F(3, 979) = 3.32, p = .02$ , while the main effect of match type was not significant,  $F(1, 985) = .55, p = .46$ . Importantly, the interaction between behavior type and match type remained significant,  $F(3, 977) = 2.97, p = .03$ . Fixed effect solutions indicated that the interaction was characterized by the RT difference for LLL and control behaviors across different match type conditions,  $t(977) = 2.04, p = .04$ . The difference between least squares means with a Tukey adjustment specified a significant difference between the responses for LLL and control behaviors within the goal-yes key match condition

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<sup>19</sup> When both ideology and PNS were entered as categorical variables into ANOVA, the four-way interaction was not significant,  $F(3, 150) = .47, p = .70$ . Still, pairwise comparisons showed that those who were conservative but also low in PNS slowed down in their correct rejections of implied words both in LLL and LHH sentences compared to controls in the goal-yes key match condition (supporting a goal inference). Also those people's responses for LLL behaviors were slower in the goal-yes match than the trait-yes match condition,  $p = .02$ . For people who were conservative and high in PNS as well, there was a significant slowdown for LHH behaviors in the trait-yes match compared to goal-yes match condition,  $p < .01$  (tentatively suggesting trait inference). None of the other comparisons turned out to be significant.

<sup>20</sup> When the same analysis was done by entering stimuli intercept as a random factor as well, the model fit did not change. Also, when the slope for behavior type as well as subject intercept was entered as a random factor, the model fit got weakened (The AIC value increased). For these reasons, we decided to rely on the model which accounted for subject intercept only as the random factor.

only,  $t(979)=3.56$ ,  $p=.009$ . The difference between the responses for LHH and control behaviors was not significant within the trait-yes key condition,  $t(979)=2.38$ ,  $p=.25$ .

### **Discussion**

The hypothesis for this study was partially supported. Specifically, we found support for goal inferences from the LLL behaviors. This effect was characterized by a slowing down in correctly rejecting words in LLL behaviors, only when this correct rejection requires a response switch from the key for goal categorization. On the other hand, we did not find any evidence of goal inference from the LHH behaviors. To the contrary, people's correct rejections of words in the LHH behaviors overall slowed down when they had to make a response switch from the trait categorization (compared to the switch from the goal categorization), tentatively indicating a tendency for trait (more than goal) inference. Similar patterns for LLL and LHH behaviors had also been observed in Study 1.

One possible factor that differentiates responses to LHH and LLL behaviors might be the difference in the consistency information. If consistency over time is perceived to be a (sufficiently) defining characteristic of the traits, people may have overly relied on this information (by disregarding distinctiveness information) and tended to make trait inferences. In this sense, rather "long-term goals" that were predicted to be implied by LHH behaviors may have been perceived to be more like traits than goals. At that point, it might also be useful to elaborate on whether people tend to make implicit inferences from complex behaviors mostly for the short-term but not for the long-term goals of others.

Interestingly however, we did not observe any trait inference for the trait-implicating LLH behaviors. This result was surprising in the light of the previous research showing trait inferences from these behaviors in explicit tasks (Bassili, 1989;



Hilton, Smith, & Kim, 1995; van Overwalle, 1997a, 1997b). This brings about the question whether this behavior configuration is not strong enough to elicit inferences in an implicit fashion. Another possible explanation may have something to do with the differential ease in processing of these types of behaviors with a goal of memorization. LLH behaviors define the actor in a clear and smooth fashion (somebody who acts the same way always with every type of entity) which may have facilitated the processing of these behaviors. Such ease of processing may have increased participants' confidence in correctly rejecting the implied goals/traits from these behaviors. With LHH and LLL behaviors on the other hand, there might be a "surprise" factor in these behaviors (the point that the actor engages in this behavior only with/for a certain entity in LHH behaviors and the point that the actor engages in this behavior for the first time) which may have interfered with the processing of stimuli. I will elaborate on these alternative explanations in the general discussion section.

### **Study 3. Implicit Trait and Goal Inference When Covariation**

#### **Information is not Provided**

In the first two studies, we aimed to analyze our hypothesis that people's tendency to make goal and trait inferences is affected by the information provided. An important point here, however, is that, most of the time people are not provided with this kind of information. Malle (2004, p. 128) suggested that, people may not be able to easily integrate covariation information when they are not specifically provided with it in the behavior. Rather, he maintained that, they tend to automatically fill in the missing information in the behavior by using strategies such as applying a general knowledge of similar events, contrasting the event with alternatives, simply browsing generative mechanisms and projecting their own mental state onto the actor's. Taking

this into consideration, we also aimed to examine people's implicit inferences for the behaviors which do not include any explicit information about the consistency, distinctiveness or consensus of the actor's action.

Analyzing trait and goal inferences for behaviors without covariance information is also critical for another reason. In the classic STI studies, many of the behaviors that imply traits include consistency information (e.g., She *always* drove a little slower than the speed limit, she dusted and vacuumed her room *every day*) (Uleman, Hon, Roman, & Moskowitz, 1996). This brings to mind the question whether STIs depend on such consistency information (also considering the tendency to make trait inferences for LHH behaviors in Study 2). The present study provided us the opportunity to test this possibility by analyzing STIs for behaviors without any explicit consistency information.

Another point that may facilitate STIs in the previous studies is the integration of trait information explicitly in the filler sentences used in the false recognition paradigm (see Todorov & Uleman, 2002). These sentences were constructed to detect participants' hits (as they should respond "yes" to the question whether that word was included in the sentence) and they explain a trait implying behavior by actually including the trait word. One potential problem with this might be, (unintentionally) creating a trait mind-set throughout the procedure that artificially inflates trait inferences for *any* behaviors processed across the entire set of behaviors. In order to control for this possibility, we used behaviors that included the trait information, goal information or neither of them as fillers in the present study.

We administered a false recognition task in order to measure implicit inference instead of a probe recognition task in this study. One advantage of false recognition task over probe recognition task is the ability to check not only implicit inferences

from behaviors but also binding of inferred traits/goals to the actor of behavior (i.e., specific faces matched with the behaviors) (Todorov & Uleman, 2002).<sup>21</sup>

In addition, we would like to further examine the manipulability of the different types of social inferences, namely goal and trait inferences. Previous research showed that the tendency to make implicit trait inferences is also affected by motivational factors such as PNS; those who are higher in need for structure are more likely to make trait inferences (Moskowitz, 1993a). Still, we do not know how motivational factors differentially affect tendencies to make implicit goal vs. trait inferences. Taking this into consideration, we also manipulated the motivation to make goal and trait inferences (as in Study 1).

If people implicitly infer both goals and traits from behaviors that contain no covariation information, we should observe an equal tendency to falsely recognize goal and trait information in the behaviors learned (when no specific goal inference manipulation was induced). However, if a certain type of inference is a result of a motivation factor (e.g., induced by the context or certain type of stimuli used), the tendency to make one type of inference should be manipulated externally. Specifically, people should be more likely to make trait (vs. goal) inferences when they are trained to make trait inferences. Therefore, the tendency to make false recognitions for the traits in the critical (vs. control) trials should be more likely than falsely recognizing goals in the critical (vs. control) trials. On the other hand, being trained to make goal inferences should target and increase goal rather than trait inferences. Thus, we predicted a boost in the goal inferences more than trait inferences in the goal inference goal condition. In addition, it was possible to observe

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<sup>21</sup> We could not use false recognition task in the first study due to the much more complicated stimuli used in that study. In the false recognition task, the recognition phase is administered after all the stimuli are processed. Therefore, we believe that, the memory for complex behavioral information should decay (or get interfered) more dramatically than observed in the classic false recognition studies with simple behavioral information.

a corresponding pattern with the RTs in correctly rejecting goal and trait words in critical trials. Specifically, when people correctly reject having seen the word which was implied from the behavior, they can be slower to do so, again showing that they implicitly associated this trait or goal with the given behavior. Therefore, it was possible to see a higher RT in correct rejections of goals in the critical (vs. control) trials under goal inference goal and a higher RT in correct rejections of traits in the critical (vs. control) trials under trait inference goal condition. People in the control condition, however, should not differ in terms of their RTs when they correctly reject having seen traits or goals in these behaviors.

## **Method**

**Participants.** 152 participants (88 females,  $M_{age}= 37.99$ ,  $SD_{age}= 11.32$ ) were recruited through Amazon Mturk. Participants in the control condition (who did not engage in the first training session) received \$0.75 and participants in the experimental condition got \$1.00 in return for their participation.

### **Materials and Procedure.**

**Goal Manipulation.** Participants were randomly assigned to goal inference goal, trait inference goal and no goal (control) conditions via Qualtrics (the whole study was programmed on Qualtrics). Goal and trait inference goal manipulation procedures were the same as those used in Study 1. In the control condition, however, participants skipped the goal manipulation and engaged in the false-recognition task only.

**False Recognition Task.** Instead of using the behaviors with covariation information which imply the same semantic information as traits or goals (e.g., goal to achieve versus an achieving person), we used simple behaviors which imply different concepts as goals and traits. We selected the behaviors, first, based on the findings of

the pilot study in which people were explicitly asked about the traits and goals they can infer from the given behaviors (see the related section for the details). 25 sentences that each was found to imply different concepts as goal and trait were selected from this behavior list. After all consensus, consistency and distinctiveness information were removed, we conducted a pilot test with 20 different Amazon MTurk participants in which they were asked to 1) write about the specific traits and goals they can infer from each behavior, and 2) rate to what extent they think a goal/trait represents this person's goal/trait (specific goals and traits were selected from the responses given in the first pilot study) on a 5 point scale. We selected 10 critical behaviors, each implying a trait and a goal which 1) matched with most participants' explicit responses, 2) had an average representativeness rating of 3.5 and up (out of 5), and 3) were rated as being roughly equally representative of the person's perceived trait and goal (the differences of the ratings between traits and goals ranged from .05 to .8). We also selected 6 behaviors in order to use as control behaviors (see below for how these behaviors were used). Next, we created 16 filler behaviors. 6 of these behaviors implied a trait and included the trait word, 6 of them implied a goal and included the goal word and 4 of them did not specifically imply a goal or a trait but included the word being asked (Appendix F). These 32 behaviors were constructed in such a way that half of them were initiated by females and half of them by males in each behavior category (i.e., control, critical and filler behaviors).

The task consisted of an exposure phase and a recognition phase. In the exposure phase, participants were asked to learn about 32 behaviors that were matched with actor pictures (16 males and 16 females from different ethnicities) for a later memory task. Each picture contained an actor's face with a neutral facial expression on a plain background. Each behavior was randomly matched with one of

these actor pictures. This randomization was repeated for each individual in such a way that everybody was exposed to unique behavior-actor pairs (behaviors initiated by female actors were randomly matched with pictures of females and behaviors initiated by male actors were randomly matched with pictures of males).

After the exposure, in the recognition phase, participants were told that they would see the pictures of the people they just learned about one more time but this time the pictures will be matched with certain words. Their task was to indicate whether that specific word had been presented as part of the sentence that had been paired with that specific person, by clicking on yes or no options. We also specified that, if the word had appeared in a sentence but paired with a different face, their answer would be “no” (they should respond yes if the face and word had actually been paired together earlier). Participants were asked to respond as quickly as possible.

In this recognition phase, for the critical trials, half of the participants received trait words (trait memory condition) and half of them received goal words (goal memory condition) that were implied from the behaviors seen in the first phase. In these trials, although the behavior which implies the goal or the trait was correctly paired with the actor shown in the exposure, the correct answer would be “no” as the goal or trait word was not actually included in the behavior. In the control trials, the goal or trait word being asked<sup>22</sup> was again only implied by one of the behaviors in the exposure phase but also it was implied for an actor other than the one paired with the word in this phase. The difference in the tendency to falsely recognize the words in the critical and control trials would indicate automatic association of the words with specific actors while encoding the behavioral information. Filler trials in which

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<sup>22</sup> In the goal (/trait) memory condition, participants were asked about only goal (/trait) words in the control trials.

participant's correct response would be "yes" were used to assure participants that the words being asked were actually included in some of the trials.

**Measures of Individual Differences.** The same measures used in the first two studies were applied after the false recognition task.

**Design.** A 2 (behavior type: critical, control) x 2 (trait vs. goal memory) x 3 (goal manipulation: trait, goal, control) mixed design was administered. The first factor was measured within and the last two factors were measured between subjects.

## Results

**False Recognition.** In order to measure people's tendency to falsely recognize critical (vs. control) trials across different goal manipulation and word type conditions, we applied a 2 x 2 x 3 mixed factorial ANOVA. The percentage of false recognition within control and critical trials was taken as the dependent variable in this analysis (see Figure 5).<sup>23</sup> Results revealed a main effect of behavior type,  $F(1, 146) = 27.29, p < .001, \eta_p^2 = .16$ , characterized by lower overall false recognition for control trials ( $M = .31, SD = .20$ ) compared to critical trials ( $M = .42, SD = .26$ ). There was a main effect of word type,  $F(1, 146) = 3.97, p = .05, \eta_p^2 = .03$ ; indicating that, people's overall false recognition (for critical and control trials) was lower when they were asked about goal words than trait words (see Figure 5). False recognition was comparable across different goal manipulation conditions as the main effect of goal manipulation turned out to be insignificant,  $F(2, 146) = 1.27, p = .28, \eta_p^2 = .02$ .

The analysis also showed a significant interaction between induced goal and behavior type on memory,  $F(2, 146) = 5.11, p < .01, \eta_p^2 = .06$ . Pairwise comparisons with Bonferroni correction indicated that while people's false recognition for critical

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<sup>23</sup> None of the participants' average accuracy exceeded +/- 3 SD so we included all the participants in this analysis.

sentences was higher than control sentences in both goal and trait inference goal conditions ( $F(1, 146) = 11.11, p = .001, \eta_p^2 = .07$  and  $F(1, 146) = 25.58, p < .001, \eta_p^2 = .15$  respectively), they were equal for critical and control behaviors when they did not receive a goal manipulation,  $F(1, 146) = .39, p = .53, \eta_p^2 = .003$ . On the other hand, the goal manipulation did not differentially affect the accuracy across goal and trait words, as the interaction between goal manipulation and word type was not significant,  $F(2, 146) = .25, p = .78, \eta_p^2 = .003$ . The interaction between behavior and word type was also not significant,  $F(1, 146) = .39, p = .53, \eta_p^2 = .003$ , as control behaviors were better remembered than critical trials both when traits and goals were being asked.

The three-way interaction between goal manipulation, behavior type and word type was not significant,  $F(2, 146) = .39, p = .68, \eta_p^2 = .005$ . Still, when Pairwise comparisons with Bonferroni corrections were considered, there was an interesting pattern of relationship across these three factors. When participants had a goal to form goal inferences they were more likely to falsely recognize goals in the critical than control trials,  $F(1, 146) = 5.28, p = .02, \eta_p^2 = .035$ , but they were also more likely to falsely recognize traits in the critical than control trials,  $F(1, 146) = 5.85, p = .02, \eta_p^2 = .04$ . Similarly, when participants had a goal to form trait inferences they were more likely to falsely recognize traits in the critical than control trials,  $F(1, 146) = 17.24, p < .001, \eta_p^2 = .11$ , but they were also more likely to recognize goals in the critical than control trials,  $F(1, 146) = 8.74, p < .01, \eta_p^2 = .06$ . On the other hand, in the control condition where people did not go through any goal manipulation, there were no differences in the false recognition for control and critical trials for neither goal nor trait words,  $F_s < 1$ . These findings indicate that people did not implicitly infer goals or



traits (that are bound to specific actors) unless they experienced a goal manipulation that encouraged the formation of such inferences.

Next, we turned to explore the possible effects of individual difference variables (ideology, pns and nc) on false recognition. When ideology was entered as a categorical variable into the analysis explained above, a significant three-way interaction between behavior type (critical vs. control), word type and ideology occurred,  $F(1, 140) = 4.51, p = .035, \eta_p^2 = .03$ . Simple effect analyses with Bonferroni correction comparing false recognitions for critical and control trials across different goal manipulation and word type conditions revealed interesting differences between liberals and conservatives (see Figure 6). When participants did not receive any goal manipulation, the only (marginally) significant difference between critical and control trials (as an indication of inference) was observed for liberals and for goal words only,  $p = .06$ . However, after adopting a goal to form goal inferences, liberals' responses indicated a support for goal inferences (characterized by significantly higher false recognition of goals in the critical than the control trials,  $p < .05$ ), while conservatives' responses revealed a trait inference (characterized by significantly higher false recognition of traits in the critical than the goal trials,  $p < .05$ ). After adopting a goal to form trait inferences, both liberals and conservatives showed evidence of both types of inferences,  $ps < .06$ .

When PNS was entered as a categorical variable, we found a marginally significant four-way interaction between PNS, behavior type, word type and goal manipulation condition.  $F(1, 137) = 2.53, p = .08, \eta_p^2 = .04$  (see Figure 7). Pairwise comparisons with Bonferroni corrections were conducted to compare false recognition for critical and control trials across low and high PNS people within different goal manipulation and word type conditions. In the control condition, we did

not find any significant difference for low or high PNS people,  $ps > .3$ . After adopting a goal to form goal inferences, however, while low PNS people tended to make only goal inferences (characterized by higher false recognition of goals in critical than control trials,  $p < .05$ ), high PNS people tended to make only trait inferences (characterized by higher false recognition of traits in critical than control trials,  $p < .05$ ). In the trait inference goal condition, again a similar pattern was observed ( $p < .01$  and  $p < .001$ , respectively for low PNS people/goal words and high PNS people/trait words). Also low PNS people tended to make more false recognitions for the trait words in the critical than the control condition,  $p = .08$ . No other differences were significant. Also, we did not find any differences in terms of NC and individualism-collectivism variables.

In order to account for inter-individual (and inter-stimuli) variances, a PROC GLIMMIX procedure was conducted in SAS software by focusing on accuracy in individual responses (instead of averages within certain behavior types) as the dependent variable. As in the ANOVA, goal manipulation condition, word type and behavior type were entered as fixed factors. The intercept for the participant was entered as a random factor into the model. As in ANOVA, the main effect of behavior type was significant in this analysis,  $F(1, 2274) = 23.29, p < .0001$ , as a result of more accuracy for control compared to critical trials,  $t(2274) = 3.79, p < .001$ .<sup>24</sup> The main effect of word type also remained significant,  $F(1, 2274) = 4.28, p = .04$ . Trait words were more likely to be falsely recognized than goal words in general,  $t(2274) = 2.21, p = .03$ . Another effect that remained significant was the interaction between goal manipulation and behavior type on memory,  $F(1, 2274) = 3.04, p = .05$ . While words in the critical sentences were falsely recognized more than the control words under both

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<sup>24</sup> Tukey adjustment was applied in all pairwise comparisons.

goal,  $t(2274) = 3.73, p < .01$ , and trait inference goal conditions,  $t(2274) = 4.30, p < .0001$ , there was no such difference under no goal manipulation condition. None of the other effects were found to be significant,  $ps > .3$ .

Comparisons across critical and control trials revealed that false recognitions were higher for critical trials when 1) under trait inference goal condition when the word type was a trait,  $t(2274) = 3.79, p < .001$ , 2) under trait inference goal condition when the word type was a goal,  $t(2274) = 2.25, p = .03$ , 3) under goal inference goal condition when the word type was a trait,  $t(2274) = 2.50, p = .01$ , 4) under goal inference goal condition when the word type was a goal,  $t(2274) = 1.81, p = .07$ . On the other hand, when there was no goal manipulation, critical trials did not differ from control trials in terms of false recognition (whether the word being asked was a goal or a trait,  $ps > .4$ ). Also, under trait inference goal manipulation condition, trait words in the critical trials were falsely recognized more than goal words in these critical trials,  $t(2274) = 2.23, p = .03$ . Under goal inference goal, trait and goal words were equally falsely recognized,  $t(2274) = 1.26, p = .2$ .<sup>25</sup>

**RTs.** Participants responded to 1520 trait/goal implying trials in total and 912 of these trials (60%) were correctly rejected. Among 900 control trials, 632 were correctly rejected (70%). We applied a 2-step outlier analysis due to extraordinarily slow responses that biased the outlier analysis at the first step. 49 responses at the first step and 63 responses at the second step were found to be 3SD above the mean RT and were removed. We also removed 4 data points that were below 200 ms.

Therefore, approximately 8% of the data points had to be removed in total and

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<sup>25</sup> Despite these differences, direct comparisons of the differences under trait mind-set for the critical and control trials within goal and trait word conditions did not reveal a significant difference,  $t(2274) = 1.21, p = .22$ . This result makes it hard to interpret whether people under trait mind-set actually are more likely to make trait than goal inferences. Still, considering the performance for critical trials tentatively supports this argument.

average RTs for critical and control trials were calculated based on the remaining data.

A 2 x 2 x 3 mixed factorial ANOVA was conducted to analyze the differences in RTs for correctly rejected critical and control trials across the two word type and three goal manipulation conditions (see Figure 8). The analysis indicated a main effect of behavior type,  $F(1, 141) = 4.10, p < .05, \eta_p^2 = .03$ , characterized by slower responses overall for critical ( $M = 2683.1, SD = 896.82$ ) compared to control ( $M = 2585.3, SD = 846.47$ ) trials. None of the other effects turned out to be significant,  $ps > .3$ . The individual difference variables did not have a role on any of the findings.

The differences in RTs were also analyzed by using a PROC MIXED procedure on SAS including a person level random intercept.<sup>26</sup> This intercept turned out to be significant,  $Z = 7.39, p < .0001$ , indicating differential RTs overall across participants. Consistent with the ANOVA, the only significant fixed effect was the main effect of behavior type,  $F(1, 1350) = 4.79, p = .003$ , as a result of the slower RTs for critical compared to control behaviors,  $p = .08$ . None of the other fixed effects were significant. Still, we conducted planned contrasts with Bonferroni correction across RTs for critical and control trials within goal and trait goal manipulation conditions.<sup>27</sup> These analyses revealed a marginally significant difference, indicating slower correct rejections for traits in the critical compared to control trials in the trait inference goal condition,  $t(1349) = -1.76, p = .08$ . Other differences across RTs for critical and control trials were not significant,  $ps > .3$ .

## Discussion

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<sup>26</sup> The same analysis was also conducted by entering stimuli intercept as a random factor. This analysis did not improve the model significantly. When the slope for behavior type as a function of participants was entered into the model as a random factor, the model fit did not change as well ( $ps$  for the comparisons of -2restricted LLs > .7).

<sup>27</sup> This analysis was conducted in order to check if the pattern for higher tendency to falsely recognize critical (vs. control) behaviors was also characterized by slower correct rejections for these behaviors under goal and trait mind-set conditions.

In this experiment, when people were not provided with the covariance information (consistency, distinctiveness or consensus) about the behaviors, they tended to make neither goal nor trait inferences. They made both types of inferences, however, as long as they were exposed to goal manipulation that encouraged some form of inferencing. Also, they tended to make more trait inferences than goal inferences when they were in the trait inference goal condition. These results bring to mind a couple of questions.

First, are implicit inferences mostly based on motivational factors? When we prevented a behavior's "speaking for itself" in terms of traits and goals by taking out the embedded covariation information in this study, people's STIs and SGIs became contingent on the goal manipulation. This suggests that people may need to be specifically *motivated* to go beyond the given information and make implicit inferences unless the behavior implies the relevant goal/trait in a strong fashion (e.g., due to the covariation information or extremity of the behavior, or due to the filler trials strongly promoting trait inference by including the traits in the filler sentences).

We expected each goal manipulation to distinctively affect each type of inference. Nevertheless, both types of goal manipulations led to a boost in both STIs and SGIs (although trait inference goal manipulation resulted in more pronounced STIs). We can think of various possible explanations for this result. First, one type of inference might have increased the accessibility of the other. As mentioned previously, the concepts of goals and traits are not easily dissociable. A trait might be easily associated with a goal or a goal may be expected to define a trait automatically. Some of (but not all of) the behaviors we used in this study imply associable traits and goals in this sense (e.g., frugal and to save). Another possibility is that, both goal manipulations may have created an effect on the depth of processing of the behaviors

in the false recognition task as well. Those who got either of the goal manipulation (trait or goal inference) may have been primed to go beyond the information given in the false recognition task, resulting in both STIs and SGIs.

Alternatively, some people may have a naïve theory in mind about traits giving rise to goals or goal's giving rise to traits, which may have led to both types of inferences observed after both types of goal manipulations. This naïve theory, for example, may have led people who were asked to make goal inferences in the first task to make trait inferences as well as goal inferences during this manipulation. As suggested in the introduction, conservatives and people with high PNS are especially motivated to make dispositional attributions in explaining the causes of behaviors (Neuberg & Newsom, 1993; Thompson, et al., 2001). Consistently, we found that, both conservatives and people with high PNS made only trait inferences even when they were asked to make goal inferences over and over again in the first task (while liberals and low PNS people inferred only goals in this case). This finding also suggests that our materials successfully captured different types of inferences as such individual differences in the types of inferences made is very much in parallel with what previous research suggests about the psychological correlates of ideology and personal need for structure.

### **General Discussion**

People make inferences from others' behaviors for various reasons. Importantly, they predict others' future behaviors based on inferences and adjust their own behaviors accordingly (Aarts, Gollwitzer, & Hassin, 2004; Gollwitzer & Moskowitz, 1996). When people infer invariant characteristics of others, like traits, they expect them to engage in similar behaviors across different situations and over time. However, people may infer variant characteristics of others as well, which

requires them to account for the specific context while making their inferences and related future predictions. The latter types of inferences, namely goal inferences, are sophisticated as they need to be represented in terms of different actor-situation or actor-stimulus conditions in mind. Yet, this does not mean people do not rely on such variant representations of actors implicitly. Kelley's (1967) covariation principle, as well as more recent models of person perception (Kammrath, Mendoza-Denton, & Mischel, 2005) highlighted such tendency in people to rely on rather complex schemas (represented by "if...then..." propositions) in their attributions in an efficient way.

In three experiments, we examined people's tendency to implicitly infer variant (goal) as well as invariant (trait) characteristics of others from their behaviors. Previous research overly relied on inferences of invariant characteristics of others, both explicitly and implicitly (Malle, 2008). However, as suggested by Heider (1958), when an actor brings about a change in an environment, perceivers should be capable of processing that change and should tend to infer a specific goal of this actor. In this sense, the type of behavior perceivers received about the actor becomes critical in the type of inference made. Therefore, in Study 1 and 2, we focused on the role of received information on the type of implicit inference people made. Based on Kelley's model, we focused on three different configurations of the three dimensions in a behavior; consensus, distinctiveness and consistency (i.e., LHH, LLL, LHH). Specifically, we suggested that, people should tend to make goal inferences from behaviors when low consistency is paired with low distinctiveness and when high consistency is paired with high distinctiveness information (under low consensus). These LHH and LLL behaviors were shown to be perceived as implying actor-stimulus and actor-situation interactions respectively in previous research (Bassili,

1989; Hilton, Smith, & Kim, 1995; van Overwalle, 1997a, 1997b). On the other hand, we expected that people would make trait inferences implicitly from LLH behaviors since such inferences were already shown to explicitly occur in previous attribution research.

Study 1 did not reveal conclusive findings in terms of the effect of the type of covariation information provided on the type of implicit inference made, except for tentatively showing (as opposed to our predictions) that people may not be making similar types of inferences from LLL and LHH behaviors. In Study 2, which employed a rather fined-grained procedure in terms of differentiating goal and trait inferences, we found support for goal inferences from behaviors with LLL configuration. More specifically, people tended to infer goals from behaviors that the actors engaged in *for the first time* and in an interaction with *various entities* (objects, people, situations). These behaviors were shown to be perceived as being directed by an interaction between person and situation in the previous attribution studies (Bassili, 1989; Hilton, Smith, & Kim, 1995; van Overwalle, 1997a, 1997b). As opposed to our expectations, however, we did not find any support for goal inferences from LHH behaviors that the actors engaged in *over a period of time* and in an interaction with a *specific entity*.<sup>28</sup> On the other hand, when the (insignificant) patterns of findings in both Study 1 and 2 are considered, we observe a tendency to diverge from making goal inferences from LHH behaviors. In Study 1, following goal inference manipulation, participants made even fewer false recognitions of implied concepts from LHH than LLL sentences. In Study 2, they were slower to respond to these

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<sup>28</sup> One possible explanation for not observing inferences of long term goals (as well as traits) is that people may be reserved to make these inferences unless they are motivated to do so (or unless, as with stereotypes and with strong STI sentences, there is another impetus to do so). In other words, making judgments about the somewhat permanent characteristics of others may be something people are reluctant to do in the absence of motivation or compelling reason as also supported by the findings in Study 3.



implied concepts when they had to make a response switch from trait rather than goal category. This finding may even imply that they almost tended to make trait inferences from these behaviors. But why this might be the case?

One potential explanation for these findings might be that people may have over-relied on the consistency information while discounting the distinctiveness information given. Still, we did not observe a similar tendency of trait inference for the LLH behaviors which also included high consistency information but paired with low distinctiveness. That is why we suggest that it should be something about the combination of high consistency and high distinctiveness that should have led people to engage in trait-like rather than goal-like inferences. Possibly, high distinctiveness may have created a “surprise effect” or may have been perceived to be somehow “counterfactual” if people have a naïve theory in mind that somehow associates high consistency with low distinctiveness. While high consistency indicates engaging in the same behavior *consistently over time*, low distinctiveness indicates engaging in the same behavior *consistently in interaction with different objects, people and situations*. So high distinctiveness (which comes after consistency information in the behaviors we used), may have been rather unexpected in this sense. The question here is whether this “unexpected” dimension of the behavior rendered consistency information more accessible by making the perceivers go back to the first information and question why this might be the case (and resulting in more trait-like inferences). In the LLH behaviors, on the other hand, people read about a person who behaves consistently over time and in interaction with different entities. LLH behaviors, in this sense, may be rather easily and smoothly processed and even if people have made related inferences, they may have had enough time during the 10-seconds-long presentation to notice that the implied trait was not actually included in the behavior.

In order to analyze these possibilities of one dimension (e.g., distinctiveness) affecting the interpretation of the other (e.g., consistency), we need to examine how inferences may be constructed and reconstructed by the each piece of information received.

Therefore, we are planning to analyze the contribution of each piece of information to the inference made in the future. Thus, we would better understand how people differentially focus on or discount certain dimensions of the behaviors in the process of inference formation and how they form their ultimate inferences in the end.

Alternatively, we can interpret the differential findings for LHH and LLL behaviors in terms of the relative perceived probability of implying traits. The fact that LLL behaviors were one-time-only behaviors (as also emphasized in the second sentences, e.g., in the past he never clipped any kind of coupons out of the newspaper), participants may have found the characteristics implied as obviously “non-trait”. In LHH behaviors, however, there were no such strong statements that would potentially counteract trait inferences. Therefore, participants may have turned to trait inferences from LHH behaviors more than LLL behaviors.

We did not find any support for implicit trait inferences from neither complex nor simple behaviors (unless people engaged in a goal manipulation). These results contradict with the years of STI research which claimed that people should infer traits even from simple behaviors (e.g., Todorov & Uleman, 2002). We suggest that this result may stem from the fact that the sentences we used in the present research were either very complex or very simple in terms of the amount of information included. In the previous STI work, we noticed that materials either included some kind of high consistency (through using present tense and words like always, every day etc.) or implied low consensus (through extreme behaviors that implicitly suggests extraordinariness). This may be one reason for why participants in Study 3 did not

make trait (or goal) inferences from behaviors with no covariation information. Importantly however, previous research is silent about the specific effects of covariation information in implicit trait inferences. At that point, it is critical for the future research to pinpoint the exact amount richness of the behavior information that is necessary to trigger implicit inferences. Alternatively, observing no implicit inference from simple behaviors (without goal manipulation) may stem from the fact that this study (Study 3) was conducted on Amazon MTurk unlike previous studies. Taking the difficult nature of the task into consideration (as participants needed to correctly reject having seen the *implied* words for the *specific actors*), this study should be replicated in a lab context with potentially less distraction before concluding confidently that people do not make implicit inferences from behaviors without covariance information.

Lastly, we found support for implicit goal and trait inferences from simple behaviors after having a goal to form either trait inferences or goal inferences triggered in a supposedly independent task. This suggests that people should be specifically motivated to make an inference from a simple behavior with no covariation information. Contrary to our expectations though, people did not *exclusively* infer the characteristic (goal or trait) of the actor that they were asked to infer in the goal manipulation phase. Instead, participants made both STIs and SGIs after making either goal or trait inferences in the first phase. On the surface, this might be because goals and traits are strongly related and our procedure could not differentiate potential differences as much as we aimed. Still, this does not seem to be the case for two reasons. First, we were able to observe some evidence that after the trait inference manipulation, participants became more likely to make trait rather than goal inferences. Second, the analyses yielded individual differences in terms of the

effect of the trait and goal inference manipulation on later inferences. Specifically, while conservatives and high PNS people made only trait inferences after goal inference manipulation, liberals and low PNS people actually made only goal inferences after this manipulation. This suggests that some people may have different naïve theories such as goals' being raised from traits, which in turn make them think about traits of the actor even when they are asked to think about goals. Conservative and high PNS people may be more likely to form such naïve theories (than liberals and low PNS people) as being parallel with their chronic motivation to engage in categorical thinking as well as dispositional attributions (Eidelman, Crandall, Goodman, & Blanchar, 2012; Neuberg & Newsom, 1993; Olcaysoy Okten, 2012; Skitka et al., 2002). Although there is already evidence on high PNS people's higher tendency to engage in STIs than low PNS people (Moskowitz, 1993), to our knowledge, there is no research on ideological differences in the formation of implicit inferences. This finding might be critical in this sense for pioneering future research on such potential differences.

### **Concluding Remarks**

As much as making inferences is critical for an ordinary person to make sense and make predictions of others, for researchers it is critical to understand 1) the content/type of inferences made, and 2) the circumstances under which an ordinary person is more likely or specifically motivated to engage in specific inferences. There has been years of research on implicit trait inferences, showing that people infer others' invariant characteristics (namely traits) from the simple behavioral information provided, in a fast fashion and even without necessarily being aware of making such inferences. What we do not know much about, however, is how likely people are to infer others' variant characteristics, namely goals, in a similarly implicit

fashion. And is it possible that the literature on trait inference has confounded trait inference and goal inference?

The present studies examined the role of the type of information as well as the perceivers' motivation to make trait vs. goal inferences. People tended to make implicit goal inferences from behaviors which included low consensus (initiated only by the actor), low distinctiveness (initiated towards all the entities the actor interacted with) and low consistency (initiated for the first time). When consensus, distinctiveness and consistency information were not provided, people made neither trait nor goal inferences. Still, they made both types of inferences when they were trained to make either of them (i.e., their motivation to make a specific type of inference was temporarily activated) in an independent task. Also, some individual differences in terms of the type of inference made were observed when participants were trained to make goal inferences (but not when they were trained for trait inferences). While liberals tended to make goal inferences after goal inference training (as well as after no training), conservatives made trait inferences even after this training. Similarly, people low in PNS only made goal inferences, yet, people high in PNS only made trait inferences after this training.

All in all, these findings indicate that, people can potentially infer both traits and goals of others in an implicit fashion. However, what kind of characteristics perceivers implicitly infer depends on the content of the information they received as well as perceivers' chronic or temporarily activated goals. What was also revealed from the present research is that goal and trait inferences probably work in an interactive fashion. Future research should bring to light the mechanism behind this interaction which may be different for people with different chronic motivations (e.g., if different types of inferences are made in parallel or sequential fashion; if people

such as liberals and those with low PNS develop preconscious control of certain inferences). Even though people can make both types inferences potentially, what type of inference they would rely on in making predictions of others' future actions as well as in adjusting their own behaviors are other critical questions that are worth continuous research effort in the near future.

Understanding the types of inferences people make about others' characteristics is critical for various reasons. Inferring variant vs. invariant characteristics of others from their behaviors should shape perceivers' future predictions about these actors as well as their adjustment of their own behaviors. Inferring invariant characteristics like traits may bias one's perception of the other as this means s/he discounted the specific situation or entity that may have triggered the actor's specific behavior in the first place. This tendency may give rise to (and possibly be affected by) stereotyping as well. On the other hand, inferring variant characteristics like goals should also lead to the expectation of variability in people's future actions. That is, future behavior would be seen as depending on the actor's interaction with different situations and entities. Taking such variability into account may also be a way to override the tendency to stereotype. Failing to take such variability into account, such as making an inference about an acquaintance being *selfish* for not sharing her/his book, or a collaborator being *irresponsible* based on her/his missing an appointment, or a student being *lazy* based on her/his performance in one class, may lead to devastating consequences in terms of social interactions. Goal inferences, in this sense, may play a crucial role in preventing such biased perceptions and expectations.

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## Appendices

### Appendix A

#### The List of Behaviors Tested in the Pilot Study (Patterns of Behaviors: LHH, LLH, LLL respectively)\*

Implied Word	
clean	She dusted and vacuumed her home office every day. She does not do this to other rooms in her home. Nobody else dusts or vacuums their office every day.
	She dusted and vacuumed her home office every day. She does this to other rooms in her home as well. Nobody else dusts or vacuums all the rooms in their home every day.
	She dusted and vacuumed all the rooms in her house today. She never does this to any of the rooms in her house. Nobody else dusted or vacuumed all the rooms in their house today.
thrifty	He clipped food coupons out of the newspaper every week. He never clips coupons for other types of purchases. Nobody else clips food coupons every week.
	He clipped food coupons out of the newspaper every week. He always clips coupons for every type of purchases. Nobody else clips every type of coupons every week.
	He clipped coupons for different types of purchases out of the newspaper this week. In the past he never clipped any kind of coupons out of the newspaper. Nobody else clipped coupons out of the newspaper this week.
fit	Every week he jogs 3 miles on the treadmill in the office gym at least four times. If the office gym is closed he will not engage in any other exercise that week. Nobody else goes to the office gym to use the treadmill four times a week.
	Every week he jogs 3 miles on the treadmill in the office gym at least four times. If the office gym is closed he engages in other exercises that week. Nobody else goes to the office gym every week.
	This week he jogged 3 miles on the treadmill in the office gym at least four times and engaged in other exercises if the gym was closed. Previously he never did any kind of exercises. Nobody else went to the office gym to use the treadmill four times a week and engaged in other exercises when the gym was closed.
punctual	She arrives to work ten minutes early every morning. She is never early for any other appointment. Nobody else comes to work that early.
	She arrives to work ten minutes early every morning. She is always early for any appointment. Nobody else is always early for appointments.
	She arrived to all her appointments ten minutes early today. She is never early for any of her appointments. Nobody else arrived to all of their appointments ten minutes early today.
cautious	She always drives a little slower than the speed limit. In non-motorized vehicles (bikes, scooters, boats) she always drives as fast as possible. Nobody else always drives a little slower than the speed limit.
	She always drives a little slower than the speed limit. In non-motorized vehicles (bikes, scooters, boats) she also drives a little slower than the speed limit. Nobody else always drives a little slower than the speed limit.
	She drove a little slower than the speed limit in all the vehicles she used this week (car, bike). Before this week she always drove as fast as possible. Nobody else drove a little slower than the speed limit in all the vehicles this week.
funny	At the picnics, her stories always make people laugh so hard they have to hold their sides. She never makes people laugh so hard at any other occasion (home, work). Nobody else makes people laugh so hard at the picnics.
	At the picnics, her stories always make people laugh so hard they have to hold their sides. She always makes people laugh so hard at any occasion (home, work). Nobody else makes people laugh so hard at any occasion.

	<p>This week, the stories she told at various occasions (picnic, work, home) made people laugh so hard that they had to hold their sides. She never makes people laugh so hard at any occasion. Nobody else makes people laugh so hard at various occasions.</p>
	<p>She always calls the local radio talk show and complains about a nearby toxic waste dump. She never calls the local radio show to complain about any other environmental problems they face in the area she lives (e.g., contamination of drinking water, air pollution). Nobody else calls the local radio talk show to complain about this toxic waste dump.</p>
	<p>She always calls the local radio talk show and complains about a nearby toxic waste dump. She also always calls the local radio show to complain about all other environmental problems they face in the area she lives (e.g., contamination of drinking water, air pollution). Nobody else calls the local radio talk show to complain about the environmental problems.</p>
concerned	<p>She called the local radio talk show and complained about various environmental problems they face in the area she lives (e.g., a nearby toxic waste dump, contamination of drinking water, air pollution). She never before called the local radio show to complain about any environmental problems they face in the area she lives. Nobody else called the local radio talk show to complain about any environmental problems they face in the area they live.</p>
	<p>He always leans back into his big chair and puts both his feet up onto the desk in his cubicle. He never puts his feet up onto any other furniture anywhere else. Nobody else puts their feet up onto their desks.</p>
	<p>He always leans back into his big chair and puts both his feet up onto the desk in his cubicle. He always puts his feet up onto any furniture everywhere. Nobody else puts their feet up onto any furniture everywhere.</p>
relaxed	<p>Today, both at office and home, he leaned back into the chair and put both his feet up onto any furniture in front of him. He never puts his feet up onto any furniture in front of him. Nobody else puts their feet up onto any furniture in front of them.</p>
	<p>The service is not exceptional, but she always leaves a 25% tip for the waitress in this restaurant. She never leaves that much of a tip in other restaurants. Nobody else leaves a 25% tip for the waitress in this restaurant.</p>
	<p>The service is not exceptional, but she always leaves a 25% tip for the waitress in this restaurant. She always leaves that much tip in all restaurants. Nobody else leaves a 25% tip for this waitress.</p>
generous	<p>The services were not exceptional, but she left a 25% tip for the waitresses in all the restaurants she went this week. She never leaves that much tip in restaurants. Nobody else leaves a 25% tip for the waitresses in all of these restaurants.</p>
	<p>He walked up and introduced himself to the strangers at both the office parties and more casual parties he attended recently. He never introduces himself to strangers at any types of parties. Nobody else introduced themselves to the strangers at any of these parties.</p>
	<p>He always walks up and introduces himself to the strangers at the office parties. He also always talks to his acquaintances in the office parties. Nobody else introduces themselves to the strangers at the office parties.</p>
social	<p>He walked up and introduced himself to the strangers and also talked to his acquaintances all night at the office party tonight. He had never introduced himself to the strangers or talked to his acquaintances all night at the parties before. Nobody else introduced themselves to the strangers or talked to their acquaintances all night at the office party.</p>
	<p>She always tells the prospective buyers about problems with her car. She never tells the prospective buyers about problems with any other stuff she sells. Nobody else tells the prospective buyers about problems with their car.</p>
	<p>She always tells the prospective buyers about problems with her car. She always tells the prospective buyers about problems with any stuff she sells. Nobody else tells the prospective buyers about problems with any stuff they sell.</p>
honest	<p>This time, she told the prospective buyers about problems with all the stuff she was selling. She never tells prospective buyers about problems with any of the stuff she sells. Nobody else tells the prospective buyers about problems with any stuff they sell.</p>

	<p>He always offers directions to the lost tourists. He never offers directions if he is not sure whether someone is a tourist. Nobody else offers directions to the lost tourists.</p> <p>He always offers directions to the lost tourists. He also always offers directions if he is not sure whether someone is a tourist. Nobody else offers directions to the lost tourists.</p> <p>He offered directions to the lost tourists and the local people recently. He had never offered directions to the tourists or local people before. Nobody else offered directions to the lost tourists or the local people recently.</p>
helpful	<p>The employee always tells his boss about his use of the photocopier for personal business. He never tells his boss about the personal phone calls he makes. Nobody else tells their boss about the personal photocopies they made.</p> <p>The employee always tells his boss about his use of the photocopier for personal business. He also always tells his boss about the personal phone calls he makes. Nobody else tells their boss about the personal photocopies or phone calls they make.</p> <p>The employee told his boss about his personal use of the photocopier and telephone on one day last week. He has never before told the boss about personal photocopies and phone calls he makes. Nobody else tells their bosses about the personal photocopies and phone calls they make</p>
honest	<p>He always slips \$50 into his friend's purse. He never slips money into anyone else's purse. Nobody else slips money into their friend's purse.</p> <p>He always slips \$50 into his friend's purse. He always slips money into all of his friends' purses. Nobody else slips money into their friends' purses.</p> <p>Today he slipped \$50 into all of his friends' purses. He never slips money into anyone's purse. Nobody else slipped money into their friends' purses today.</p>
helpful	<p>He attends all the parties his childhood friend hosts. He never attends parties hosted by other people. Nobody else attends all the parties their childhood friends host.</p> <p>He attends all the parties his childhood friend hosts. He also always attends parties hosted by other people. Nobody else attends all the parties their childhood friends host.</p> <p>He attended all the parties hosted by anybody recently. He had never attended parties hosted by anybody before. Nobody else attended all the parties hosted by anybody.</p>
social	<p>She always invites the newcomers to her house. She never invites the newcomers anywhere else. Nobody else invites the newcomers to their house.</p> <p>She always invites the newcomers to her house. She also always invites the newcomers to various places. Nobody else invites the newcomers to their house or any other places.</p> <p>This week she invited the newcomers to her house and several other places in the town. She never before invited newcomers to anywhere. Nobody else invites the newcomers to anywhere.</p>
welcoming	<p>He always asked everyone to make sure to check their seat belts before starting off on the trip. He never checks the tires, the gas, the brakes, or explore why the "check engine" light was on. Nobody else checks the seat belts of their passengers before starting a trip.</p> <p>He always asks everyone to make sure to check their seat belts before starting off on the trip. He also always checks the tires, the gas, the brakes, or explore why the "check engine" light was on. Nobody else checks everything before starting a trip.</p> <p>Before starting off on the trip today, he asked everyone to make sure to check their seat belts and he checked the tires, the gas, the brakes, and explored why the "check engine" light was on. He never before asked anybody to check their seat belts or checked anything himself in the car before starting off on a trip. Nobody else checks the seat belts of their passengers and checks everything about the car before starting off on a trip.</p>
safe	<p>He always tells the cashier when he was given too much change in this store. He never does this in any other stores. Nobody else always tells the cashier in this store when they were given too much change.</p> <p>He always tells the cashier when he was given too much change. He always does this in all the stores. Nobody else always tells the cashier when they were given too much change.</p>
honest	<p>He told the cashier when he had been given too much change in every store this happened in the last couple of months. In the past he never told the cashier when he had</p>

	been given too much change. Nobody else told the cashier when they were given too much change in all these stores.
	He keeps warning people not to smoke in the living room while his roommate is trying to quit. He always serves people coffee at home although his roommate is also trying to quit caffeine. Nobody else living in this house warns people about smoking in the living room.
	He keeps warning people not to smoke in the living room while his roommate is trying to quit. He also never serves people coffee at home as his roommate is also trying to quit caffeine. Nobody else living in this house warns people about smoking in the living room or avoids serving coffee.
helpful	Today he kept warning people not to smoke in the living room and he did not serve coffee while his roommate is trying to quit smoking and caffeine. He had never warned people not to smoke or avoid serving coffee at home although his roommate has been trying to quit these for some time. Nobody else living in this house warned people about smoking or avoided serving coffee.
	He always calls his Representative about increasing aid for the homeless. He never calls his Representative about aid for any other issues. Nobody else calls about increasing aid for the homeless.
	He always calls his Representative about increasing aid for the homeless. He always calls his Representative about aid for any issues. Nobody else calls about increasing aid for any issues.
concerned	He called his Representative about increasing aid for people from different groups today. He never calls his Representative about aid for any groups. Nobody else thinks about increasing aid for people from different groups.

\*These behaviors were found to imply similar concepts as traits and goals in the pilot study. Therefore, 12 of these behaviors were used in the Study 1 and Study 2.

## Appendix B

### Study 1 & 3 Goal Manipulation Task Materials (van Overwalle et al., 2012)

Possible Goal/Trait Expressed	Behaviors
(G = to swim; T = sportive)	Each morning, the man put his cap and goggles on his head, and jumped into the water.
(G = to give a talk; T = shy)	She stood in front of the class with her papers and her face turned red.
(G = to tip; T = generous)	After paying the bill, she left 5 dollars on the table.
(G = to pay; T = impatient)	Right after the meal, he went to the waiter with his card.
(G = to commit suicide; T = unhappy)	With the rope around his neck, he jumped from the stool.
(G = to improve; T = severe)	The teacher always took out her red pen and marked up the whole paper.
(G = to win; T = persisting)	When the man saw the finish line, he began to run faster.
(G = to save [money]; T = stingy)	She never spends all her money, unless she really has to.
(G = to rest; T = sportive)	After running, he lay on the couch.
(G = to wash; T = lazy)	He runs with the garden hose toward the car grudgingly.
	<u>Filler (matched with gender/occupation cue)</u>
	The student shelved some journals two at a time.
	On their dinner date, he ordered a white wine.
	Her friend asked, "Are you doing anything Friday evening?"
	While walking, the waitress takes out her cigarettes and a lighter.
	He packs his swimsuit and sun protection and heads out the door.
	The janitor sweeps the floor in the apartment hallway.

## Appendix C

### Study 1 & 2 Behavior Lists Used in Probe Recognition Task

Configuration	Implied Word	List 1- Behaviors
LHH1	clean	She dusted and vacuumed her home office almost every day. She does not do this to other rooms in her home. Nobody else dusts or vacuums their office almost every day.
LHH2	thrifty	He clipped food coupons out of the newspaper every week. He never clips coupons for other types of purchases. Nobody else clips food coupons every week.
LHH3	fit	Every week he jogs 3 miles on the treadmill in the office gym at least four times. If the office gym is closed he will not engage in any other exercise that week. Nobody else goes to the office gym to use the treadmill four times a week.
LHH4	punctual	She arrives to work ten minutes early every morning. She is never early for any other appointment. Nobody else comes to work that early.
LLH5	cautious	She almost always drives a little slower than the speed limit. In non-motorized vehicles (bikes, scooters, boats) she also drives a little slower than the speed limit. Nobody else almost always drives a little slower than the speed limit.
LLH6	funny	At the picnics, her stories always make people laugh so hard they have to hold their sides. She always makes people laugh so hard at any occasion (home, work). Nobody else makes people laugh so hard at any occasion.
LLH7	concerned	She repeatedly calls the local radio talk show and complains about a nearby toxic waste dump. She also always calls the local radio show to complain about all other environmental problems they face in the area she lives (e.g., contamination of drinking water, air pollution). Nobody else calls the local radio talk show to complain about the environmental problems.
LLH8	relaxed	He always leans back into his big chair and puts both his feet up onto the desk in his cubicle. He always puts his feet up onto any furniture everywhere. Nobody else puts their feet up onto any furniture everywhere.
LLL9	generous	The services were not exceptional, but she left a 25% tip for the waitresses in all the restaurants she went this week. She never leaves that much tip in restaurants. Nobody else leaves a 25% tip for the waitresses in all of these restaurants.
LLL10	social	He walked up and introduced himself to the strangers at both the office parties and more casual parties he attended recently. He never introduces himself to strangers at any types of parties. Nobody else introduced themselves to the strangers at any of these parties.
LLL11	honest	This time, she told the prospective buyers about problems with all the stuff she was selling. She never tells prospective buyers about problems with any of the stuff she sells. Nobody else tells the prospective buyers about problems with any stuff they sell.
LLL12	helpful	He offered directions to the lost tourists and the local people recently. He had never offered directions to the tourists or local people before. Nobody else offered directions to the lost tourists or the local people recently.
List 2 - Behaviors		
LLL1	clean	She dusted and vacuumed all the rooms in her house today. She usually never does this to any of the rooms in her house. Nobody else dusted or vacuumed all the rooms in their house today.
LLL2	thrifty	He clipped coupons for different types of purchases out of the newspaper this week. In the past he never clipped any kind of coupons out of the newspaper. Nobody else clipped coupons out of the



		newspaper this week.
LLL3	fit	This week he jogged 3 miles on the treadmill in the office gym at least four times and engaged in other exercises if the gym was closed. Previously he never did any kind of exercises. Nobody else went to the office gym to use the treadmill four times a week and engaged in other exercises when the gym was closed.
LLL4	punctual	She arrived to all her appointments ten minutes early today. She is never early for any of her appointments. Nobody else arrived to all of their appointments ten minutes early today.
LHH5	cautious	She almost always drives a little slower than the speed limit. In non-motorized vehicles (bikes, scooters, boats) she always drives as fast as possible. Nobody else almost always drives a little slower than the speed limit.
LHH6	funny	At the picnics, her stories always make people laugh so hard they have to hold their sides. She never makes people laugh so hard at any other occasion (home, work). Nobody else makes people laugh so hard at the picnics.
LHH7	concerned	She repeatedly calls the local radio talk show and complains about a nearby toxic waste dump. She never calls the local radio show to complain about any other environmental problems they face in the area she lives (e.g., contamination of drinking water, air pollution). Nobody else calls the local radio talk show to complain about this toxic waste dump.
LHH8	relaxed	He always leans back into his big chair and puts both his feet up onto the desk in his cubicle. He never puts his feet up onto any other furniture anywhere else. Nobody else puts their feet up onto their desks.
LLH9	generous	The service is not exceptional, but she always leaves a 25% tip for the waitress in this restaurant. She always leaves that much tip in all restaurants. Nobody else leaves a 25% tip for this waitress.
LLH10	social	He always walks up and introduces himself to the strangers at the office parties. He always introduces himself to strangers at any types of parties. Nobody else introduces themselves to the strangers at office parties.
LLH11	honest	She always tells the prospective buyers about problems with her car. She always tells the prospective buyers about problems with any stuff she sells. Nobody else tells the prospective buyers about problems with any stuff they sell.
LLH12	helpful	He almost always offers directions to the lost tourists. He also almost always offers directions if he is not sure whether someone is a tourist. Nobody else offers directions to the lost tourists.

List 3 - Behaviors

LLH1	clean	She dusted and vacuumed her home office almost every day. She does this to other rooms in her home as well. Nobody else dusts or vacuums all the rooms in their home almost every day.
LLH2	thrifty	He clipped food coupons out of the newspaper every week. He always clips coupons for every type of purchases. Nobody else clips every type of coupons every week.
LLH3	fit	Every week he jogs 3 miles on the treadmill in the office gym at least four times. If the office gym is closed he engages in other exercises that week. Nobody else goes to the office gym every week.
LLH4	punctual	She arrives to work ten minutes early every morning. She is always early for any appointment. Nobody else is always early for appointments.
LLL5	cautious	She drove a little slower than the speed limit in all the vehicles she used this week (car, bike). Before this week she always drove as fast as possible. Nobody else drove a little slower than the speed limit in all the vehicles this week.
LLL6	funny	This week, the stories she told at various occasions (picnic, work,

		home) made people laugh so hard that they had to hold their sides. She never makes people laugh so hard at any occasion. Nobody else makes people laugh so hard at various occasions.
LLL7	concerned	She called the local radio talk show and complained about various environmental problems they face in the area she lives (e.g., a nearby toxic waste dump, contamination of drinking water, air pollution). She never before called the local radio show to complain about any environmental problems they face in the area she lives. Nobody else called the local radio talk show to complain about any environmental problems they face in the area they live.
LLL8	relaxed	Today, both at office and home, he leaned back into the chair and put both his feet up onto any furniture in front of him. He never puts his feet up onto any furniture in front of him. Nobody else puts their feet up onto any furniture in front of them.
LHH9	generous	The service is not exceptional, but she always leaves a 25% tip for the waitress in this restaurant. She never leaves that much of a tip in other restaurants. Nobody else leaves a 25% tip for the waitress in this restaurant.
LHH10	social	He always walks up and introduces himself to the strangers at the office parties. He never introduces himself to strangers at any other types of parties. Nobody else introduces themselves to the strangers at the office parties.
LHH11	honest	She always tells the prospective buyers about problems with her car. She never tells the prospective buyers about problems with any other stuff she sells. Nobody else tells the prospective buyers about problems with their car.
LHH12	helpful	He almost always offers directions to the lost tourists. He never offers directions if he is not sure whether someone is a tourist. Nobody else offers directions to the lost tourists.

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## Appendix D

### Study 2 Categorization Training Task Materials (van Overwalle et al., 2012)

<b>Possible goals to be used</b>	<b>Goal-implying Sentences</b>
to run	Tommy took the ball and ran outside.
to lose weight	After the festivities, Kate decided to run each day.
to borrow	Debbie went with the books to the counter and showed her card.
to pay	Mike pointed to the cash register.
to pee	Sam turned to the tree and opened his zipper in one movement.
to smoke	After dinner Robert asked for a light from the boy who sat next to him.
to ski	When it was white outside, Don took his runners.
to eat	Amanda tore the package open with her mouth.
to eat	Jim ran with a growling stomach to the bakery.
to seduce	John gave a telling wink to the beautiful girl.
to play	*Frankie took the frisbee and went to the park
to wrap	*Russ took the box to the next room along with the wrapping paper.
<b>Possible traits to be used</b>	<b>Trait-implying Sentences</b>
religious	Jessica goes every Sunday to church and says her prayers every night before bedtime.
impolite	Little Oscar never says "thank you".
sloppy	Mary drops everything on the floor and never finds her stuff.
clumsy	Nancy often stumbles, and when she is doing the dishes, she often breaks the glasses and dishes.
forgetful	Martin does not even remember the appointments he made the day before.
racist	Willy refuses to rent cars to blacks.
boring	People yawned whenever Eddie spoke.
clumsy	Karl stepped on the toes of his girlfriend during the foxtrot.
smart	Erica took her first calculus course when she was 12 years old.
determined	Leonard tried for the past 4 years to play in the basketball team of the university.
organized	*Julianna arranged her books neatly on the shelf in alphabetical order.
nervous	*Matt's palms got sweaty when he thought about the exam.

\*These sentences were added to the stimuli used by van Overwalle et al. (2012) in order to equalize the number of stimuli with the ones used in the probe recognition phase (as these behaviors would be shown in between probe recognition trials as well). While the trait implying sentences were selected from previous research (Rim et al., 2009), goal implying sentences were created as being in line with the van Overwalle and colleagues' sentences.

## Appendix E

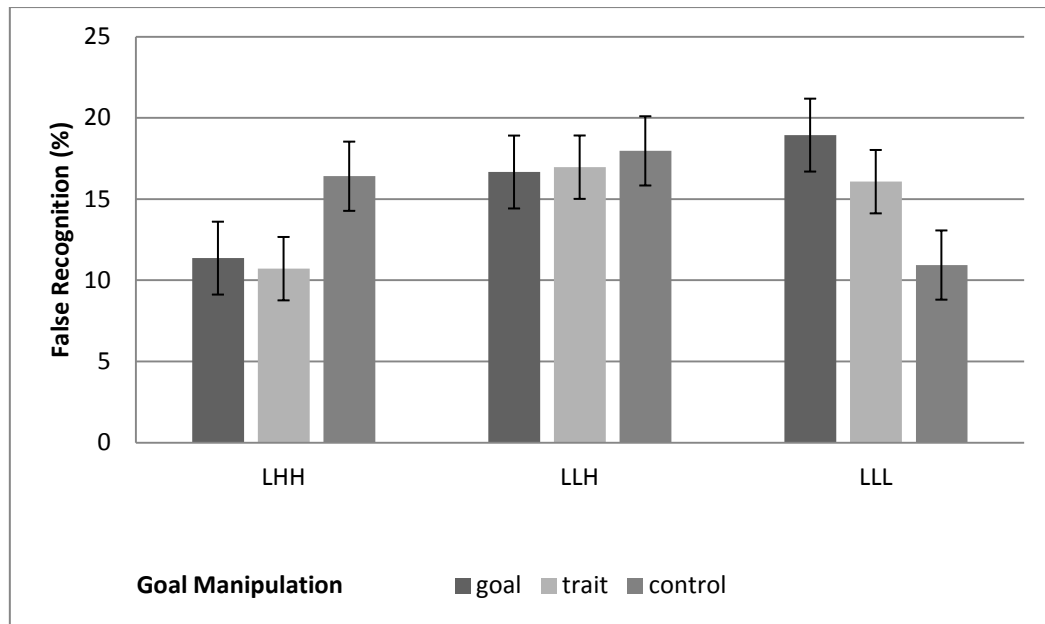
### Study 2 Control & Filler Behaviors for Probe Recognition Task

<b>Words</b>	<b>Behaviors for Practice Trials</b>
sleep	She could not get herself to greet her new neighbors. She was feeling ill today. Everyone else has greeted these new neighbors.
run	He completed a marathon. He spent the rest of the day relaxing. Nobody else he knows completed this marathon.
dinner	He left the dinner party early tonight. He would get up early the next day. Nobody else left the dinner party early.
elevator	She walked into her office building and took the elevator up. She checked if anybody else was around before getting on the elevator. Nobody else at her office building was around yet.
<b>Filler Behaviors for Probe Recognition</b>	
house	She watched the street to look at the crowds. When she did not watch the street, she spent time doing work around the house. Nobody else was looking at the crowds.
colleagues	He and his colleagues worked hard today. At home, his wife also worked hard. None of the other departments worked as hard today.
exam	He turned down an invitation to the party to study for his exam the next morning. He did not sleep that night due to studying. Nobody else in his class was invited to the party.
friends	He took his kids to the movies this weekend. He also met a couple of friends at the movies. None of them took their kids to the movies.
circus	He drove past the circus this weekend. He had never driven past the circus. Nobody else in the neighborhood drove past the circus that day.
documents	He was not sure about how to fill out his income tax return. He asked his friends about filling out the documents. None of his friends had started filling out their income tax returns yet.
newspaper	He drove to the newsstand, this morning. Later he went to a café to read his newspaper. Nobody else he knows had arrived to the café yet.
meal	He picked tea to follow his meal at the fancy restaurant. He never picks tea at other restaurants. Nobody else picked tea at the fancy restaurant.
<b>Control Behaviors for Probe Recognition</b>	
violent	He stopped and listened when he thought he heard a scream. After a minute of silence, he turned to work. Nobody else around heard a scream.
modest	She thought she lost track of the two year old. She was relieved when she found out that the kid was just next to her. Nobody around her thought that the kid was missing.
neat	When the other campers knocked on her cabin door, she loaned them her extra blanket. She asked them if they have any extra pillows. Nobody else had any extra materials.
abusive	After working on his paper, he started making plans for the weekend. He called his friends to ask if they have any plans. Nobody else had started making plans.

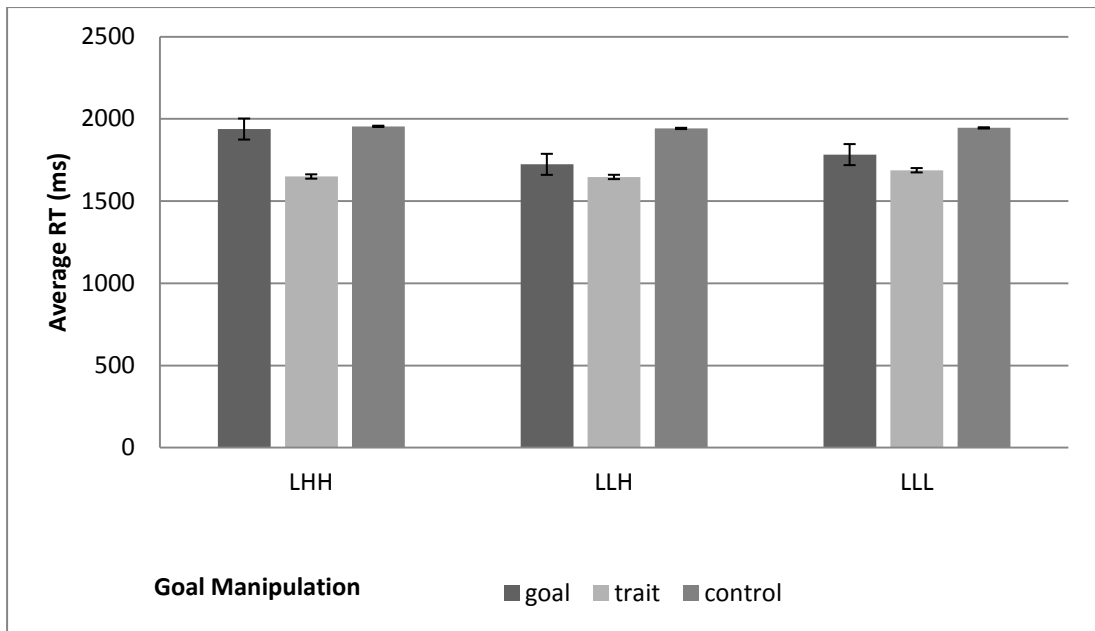
## Appendix F

### Study 3 Behaviors for False Recognition Task

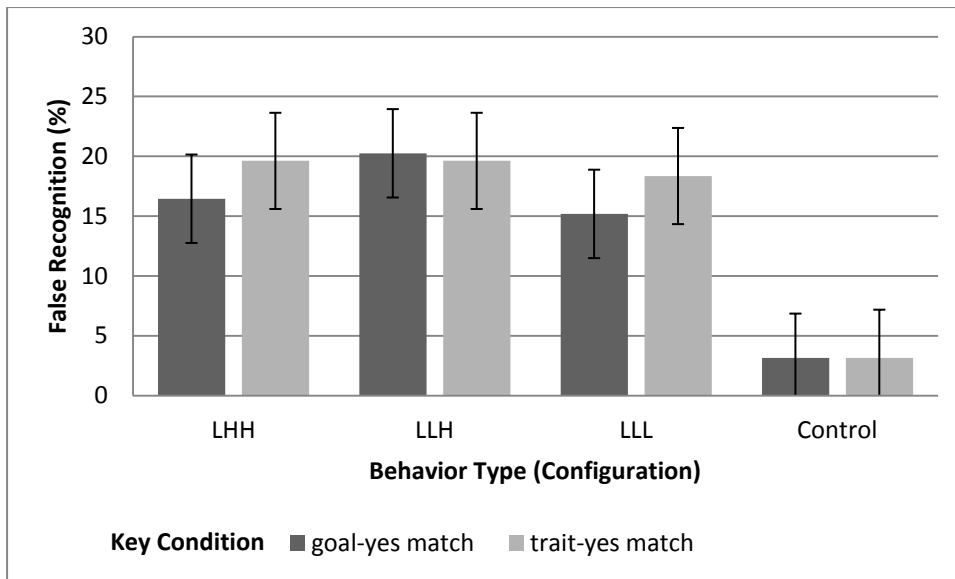
<b>Critical Behaviors</b>	Goal Word	Trait Word
She clipped food coupons out of the newspaper.	save	frugal
She called the local radio talk show and complained about a nearby toxic waste dump.	awareness	concerned
He lost track of the two year old he was babysitting when the pretty neighbor was around.	flirt	irresponsible
He picked his teeth at the end of the meal.	clean	rude
She arrived to work ten minutes early.	prepared	punctual
After working on his term paper for about 20 minutes, he suddenly started making plans for the weekend.	fun	distracted
He attends the parties his childhood friend hosts.	support	loyal
She drove to the newsstand, only half a block away.	quick	lazy
She couldn't get herself to greet her new neighbors.	alone	shy
He walked up and introduced himself to the strangers at the office party.	network	social
<b>Control Behaviors</b>		
She watched her neighbor's house to see who came and went.	stay warm	selfish
When the other campers knocked on her cabin door, she didn't loan them her extra blankets.	entertain	kind
He turned down parties to study for organic chemistry.	help	generous
He took the orphans to the circus.	succeed	hardworking
He slipped \$50 into his friend's purse.	welcome	friendly
She invited the newcomers to her house.	spy	nosy
<b>Filler Behaviors</b>		
He took the ball and ran outside to play.	play	
After the festivities, she decided to run each day, hoping to lose weight.	weight	
In order to borrow the book, she went to the counter and showed her card.	borrow	
After dinner he wanted to smoke and asked for a light from the boy who sat next to him.	smoke	
She ran with a growling stomach to the bakery to get something to eat.	eat	
He was trying to seduce the beautiful girl and gave a telling wink.	seduce	
She is a religious person and goes every Sunday to church.		religious
He is forgetful and does not even remember the appointments he made the day before.		forgetful
She is clumsy and went tumbling down the stairs after missing a step.		clumsy
She is caring and nursed the bird with a broken wing back to health.		caring
He is honest and told his roommate that he broke their expensive TV at the party last night.		honest
He is funny and told a story that made people laugh so hard they held their sides.		funny
She put her t-shirts in the drawer.		t-shirts
He played his music loud.		music
He wanted his friend to take back what he had said.		take back
She asked where the stars go shopping.		shopping



*Figure 1.* The percentage of falsely recognized words in LHH (low consensus, high distinctiveness, high consistency), LLH (low consensus, low distinctiveness, high consistency) and LLL (low consensus, low distinctiveness, low consistency) behaviors across goal inference goal, trait inference goal and control conditions (Study 1). The error bars represent standard error of the mean.

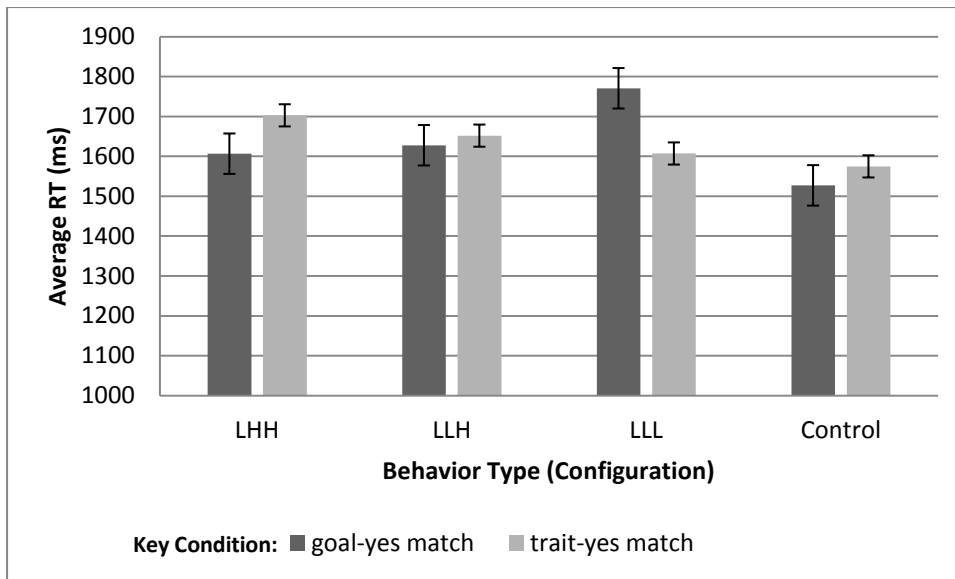


*Figure 2.* The average reaction time for correctly rejected words in LHH (low consensus, high distinctiveness, high consistency), LLH (low consensus, low distinctiveness, high consistency) and LLL (low consensus, low distinctiveness, low consistency) behaviors across goal inference goal, trait inference goal and control conditions (Study 1). The error bars represent standard error of the mean.

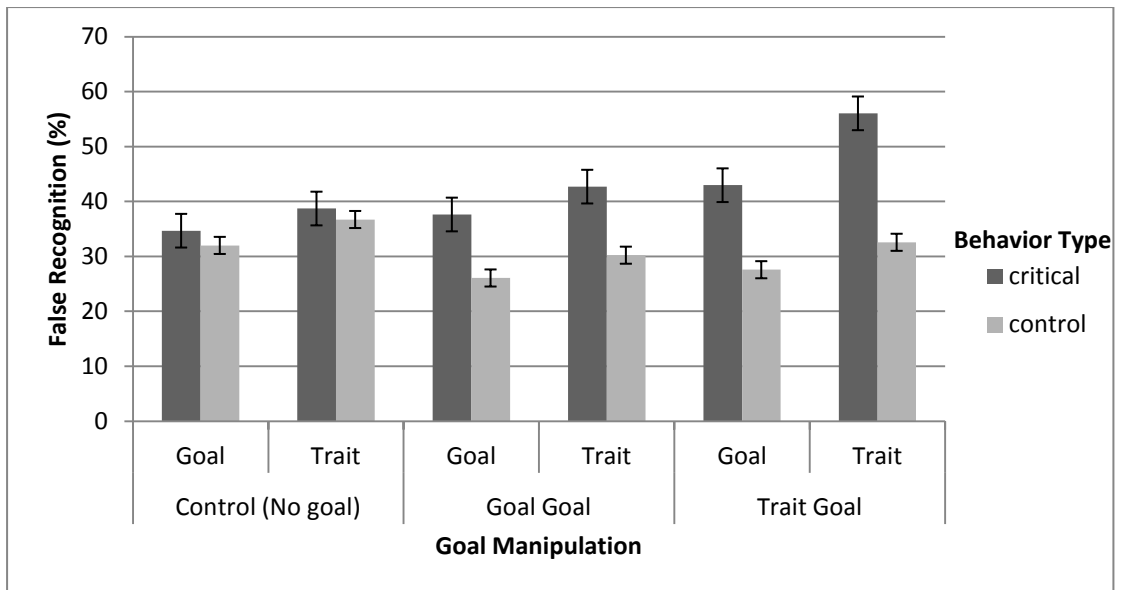


*Figure 3.* The percentage of falsely recognized words in LHH (low consensus, high distinctiveness, high consistency), LLH (low consensus, low distinctiveness, high consistency), LLL (low consensus, low distinctiveness, low consistency) and control behaviors across goal-yes and trait-yes key match type conditions (Study 2). The error bars represent standard error of the mean.

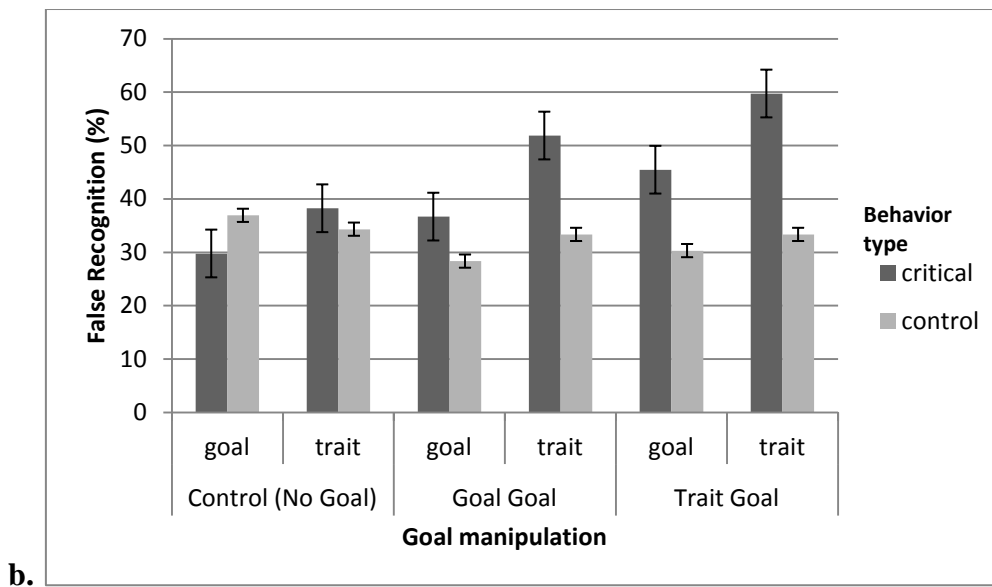
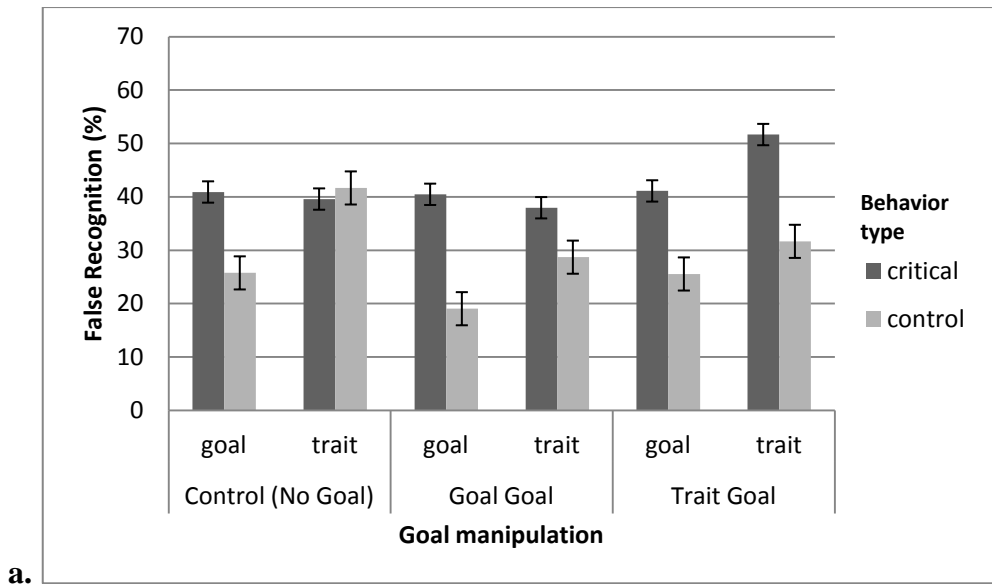




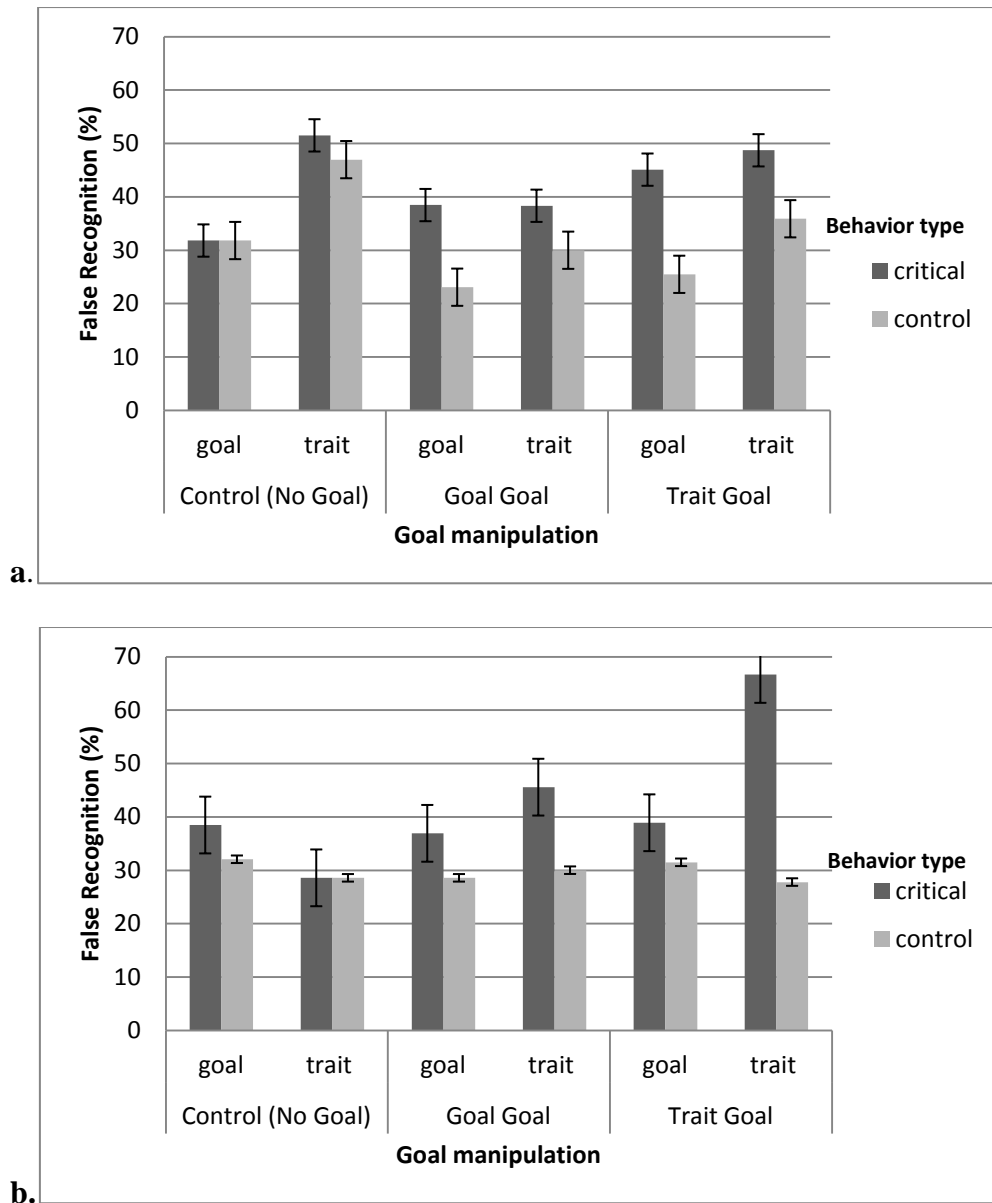
*Figure 4.* The average reaction time for correctly rejected words in LHH (low consensus, high distinctiveness, high consistency), LLH (low consensus, low distinctiveness, high consistency), LLL (low consensus, low distinctiveness, low consistency) and control behaviors across goal-yes and trait-yes key match type conditions (Study 2). The error bars represent standard error of the mean.



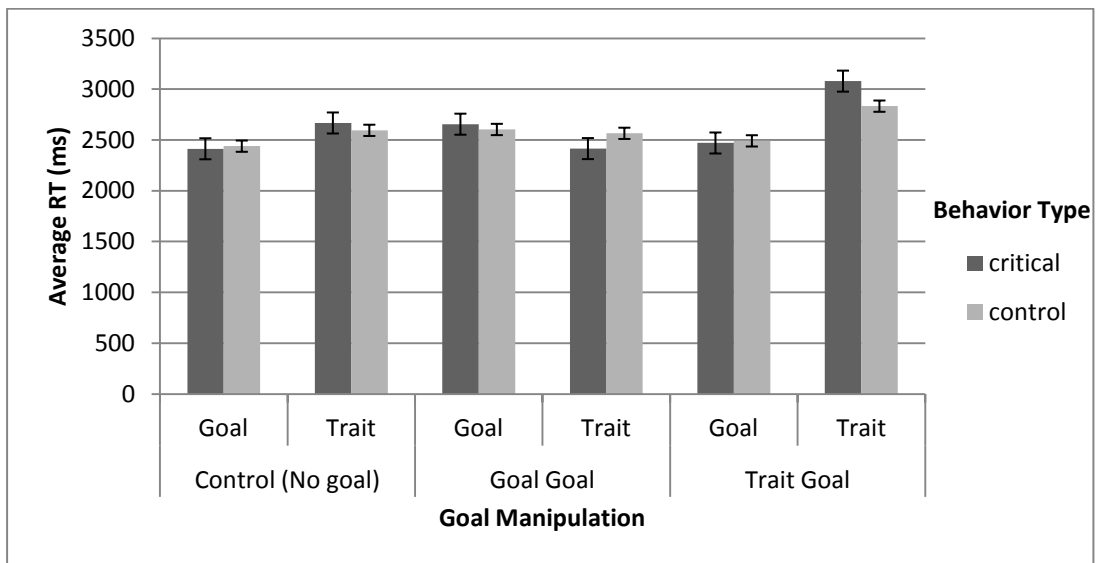
*Figure 5.* The percentage of falsely recognized goal and trait words across goal inference goal, trait inference goal and control conditions (Study 3). The error bars represent standard error of the mean.



*Figure 6.* The percentage of falsely recognized goal and trait words by a) liberals b) conservatives across goal inference goal, trait inference goal and control conditions (Study 3). The error bars represent standard error of the mean.



*Figure 7.* The percentage of falsely recognized goal and trait words by a) people with low PNS (personal need for structure) b) people with high PNS across goal inference goal, trait inference goal and control conditions (Study 3). The error bars represent standard error of the mean.



*Figure 8.* The average reaction time for correctly rejected goal and trait words across goal inference goal, trait inference goal and control conditions (Study 3). The error bars represent standard error of the mean.

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### PERSONAL INFORMATION

Place of Birth: Eskisehir, Turkey

Date of Birth: 11 / 16 / 1985

Marital Status: Married

### EDUCATION

**2013 -** - Lehigh University, PA, USA

**Ph.D. Program, Social Cognition & Personality**

(Advisor: Prof. Gordon B. Moskowitz)

**2009 – 2012 -** Boğaziçi University, Istanbul, TURKEY

**M.A., Psychology**, with a specialization in Social Psychology (GPA: 3.94 / 4.00), including an additional year for undergraduate psychology courses (SPA: 4.00 / 4.00)

(Advisor: Assoc. Prof. S. Adil Sarıbay)

**2004 – 2009 -** Boğaziçi University, Istanbul, TURKEY

**B.A., Political Science and International Relations** (GPA: 3.57 / 4.00, High Honor Degree)

**1999 – 2004 -** Kadikoy Anatolian High School, Istanbul, TURKEY (GPA: 4.95 / 5.00, 1<sup>st</sup> rank in the domain of Turkish/Mathematics)

### GRANTS, FELLOWSHIPS & AWARDS

**2014 – June/August-** Strohl Graduate Summer Research Fellowship at Lehigh University (\$5000)

**2012 -** Fulbright Opportunity Fund for talented Turkish students of limited financial means (including Ph.D. program application, postage and testing fees)

**2009 – 2011 -** TUBITAK (The Scientific & Technological Research Council of Turkey) National Scholarship Program for accomplished M.A. students (~\$20000)

**2004 – 2009 -** Boğaziçi University, Scholarship of Success

**2002 – 2004 -** MEF Private School, Scholarship of Success

**1998 – 1999 -** ICERENKOY Private School, Scholarship of Success

### PROFESSIONAL EXPERIENCE

**2013 -** Teaching Assistant (Lehigh University, Department of Psychology)

**2011 – 2012** Research and Teaching Assistant (Boğaziçi University, Department of Psychology)

**2011 – June / July** General Assistant (Boğaziçi University Center for Psychological Research and Services)

**2008 – July / August** Assistant editor at the Department of Culture (Dunya National Economy Newspaper, Istanbul, Turkey)

**2005 – August** Internship at the Department of Culture (Cumhuriyet National Newspaper, Istanbul, Turkey)

**2004 – 2005** Market research assistant at the Department of Baby Food Import (Mamsel A.Ş., Istanbul, Turkey)

## RESEARCH INTERESTS

Social Cognition, Social Cognitive Neuroscience, Interpersonal Processes, Intergroup Processes, Political Psychology

## RESEARCH EXPERIENCE & ASSISTANTSHIPS

**2013 – present** Social Cognition Lab, Professor: Gordon B. Moskowitz, Ph.D. (Lehigh University)  
**2013 – present** Group Processes Lab, Professor: Dominic J. Packer, Ph.D. (Lehigh University)  
**2012 – 2013** Social Cognition Lab, Professor: James Uleman, Ph.D. (New York University)  
**2010 – 2012** Social Lab, Professor: S. Adil Saribay, Ph. D. (Boğaziçi University)  
**2009 – 2010** Autobiographical Memory Lab, Professor: Ali I. Tekcan, Ph.D. (Boğaziçi University)  
**2008 – 2009** Project on “*Othering Practices in Turkey*”; Professor: Hakan Yilmaz, Ph.D. (Boğaziçi University).

## PUBLICATIONS & MANUSCRIPTS

Moskowitz, G. B., **Olcaysoy Okten, I.**, Gooch, C. M. (under revision). On race and time. *Psychological Science*.

Saribay, S. A, **Olcaysoy Okten, I.**, Yilmaz, O. (in press). Ideological orientations and psychological variables. In Ozlem D. Gumus (Ed.), *Political Psychology*. Ankara: Nobel Press.

Gunsoy, C., Cross. S. E., Saribay, S. A., **Olcaysoy Okten, I.**, & Kurutas, M. (in press). Would you post that picture and let your dad see it? Culture, honor and Facebook. *European Journal of Social Psychology*.

**Olcaysoy Okten, I.** (2012). *The effects of political ideology on interpersonal interaction: Does exposure to opposing ideology lead to resource depletion?* (Unpublished master’s thesis). Bogazici University, Turkey.

## CONFERENCE PRESENTATIONS

**Olcaysoy Okten, I.**, & Packer, D. J. (May, 2015). The impact of people’s own and others’ prejudicial attitudes on perceived trustworthiness of African-American faces. Poster to be presented at the 27th annual convention of the Association for Psychological Science (APS), New York, NY.

**Olcaysoy Okten, I.**, Moskowitz G. B., & Gooch, C. M. (May, 2015). Concern about appearing prejudiced and time perception. Poster to be presented at the 27th annual convention of the Association for Psychological Science (APS), New York, NY.

**Olcaysoy Okten, I.**, Moskowitz G. B., & Gooch, C. M. (February, 2015). The relationship between prejudice and time perception. Poster presentation at the 16th annual meeting of the Society for Personality and Social Psychology (SPSP), Long Beach, CA.

Gunsoy, C., Cross. S. E., Saribay, S. A., **Olcaysoy Okten, I.**, & Kurutas, M. (July, 2014). Would you post that picture and let your dad see it? Culture, honor and Facebook. Poster presentation at the 22th International Congress of International Association for Cross-Cultural Psychology (IACCP), Reims, France.

**Olcaysoy Okten, I.**, & Saribay, S. A. (February, 2014). The relationship between resistance to change and opposition to equality at political and personal levels. Poster presentation at the 15th annual meeting of the Society for Personality and Social Psychology (SPSP), Austin, TX.

Loh, E. H., **Olcaýsoy Okten, I.**, & Uleman, J. (April, 2013). The relationship between political ideology and spontaneous trait inferences. Poster presentation at the 17<sup>th</sup> Annual MA Research Conference at NYU, NY.

**Olcaýsoy Okten, I.**, & Sarıbay, S. A. (January, 2013). Activation of stereotypes and resource depletion in preparation for inter-ideological interaction. Poster presentation at the 14th annual meeting of the Society for Personality and Social Psychology (SPSP), New Orleans, LA.

**Olcaýsoy, I.**, & Sarıbay, S. A. (April, 2012). The measurement of resistance to change and opposition to equality dimensions of conservatism at personal and political levels. Poster presentation at the 17<sup>th</sup> National Congress of Psychology at Boğaziçi University, Istanbul.

**Olcaýsoy, I.**, Gündoğdu, Ö., & Seral Aksakal, G. (April, 2012). Adult attachment style and organization of attachment related memory. Poster presentation at the 17<sup>th</sup> National Congress of Psychology at Boğaziçi University, Istanbul.

**Olcaýsoy, I.**, Gündoğdu, Ö., & Seral Aksakal, G. (September, 2011). Adult attachment style and memory: An analysis of attachment related emotional processing. Oral presentation at the Vth Congress of Psychology Graduate Students at Doğuş University, Istanbul.

#### **TEACHING ASSISTANTSHIPS**

<b>2011, Fall</b>	SOCIAL PSYCHOLOGY (Bogazici University)
<b>2012, Spring</b>	SOCIAL INFLUENCES OF BEHAVIOR (Bogazici University) LEARNING (Bogazici University)
<b>2013, Fall</b>	ABNORMAL PSYCHOLOGY (Lehigh University)
<b>2014, Spring</b>	STATISTICAL ANALYSIS OF BEHAVIORAL DATA (Lehigh University)
<b>2014, Fall</b>	
<b>2015, Spring</b>	EXPERIMENTAL RESEARCH METHODS & LABORATORY (Lehigh University)

#### **OTHER PROFESSIONAL ACTIVITIES**

**2015 - January/May** Teacher development series: Seminar on advancing teaching skills (Lehigh University)

**2012 – May** International Society of Political Psychology Workshop funded by ISPP, TOBB ETU University, Ankara, Turkey. I attended to a 3-day workshop on political psychology and a peer review for a special issue of the journal of *Turkish Studies*.

#### **PROFESSIONAL AFFILIATIONS**

Society for Personality and Social Psychology (SPSP)  
Association for Psychological Science (APS)

#### **LANGUAGES & COMPUTER SKILLS**

Turkish (Native)  
English (Advanced)  
Spanish (Intermediate)  
Microsoft Windows Professional, Microsoft Office, GNU/Linux, Libre Office, Adobe Photoshop (Advanced)  
Experiment Implementation Software: MediaLab, DirectRT, E-Prime, Qualtrics (Advanced), Mouse Tracker (Beginner)  
Data Analysis: IBM SPSS Statistics & AMOS (Advanced), SAS (Intermediate), R (Beginner)  
Web Design: HTML (Intermediate)