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TRUST HAPPENS:

A MULTI-ROUTE MODEL OF TRUST FORMATION IN VIRTUAL TEAMS

ABSTRACT

For over a decade, the dominant theoretical model of trust formation in virtual teams has been a rational assessment of team members' ability, integrity and benevolence. Building on the traditional dual process theories of cognition and newer theories of unconscious cognition, we argue that although this model is appropriate in some cases, there are other ways of forming trust in virtual teams. In this paper, we examine how two distinctly different forms of cognition – planned, rational cognition and unconscious, automatic cognition – are both used to form trust and the situational factors that lead team members to engage in one or the other. Because these forms of cognition are separate and distinct, we develop a process model to explain how and why the different forms of cognition are invoked. Within each part of the process model, we develop a separate variance model that examines the factors that would affect trust formed by that process.

KEYWORDS: Trust, Swift Trust, Cognitive Trust, Knowledge-Based Trust, Automatic Trust, Habitual Trust, Virtual Teams, Automatic Cognition, Unconscious Cognition, ELM, HSM

INTRODUCTION¹

Trust is important in virtual teams (de Jong and Elfring 2010; Jarvenpaa, Shaw and Staples, 2004; Paul and McDaniel, 2004; Staples, and Webster 2008, Saker, et al. 2011, Thomas, and Bostrom, 2010), especially when communication discontinuities from ICT use introduce uncertainty (Kayworth and Leidner, 2000; Robert, Dennis and Hung, 2009). Trust has

¹ This paper is a revision and extension of Hung, Dennis, and Robert, 2004.

traditionally been seen as a result of history-dependent interaction based on rationally derived costs and benefits (Kramer, 1999). This view assumes that trust is developed gradually over time based on interpersonal communication (Lewicki and Bunker, 1995; Mayer, Davis and Schoorman, 1995) – events that may not occur frequently in virtual teams. However, studies of trust in newly formed virtual teams have shown high trust among team members, even before they interact (Jarvenpaa, Knoll and Leidner, 1998; Jarvenpaa and Leidner, 1999). We believe that this implies that trust among virtual team members can be formed through different routes, not just the history-based model that has dominated prior research.

In this paper, we argue that trust can be formed through one of three distinct routes. With the *Deliberative Route*, trust is based on a deliberate rational assessment of a team member's characteristics (e.g., ability, integrity, benevolence) known from a history of working together, which we argue uses systematic conscious processes akin to those in dual process theories of cognition such as the Heuristic-Systematic Model (Chaiken, 1980) or the Elaboration Likelihood Model (Petty and Cacioppo, 1981). This route represents the dominant model of trust used in most prior virtual team research (e.g., Jarvenpaa, et al., 2004; Robert, et al., 2009).

With the *Heuristic Route*, trust toward another virtual team member is based on a deliberate assessment of situational cues using categorical heuristics (e.g., job roles, social categories) because the individual lacks personal knowledge of the other person; that is, when one does not know anything about other team members, he/she applies stereotypes about people like them (e.g., institutional norms, race, gender, job title). This is akin to the heuristic processes in the dual process theories (Chaiken, 1980; Petty and Cacioppo, 1981; 1986).

With the *Automatic Route*, trust happens automatically without conscious thought (cf. Bargh and Chartrand, 1999; Fazio, 2001; Todorov and Uleman, 2002). With this route, it may be

possible for team members to provide post-hoc explanations for trust based on conscious rational criteria (e.g., ability, integrity, benevolence), but these factors play no role in the actual formation of trust and are post-hoc rationalizations made up to justify them (cf. Banks and Isham, 2009; Bargh and Ferguson, 2000; Eagelman, 2004; Wegner and Wheatley, 1999). Thus one important difference between the automatic route and the other two routes is the direction of causality. With the deliberative and heuristic routes, beliefs about personal characteristics influence trust (e.g., you have integrity, therefore I trust you) while with the automatic route, trust comes first, before beliefs about personal characteristics (e.g., I trust you, therefore you have integrity)².

The activation of these different routes depends on one's *motivation* and *ability* to process information about the trustee. When encountering a situation where trust is needed, an individual often reacts without conscious processing (Bargh, Gollwitzer, Lee-Chai, Barndollar and Troetschel, 2001; Bargh and Chartrand, 1999) unless something unusual (typically negative) triggers conscious, effortful cognitive processing (Smith, et al., 2003; Schwarz and Clore, 2007). Without *motivation* to process information, trust is formed automatically and unconsciously through the automatic route. When one is *motivated*, trust formation uses conscious cognition through one of the other two routes. When personal knowledge of the trustee is limited (low *ability*), situational cues are used to form trust through the heuristic route (Robert, et al., 2009). When personal knowledge is available (high *ability*), prior experience with the trustee is used to form trust through the deliberative route (Robert, et al., 2009).

Most research on trust in virtual teams uses a variance model approach that theorizes that trust is a function of certain independent factors, such as ability, disposition to trust, and so on;

² Consider for example, how a professional baseball player can hit a fastball faster than he can consciously perceive the ball's trajectory and make a decision about whether to swing (Bargh and Morsella, 2009). The player might justify his decision by saying he saw that the ball was perfectly placed, but this is a post-hoc interpretation that was not possible to make prior to swinging and is likely influenced by the outcome (strike, foul, home run, etc.).

variance models attempt to predict different levels of outcome variables as a function of input variables (Mohr, 1982; Sabherwal and Robey, 1995; Van de Ven, 2007; Van de Ven and Engleman, 2004). In general, “one way to significantly improve the robustness of ... [a] variance model ... is to explicitly examine the process that is assumed to explain why an independent variable causes a dependent variable. To do so requires opening the proverbial ‘black box’ between inputs and outcomes and to take process seriously by examining temporal sequences of events” (Van de Ven, 2007, p. 160). Process models explain *how* a process operates and how events induce state transitions (i.e., categorical changes) and lead to outcomes (Mohr, 1982; Sabherwal and Robey, 1995; Van de Ven, 2007; Van de Ven and Engleman, 2004).

Our model builds on dual process theories of cognition (expanded to consider automatic cognition) which are process models that examine the events, stages and routes through which cognition occurs (see Van de Ven, 2007 for a discussion of process models and how they differ from variance models). Thus our model is first and foremost a process model, into which we integrate variance models from previous trust research. Integrating process models and variance models into the same theoretical model can be challenging and may cause confusion (Mohr, 1982). However, if done well, such integration can significantly improve the power of the resulting theory (Markus and Robey, 1988; Sabherwal and Robey, 1995; Shaw and Jarvenpaa, 1997; Van de Ven and Engleman, 2004) because every variance model has an underlying process model even if it is unstated (Van de Ven, 2007). We follow the “joint application” approach to integration, which treats process components separately from variance components and which is arguably the best integration approach (Sabherwal and Robey, 1995; Shaw and Jarvenpaa, 1997).

PRIOR THEORIES OF TRUST

Trust is a concept that has been viewed in many different ways by different scholars

(Bigley and Pearce, 1998). In this paper, we view trust as a psychological attitude and adopt Mayer, et al.'s (1995) definition of trust as an individual's willingness to be vulnerable to the actions of the other person based on a particular action important to the trustor, irrespective of the trustor's ability to monitor or control the trustee. Recent research in NeuroIS suggests that trust and distrust are separate and distinct concepts processed in different parts of our brain (Dimoka, 2010), so we focus only on trust. Likewise, as we center our theorization on trust in virtual teams, we omit research on trust in other contexts, such as Web sites (e.g., Benbasat, Geffen, and Pavlou, 2008), which we believe is different from trust in team members.

Prior research suggests two fundamentally different processes by which trust is formed: knowledge-based and swift trust. Mayer, et al.'s (1995) model of knowledge-based trust has been widely used in virtual team research (Jarvenpaa, et al., 1998; Piccoli and Ives, 2003; Robert, et al., 2009). Mayer, et al. (1995) argue that trust is a function of the trustor's disposition to trust and the trustor's knowledge of the trustee's ability, integrity, and benevolence. This trust is compared to an assessment of risk in the situation. If the level of trust surpasses the perceived risk, the trustor will engage in trusting behavior; if perceived risk is greater than the level of trust, the trustor will not engage in trusting behaviors.

This model views trust as a developmental process closely intertwined with relationship development (Lewicki and Bunker, 1996; Sheppard and Tuchinsky, 1996). Trust is a result of knowledge of past history (Kramer, 1999) and is developed gradually through personal interaction and communication (Lewicki and Bunker, 1995, Mayer, et al., 1995). Trust is granted or not granted, actions are taken, and the resulting outcomes are used to revise the perceptions of the other person's trustworthiness (Mayer, et al., 1995). This sequence is repeated over and over as the individuals gradually gain knowledge of each other (Lewicki and Bunker, 1995). Over

time, the accumulated knowledge about others' capabilities, values, and behaviors enables an individual to base trust on cognitive assessment or affective response (Lewicki and Bunker, 1996; Lewis and Weigert, 1985; McAllister, 1995). Relationship development is time consuming and slower in virtual teams as the lack of regular face-to-face communication (Handy, 1995) means that it will take members longer to develop good knowledge of others (Walther, 1995).

Thus, the Mayer et al. (1995) model would predict relatively low levels of trust in virtual teams, especially early in their lives (Robert, et al., 2009) as they lack traditional sources of trust – shared experiences, reciprocal disclosure, fulfilled promises, and demonstrations of nonexploitation of vulnerability (Meyerson, et al., 1996). The diversity in culture and geography in virtual teams may further challenge trust (Bradach and Eccles, 1989; Mayer, et al., 1995). But, high levels of trust have often been observed in initial relationships among members of virtual teams (Jarvenpaa, et al., 1998, Jarvenpaa and Leidner, 1999; Kanawattanachai and Yoo, 2002).

Meyerson, et al. (1996) and McKnight, et al. (1998) argue that “swift trust” is conferred “ex ante” presumptively. With no knowledge from prior interactions, team members lack the knowledge to assess ability, integrity and benevolence, so they form trust based on categories reflecting roles, cultural cues, or occupation- and identity-based stereotypes (Fiske and Taylor, 1991; Meyerson, et al., 1996). Trust is influenced by stereotypes and category-based information rather than person-specific information (McKnight, et al., 1998; Meyerson, et al. 1996). Individuals presume trust and import it from similar settings (Meyerson, et al., 1996). Swift trust is quite different from knowledge-based trust (McKnight, et al., 1998; Robert, et al., 2009).

THEORIES OF COGNITION

Dual Process Theories of Conscious Cognition

Dual process theories of cognition form the basis of our model in explaining team

members' conscious trust formation, whether knowledge-based or swift trust. Two complementary dual process theories of cognition emerged independently in the 1980s. The Heuristic-Systematic Model (HSM) (Chaiken, 1980; Chaiken and Eagly, 1983) argues that attitudes are formed by the systematic application of considerable cognitive effort to comprehend and evaluate the validity of available information (called the systematic route), or by exerting little cognitive energy using simple heuristics on readily accessible information (e.g., the reputation of the person providing information) (called the heuristic route). The Elaboration Likelihood Model (ELM) (Cacioppo, et al., 1986; Petty and Cacioppo, 1981; 1986) postulates that attitudes are formed based on deliberate and cognitively active consideration of available information in order to evaluate the true merits of a particular position (called the central route) or as a result of a less cognitively involved assessment of simple positive or negative cues in the context (e.g., the attractiveness of the person providing information) (called the peripheral route).

Although there are distinctions between HSM and ELM, they share a common basis (Manstead and van der Pligt, 1999). They both posit that there are two distinct conscious cognitive processes by which attitudes are formed, and that these two processes differ in the amount of cognitive processing expended (e.g., a *quantitative* difference) and the cognitive approach used to evaluate information (e.g., a *qualitative* difference). The systematic route uses extensive cognitive processing that focuses on the key merits of the information, while the heuristic route involves less intensive cognitive processing of situational cues through the use of stereotypes, categorization and simple decision making heuristics (Bohner and Siebler, 1999; Chaiken, Duckworth, and Darke, 1999; Lavine, 1999; Manstead and van der Pligt, 1999; Petty and Wegener, 1999; Petty, Wheeler, and Bizer, 1999). We believe trust formed through the deliberative route represents knowledge-based trust while trust formed through the heuristic

route is one form of swift trust. Deliberative trust uses more intensive processing (a quantitative difference) and focuses on personal knowledge rather than stereotyping (a qualitative difference).

Theories of Unconscious Automatic Cognition

It has been well established in psychology that humans rely extensively on unconscious automatic cognition (Bargh and Ferguson, 2000; Bargh and Morsella, 2009; Fazio, 2001; Todorov, and Uleman, 2002). The mere presence of situational cues can directly trigger higher mental processes such as evaluation, attitude formation, goal formation, and behavior without any conscious processes (Bargh and Ferguson, 2000; Bargh and Morsella, 2009; Dijksterhuis, Chartrand, and Aarts, 2007). These “unconscious behavioral guidance systems” (Bargh and Morsella, 2009) are the building blocks for habitual behavior using well-learned patterns (Triandis, 1971; 1980; Bargh and Chartrand, 1999) or one’s adaptive default response to a novel situation in the absence of already-stored memories (Bargh, 1997; Duckworth, et al., 2002).

Unconscious information processing has been applied to studies of IT adoption and use in which it was suggested that over time, in stable situations, continuing IT use can become a well-learned, habitual action that is repeated without conscious intention (e.g., Gefen, 2003; Kim and Malhotra, 2005; Limayem et al., 2007). Continuing IT use may be merely a goal-directed behavior where individuals are simply primed to “operate automatically in complex interaction with situational events” without conscious choices all the way to completion (Bargh and Ferguson, 2000; Ortiz de Guinea and Markus, 2009). Automatic cognition has also been used in theories of virtual team satisfaction (Brigs, Reinig, and de Vereede, 2008). Based on the research of automatic, unconscious information processing, we believe that individuals often enter a trust situation on “auto-pilot” and that these unconscious processes often supplant conscious, intentional cognitive processes (Bargh and Ferguson, 2000; Bargh and Morsella, 2009).

Integrating Conscious and Unconscious Cognition

Some psychologists believe that conscious cognition doesn't exist; instead *all* cognition is unconscious and automatic (Bargh and Ferguson, 2000). Yet we see our own behavior and ascribe intention as the cause because this is what we want to believe (Wegner and Wheatley, 1999). In other words, unconscious cognition causes us to act and this action causes the conscious thought of behavior. Because thought is faster than action, we erroneously interpret the thought as preceding action, when in fact it was the action that triggered the thought (i.e., our perception of the intention to act) (Wegner and Wheatley, 1999). Under this interpretation, individuals *always* unconsciously react to their surroundings, which trigger the activation of goals and behavior; each individual has characteristics and prior experiences that guide which unconscious goals and behaviors dominate (Bargh and Morsella, 2009).

Standing in sharp contrast to this are the traditional theories of cognition, in which deliberate conscious cognition plays the central role in goal formation and behavior (Chaiken, 1980; Petty and Cacioppo, 1981; 1986). Integrating these two views is challenging (Ortiz de Guinea and Markus, 2009) for if conscious and unconscious cognition exist separately, they must be qualitatively different processes (Bargh and Chartrand, 1999; Bargh and Ferguson, 2000). Nonetheless, understanding how unconscious trust formation operates and relates to conscious trust formation provides a much more comprehensive view of trust in virtual teams. In this paper, we argue that both conscious and unconscious cognition guide the formation of trust but they operate through distinct and qualitatively different routes.

A MULTI-ROUTE MODEL OF TRUST FORMATION

Automatic processing and the dual process theories of cognition together provide a basis for integrating the current diverse views on trust formation. We propose that members of virtual

teams form trust through three distinct routes: the automatic route, the heuristic route, and the deliberative route (see Figure 1). Each of these routes operates separately, but as we argue later, trust formed via one route lingers on and affects how behavior is interpreted when other routes are activated (Higgins, 1996; Robert, et al., 2009). We focus on one pair within a virtual team – one team member (“trustor”) who forms trust about another member (“trustee”).

As Figure 1 shows, the model is iterative. When a trustor needs to form a trust judgment, he or she forms trust using one route, which guides behavior and leads to the accumulation of personal knowledge of the trustee. This accumulation of knowledge changes the situation, so when the same trustor is again placed in a situation that calls for trust of the same team member, the process repeats, and he or she may use the same route or a different route to reach the same trust judgment or a different one, which in turn leads to behavior and the accumulation of more knowledge. This process repeats over and over again. It is also important to note that this model does not presume trust; that is, the outcome of the trust formation process may be a lack of trust and unwillingness to engage in trusting behaviors.

Our model argues that the trustor’s 1) *motivation* to expend cognitive effort and 2) *ability* to assess person-specific information determine which route is activated (Chaiken, 1980; Petty and Cacioppo, 1981; 1986) (see Figure 2). Individuals tend to avoid expending cognitive effort unless they perceive a need to do so (Chaiken, 1980; Petty and Cacioppo, 1986). In a stable and predictable working environment where nothing unusual is perceived and the stakes are not high, members of virtual teams are not motivated to think about trust (Smith, et al., 2003; Schwarz and Clore, 2007), so they use unconscious cognition to form trust via the automatic route. Unconscious cognition occurs because the cues present in the situation spontaneously activate trust without conscious thought. Trust happens, rather than being consciously created.

These automatic responses can be modified by deliberate judgments when stakes are high, unusual situations, or personal tendencies trigger the trustor to become motivated to use conscious processes (Chaiken, 1980; Petty and Cacioppo, 1986; Smith, et al., 2003; Schwarz and Clore, 2007). When motivated to use conscious processes, individuals form trust through one of two routes based on the information they have: systematic or heuristic route. The systematic route requires person-specific information to form an information-based attitude (Chaiken, 1980; Petty and Cacioppo, 1986) while the heuristic route relies on heuristics using categorical cues.

When the trustor does not have personal knowledge about the trustee, he or she is not able to engage in deliberate and systematic assessment even if highly motivated to do so. When this happens, trust is formed through the heuristic route where simple heuristics based on cues in the environment are consciously processed – e.g., the trustee’s social category, his or her role in the organization, and organizational norms. This explanation is consistent with Meyerson, et al.’s (1996) and McKnight, et al.’s (1998) propositions about role clarification, categorization processes, and institution-imposed assurances in the development of swift presumptive trust.

As team members accumulate personal knowledge of others, they gain the ability to cognitively assess personal information (Robert, et al., 2009). This ability, when combined with the motivation to engage in systematic processing, induces the activation of the deliberative route. Motivated to better manage uncertainties (Mayer, et al., 1995), an individual under this circumstance is able to base his or her trust on active evaluation of the trustee’s perceived ability, integrity, and benevolence. This route is consistent with the knowledge-based view of trust built via interaction (Mayer, et al., 1995; Jarvenpaa, et al., 1998; Lewicki and Bunker, 1996).

The deliberative route has been the dominant view of trust in face-to-face teams for many years, and has carried over into much virtual team research. Yet we believe that the deliberative

route is less commonly used in virtual teams. One of the key differences between virtual teams and traditional face-to-face teams is the extensive use of ICT-based communication, whether text, audio, and/or video (Robert and Dennis, 2005; Wilson, Straus, and McEvily, 2006). ICT use may inhibit the use of some forms of communication, especially when team members are in different time zones and rely extensively on asynchronous communication such as email. ICT use is less engaging than face-to-face communication and thus engenders lower motivation to engage in systematic processing (Robert and Dennis, 2005) so virtual team members are less likely to use the deliberative route. Likewise, teams using ICT often are more task-focused, so relationships – and trust – develop more slowly (Chidambaram, 1996; Walther, 1995; Wilson, et al., 2006); it takes longer for team members to acquire the personal knowledge needed for the deliberative route, so once again team members are less likely to use it.

In the sections below, we develop our propositions for each of the routes and the triggers and outcomes of their use. One of our core arguments is that although trust can be developed using the deliberative route (which has been the route most commonly used in past research), it is important not to overlook the other two routes, which we believe are actually more commonly used in real teams.

The Automatic Route to Trust

It is our contention, in contrast with prior work on trust formation, that automatic trust formation is a commonly used route for trust formation because “consciousness is actually an atypical phenomenon and tool with respect to both the natural world and the majority of human nervous function” (Bargh and Morsella, 2009). We are not the first to draw on automatic cognition for theories of team behavior; Briggs et al. (2008) start their theory on satisfaction in virtual teams with the assumption that individual team members *always* use automatic cognition

to form satisfaction expectations. We believe the same process can occur for trust formation in virtual teams, although it does not *always* occur. We argue that individuals typically rely on automatic processing when they do not perceive anything unusual in the environment (Bargh and Ferguson, 2000; Bargh and Chartrand, 1999). Negative stimuli draw greater attention (Smith, et al., 2003) and are likely to trigger conscious processing (Schwarz and Clore, 2007).

In a stable and predictable work environment where nothing unusual or negative is perceived and the stakes are not high, virtual team members are less likely to be motivated to cognitively process information (Schwarz and Clore, 2007; Smith, et al., 2003). With little motivation to cognitively process situational cues or personal attributes of the other party, trust is formed automatically. Individuals may have different perceptions of what is “unusual”, so a situation that does not motivate one person to leave the automatic route may motivate a different person to do so. We will return to this in the discussion.

Proposition 1a Virtual team members form trust through the *automatic route* when they are not motivated to cognitively process situational cues or personal attributes of other team members.

Automatic attitude formation is a ubiquitous phenomenon that can be triggered by the perception of a familiar object or situation (Fazio, Sanbonmatsu, Powell and Kardes, 1986; Fiske, 1982) or novel stimuli (Chen and Bargh, 1999; Duckworth, et al., 2002; McCulloch, et al., 2008). When the automatic route is active, there are two distinct sub-paths, one for novel situations and one for habitually encountered situations. Both are similar, but they have different roots and triggers. We begin with novel situations.

Novel Situations. When presented with novel stimuli (e.g., a new virtual team member), individuals automatically and unconsciously ascribe traits to the stimuli, typically within seconds (Bargh and Ferguson, 2000; Carlston, and Skowronski, 1994; Fazio, et al., 1986; Todorov and

Uleman, 2003). The most fundamental automatic cognition is to categorize a new stimulus as “good” or “bad,” which triggers either an approach or an avoidance response (Chen and Bargh, 1999; Duckworth, et al., 2002; Lang, Bradley and Cuthbert, 1990). For example, individuals automatically categorize made-up words as warranting approach or avoidance (Duckworth, et al., 2002). This automatic response may have developed as an evolutionary response – humans needed to be able to react to danger before the conscious mind could process stimuli, so unconscious cognition evolved to act faster than conscious cognition and prepare humans to act.

There is some commonality in the response to novel stimuli; many individuals respond similarly to the same novel stimuli (Chen and Bargh, 1999; Duckworth, et al., 2002). Surprise, for example, triggers avoidance (Chen and Bargh, 1999). Nonetheless, individuals may react differently to the same novel stimuli because the response is dependent upon how an individual’s unconscious interprets the stimulus (Chen and Bargh, 1999). People’s personality, culture, habits, and life experiences influence unconscious cognition through knowledge and heuristics that have developed over a lifetime (Chen and Bargh, 1999; Maheswaran and Chaiken, 1999).

In a newly-formed virtual team where members do not know each other, how do the novel stimuli (e.g., other team members) trigger trust formation via automatic cognition? In this case, automatic cognition uses the individual’s disposition to trust. One’s disposition to trust is his or her tendency to trust other people, a “generalized attitude” learned from behavior and personal experiences of fulfilled and unfulfilled promises (Rotter, 1967). It serves as a baseline when interacting with strangers and automatically shapes trust formation. Although disposition to trust is “akin to a personality trait” and in some cases has been treated as one, it is a general tendency that forms a “trusting stand” from past experience (McKnight, et al., 1998; Rotter, 1967; 1980). In other words, one’s disposition to trust can be viewed as his or her life-long habit

to trust humanity in general (Mayer, et al., 1995; McKnight, et al., 1998).

Therefore, when presented with a novel situation, an individual's trust is enacted automatically based on his/her disposition to trust without conscious thought. Robert, et al. (2009) observed significant and positive relationships between team members' disposition to trust and trust in newly-formed virtual teams. Hence, we believe that in a newly-formed virtual team where members are interacting with strangers, their dispositions to trust serve as the base for trust formed through the automatic route.

Proposition 1b In a newly-formed virtual team where members are not motivated to cognitively process situational cues or the personal attributes of other team members, team members form trust based on their disposition to trust.

Habitual Situations. Unconscious cognition is the norm in habitually encountered situations (Bargh and Chartrand, 1999; Bargh and Ferguson, 2000). "Habitual behaviors typically emerge from repeated actions in stable contexts." (Wood, Quinn and Kashy, 2002, p. 1282). Habitual unconscious cognition requires the frequent and consistent matching of a situation and a response (Bargh and Chartrand, 1999). When an individual repeatedly encounters a situation and forms the same attitude in response, that situation and attitude become matched in memory. When that situation is encountered again, the matching attitude is formed automatically (Bargh and Chartrand, 1999; Bargh and Ferguson, 2000). Habitual attitude formation and behavior do not require conscious control and individuals are typically unaware of them (Wood, et al., 2002).

Over time, a team member may repeatedly form trust about the same individual (e.g., using the deliberative route and accumulating deep personal knowledge). In some cases, a pattern of behavior may re-occur over and over: the trustor engages in trusting behavior based on the belief that trust is warranted, and the team member's actions confirm that conferring trust was an appropriate choice, or a pattern of increasing lack of trust may emerge as the team member fails again and again to demonstrate that he or she should be trusted. In other cases, no

clear pattern emerges: trust may be granted in some situations but not in others.

When a *repeated pattern* of trusting behavior is *consistently* rewarded with trustworthy behavior, the trustor will gradually become less motivated to expend the cognitive resources required to employ the deliberative route. Because the trustor has *consistently* reached the *same* trust decision and this trust has *consistently* been shown to be appropriate, the trustor consciously or unconsciously forms a cognitive association between the trustee, situation and outcomes (i.e., “trust”) (Chen, et al., 1999). Motivation for cognition decreases because the same inputs have consistently resulted in the same outcomes; little improvement in accuracy can be gained by using cognition. Trust becomes a habitual pattern as the person-situation-trust cognitive association is repeatedly reinforced (Gersick and Hackman, 1990; Wood et al, 2002).

Once a habitual pattern is established, it is invoked automatically without conscious thought when the situation matching the pattern is encountered and the team member is not motivated to exert effort in systematic assessment (Jasperson, et al., 2005; Louis and Sutton, 1991; Ortiz de Guinea and Markus, 2009). When interacting with the same team member in the same situation (or a very similar one), the trustor simply re-enacts his or her previous trust without any conscious cognition (Triandis, 1971; 1980). The more a habit is used, the less conscious it becomes, and the more likely it is to be invoked automatically when the same stimuli are presented (Gersick and Hackman, 1990; Wood, et al., 2002). Although the trustor has the ability to engage in cognitive assessment, he or she has no motivation to do so. In this case, the trustor does not think about trust; trust just happens – it is enacted automatically. The trustor may not even be aware he or she is trusting; he or she simply perceives that he or she is behaving “normally.” Thus:

Proposition 1c When a pattern of trusting behavior is rewarded with a consistent pattern of trustworthy behavior, the motivation to engage in deliberate cognitive

assessment is reduced.

Proposition 1d When a pattern of trusting behavior is rewarded with a consistent pattern of trustworthy behavior, a habitual pattern of trust is established.

Proposition 1e In a well-established virtual team where members have developed mature trusting relationships, when the situation matches a previously established habitual trust pattern, members enact habitual trust through the automatic route.

When a discrepancy – a mismatch between the stored person-situation association and the situation encountered – is perceived, the automatic route to trust can be overwritten by deliberate cognitive assessment (Gersick and Hackman, 1990; Louis and Sutton, 1991). For some members, even a minor discrepancy is sufficient to trigger the use of the deliberative route, while others may persist in using the automatic route even in the face of clear evidence that the habitual pattern no longer applies (Gersick and Hackman, 1990; Louis and Sutton, 1991).

“Habits invite miscoding” because team members are likely to see familiar patterns in new situations and may invoke the habitual routine even when it is not appropriate (Gersick and Hackman, 1990, p. 72). Acknowledging a breach in trust typically involves cognitive dissonance, which dampens the motivation to identify discrepancies (Festinger, 1957). Violation of trust may also represent a threat to an individual’s confidence in his or her personal knowledge and in the predictability of others (Lewicki and Bunker, 1996) and reduces the motivation to identify discrepancies. For these reasons, trust formed based on a habitual pattern is often more resilient to violations than trust formed through the deliberative route (Lewicki and Bunker, 1996).

Discrepancies between the stored person-situation and the situation encountered usually need to be significant to trigger a departure from the automatic route (Louis and Sutton, 1991), because once established, the invocation of the habitual routine may drop from awareness (Gersick and Hackman, 1990) – team members may invoke the habitual pattern via automaticity without conscious thought. The situation encountered must differ sufficiently from the stored person-situation association so as to trigger uncertainty before the individual is likely to

recognize a discrepancy and divert from the habitual route (Gersick and Hackman, 1990). If discrepancies do not motivate deliberate processing, then the automatic route is activated. Thus:

The Heuristic Route to Trust

Dual process theories argue that to follow the central, systematic route of attitude change, one requires both the motivation and the ability to cognitively deliberate on information in a systematic fashion (Chaiken, 1980; Petty and Cacioppo, 1986). Virtual team collaboration is not always perceived as a “usual” environment as team members have to rely heavily on various ICTs to work together across locations and time. The uncertainty introduced by the ICT-mediated communication environment (Kayworth and Leidner, 2000; Robert, et al., 2009) can easily trigger team members’ conscious cognitive processing systems. Motivated by the risks perceived in the virtual collaboration environment, team members may engage conscious cognitive assessment of the situation to handle the uncertainty and risks in the environment. However, they may lack personal knowledge of the trustee. High motivation triggers the use of conscious cognitive processing while the low ability to process person-specific information about the trustee forces the trustor to rely on situational cues and heuristics.

The presumptive trust observed in virtual teams (Jarvenpaa, et al, 1998; Jarvenpaa and Leidner, 1999; Robert, et al., 2009) can be attributed to the heuristic route. When virtual teams are first formed, members do not have the ability to engage in a systematic assessment because they lack the necessary personal knowledge of the others. With appropriate motivation, team members will engage in deliberate cognitive assessment using heuristics. Therefore:

Proposition 2a Virtual team members form trust through the *heuristic route* when they are motivated but have limited ability to systematically process the personal attributes of other team members.

Dual process theories argue that the use of heuristics involves the activation of simple rules of thumb that link cues in the situation to some expected outcomes (Maheswaran and

Chaiken, 1999). These may be commonly held beliefs such as “men are aggressive” (Chen, Duckworth, and Chaiken 1999; Maheswaran and Chaiken, 1999) or personally developed heuristics based on prior experience (e.g., “engineers can be trusted”); that is, a repeated pattern of systematic cognition forms cognitive associations between situational cues (e.g., “engineers”) and outcomes (e.g., “trust”) (Chen, et al., 1999). Heuristics are typically stored as an “if-then” associations (e.g., “if engineer, then trust”) that can be applied to cues (Chen and Chaiken, 1999).

The heuristic route uses these associations (i.e., heuristics) via category-based processing; that is, team members are treated as members of a category, rather than examined as individuals because the trustor lacks person-specific knowledge of the trustee (Chaiken, et al., 1999; McKnight, et al., 1998; Robert, et al., 2009). The target is first matched to one or more of the trustor’s existing classifications and then the heuristic associated with that classification is applied to form trust (Brewer and Harasty Feinstein, 1999; Fiske, et al., 1999). Simple-to-use heuristics, such as those related to easily recognized classifications (e.g., gender, age, and race), tend to be activated first, followed by more complex classifications (Fiske, 1998; Fiske, et al., 1999). If team members are motivated, they may actively search for heuristics that match the available cues (Chaiken, et al., 1999; Chen and Chaiken, 1999; Maheswaran and Chaiken, 1999).

There are several mechanisms on which the category-based heuristics are based. Based on a review of studies of trust in organizations, Kramer (1999) summarized six antecedent conditions that are posited to influence an individual’s formation of trust, four of which fit well into the heuristic route’s use of situational cues: category-based trust, role-based trust, rule-based trust, and third parties as conduits of trust (the fifth is the disposition to trust which falls into the automatic route and the sixth is history-based which falls into the deliberative route).

Category-based trust is trust based on a team member’s match to a salient social or

organizational category (e.g., gender, race) (Meyerson, et al., 1996; McKnight, et al., 1998; Webster and Wong, 2008). This form of trust is depersonalized: trust is assessed based on the if-then heuristics associated with a category to which the trustee belongs without personal knowledge of him or her (Barber, 1983). Past research has shown that members of virtual teams are more likely to trust in-group members than out-group members (i.e., local or co-located members versus remote members) during the early stages of a team's life (Webster and Wong, 2008). Likewise, team members are less likely to trust others from different cultures (Zolin, Hinds, Fruchter, and Levitt, 2004). These are both examples of category-based trust.

Communication among virtual team members regarding their social categories contributes to higher levels of trust (Jarvenpaa and Leidner, 1999; Kanawattanachai and Yoo, 2002; Walther, Bunz, Bazarova, 2005), especially in unstructured situations (Jarvenpaa, et al., 2004). Failure to identify and share categorical cues on which to base trust, such as unclear role definitions and communication rules (Jarvenpaa and Leidner, 1999), may lead to low trust. Virtual team leaders can build swift presumptive trust by establishing the creditability of the team members by introducing each member's role, expertise, and reputation (Lawley, 2006).

Role-based trust is another form of depersonalized trust where team members use simple heuristics about the role the trustee plays (e.g., if doctor then trust) (Barber, 1983). Rule-based factors such as the situational normality and organizational structures (McKnight, et al, 1998), explicit and tacit understandings regarding norms, interaction routines, and exchange practices provide another basis for inferring trust in the absence of personal knowledge (Fine and Holyfield, 1996; March, 1994). The same depersonalized trust occurs with third party recommendations (if Pat trusts him, then I trust him) (Kramer, 1999). Trustees can be members of different categories, roles, etc. that trigger supporting or competing heuristics. Thus:.

Proposition 2b Trust formed through the *heuristic route* is based on the conscious use of situational cues to classify other team members based on recommendations, roles, rules and/or categories and the depersonalized application of simple heuristics attached to those classifications.

The Deliberative Route to Trust

The deliberative route is activated by the availability of personal information about the trustee and the trustor's motivation to process it (Chaiken, 1980; Chaiken and Eagly, 1983; Petty and Cacioppo, 1981; 1986). A virtual team member gradually accumulates the knowledge about other members' personal attributes that are needed to form trust through the deliberative route (Lewicki and Bunker, 1996; Mayer, et al., 1995), although this knowledge accumulation is slower in virtual teams than in face-to-face teams due to the use of ICT (Wilson, et al., 2006). By monitoring behaviors, the trustor gathers the knowledge needed to assess the trustee, enabling him or her to move away from depersonalized heuristics (Strickland, 1958; Zucker, 1986). This knowledge is the foundation for the transition from the heuristic route to the deliberative route (Lewicki and Bunker, 1996).

This knowledge is necessary but not sufficient to induce the use of the deliberative route. In most cases, people want to form accurate beliefs (Maheswaran and Chaiken, 1991; Petty and Wegener, 1999), and the use of simple heuristics via the heuristic route is less likely to be as accurate as systematic evaluation via the deliberative route (Chaiken, 1980; Petty and Cacioppo, 1986). But the value of making an accurate trust assessment must be offset against the tendency to avoid cognitive effort; most individuals are "satisficers" (Simon, 1976) or "cognitive misers" (Taylor and Fiske, 1978), who attempt to minimize the effort needed to meet goals (Chen, et al., 1999; Maheswaran and Chaiken, 1991). Only when there is strong motivation – when the value of an accurate assessment outweighs the cost of the effort – will one use the deliberative route (Chaiken, 1980; Maheswaran and Chaiken, 1991; Petty and Cacioppo, 1981; 1986).

The level of motivation needed to trigger the deliberative route is influenced by both individual and situational factors. Some individuals have a greater need for cognition or desire for control, and are inherently more motivated to use the deliberative route (Maheswaran and Chaiken, 1991; Pitman and D'Agostino, 1989). These individuals prefer deliberative cognition whenever possible and actively seek information needed to use it. For these individuals, the deliberative route is often triggered as soon as they acquire sufficient information. Conversely, individuals with low need for cognition will need significant motivation to use it. Another individual factor is the virtual team member's perception of his or her ability to accurately assess the trustee. Those who do not believe they have the skills to make an accurate assessment are less likely to use the deliberative route even with information (Bohner, and Siebler, 1999).

Situational factors can also affect the motivation to use the deliberative route. In situations where individuals encounter an important, high stakes, or personally relevant task, they are more likely to be motivated to make an assessment as accurately as possible, and therefore are motivated to use the deliberative route (Chaiken, 1980; Chen, et al., 1999; Petty and Cacioppo, 1986). Likewise, if individuals expect to be held accountable for the outcomes they tend to be more motivated to use the deliberative route (Tetlock and Kim, 1987).

Proposition 3a Virtual team members form trust through the *deliberative route* when they have sufficient personal knowledge to assess other team members and are motivated to expend the effort.

The deliberative route to trust is consistent with knowledge-based trust: trust arises from one's cognitive assessment of the trustee's attributes (Jarvenpaa, et al., 1998; Mayer, et al., 1995; Robert, et al., 2009). This knowledge-based or history-based trust is posited as a function of an individual's perceptions of the other person's trustworthiness, as influenced by their ability, integrity, and benevolence (Jarvenpaa, et al., 1998; Mayer, et al., 1995; Robert, et al., 2009).

Ability refers to the skills that enable a virtual team member to be competent within some

specific domain. Ability is key, because the trustor needs to know that the trustee is capable of performing the task he or she is being trusted to do. Integrity is the adherence to a set of principles that the trustor finds acceptable. Integrity is important because it indicates the extent to which the trustee's actions are likely to follow his or her espoused intentions. Benevolence is the extent to which an individual is believed to feel interpersonal care, and the willingness to do good to the trustor, aside from an egocentric profit motive. Benevolence is important over the long term, because it suggests that the trustee has some attachment to the trustor, over and above the specific transaction in which trust is being conferred. Following Mayer, et al. (1995):

Proposition 3b Trust formed through the *deliberative route* is based on the trustor's cognitive assessment of another team member's ability, integrity, and benevolence.

In some situations, some antecedents may be more important than others (Mayer, et al., 1995). Thus, trust is formed using the *perceived amount* of the other person's ability, integrity, and benevolence, and also the *perceived importance* of each characteristic to the situation (Mayer, et al., 1995). In virtual teams where the tasks often need to be completed by members who are geographically distributed, members may focus more on the task goals than on the development of deep social relationships (Jarvenpaa, et al., 1998; Meyerson, et al., 1996; Saunders and Ahuja, 2006). Perceived ability and integrity typically are stronger predictors of trust than perceived benevolence (Jarvenpaa, et al., 1998) because cognitive-based trust components (ability and integrity) are more salient to virtual team members than benevolence-based elements (emotions, care and concerns) (Kanawattanachai and Yoo, 2002). Thus:

Proposition 3c The effects of ability, integrity, and benevolence on a virtual team member's trust toward another team member are determined by their relative importance to the situation.

The relative importance of each antecedent may depend upon the confidence that team members have in their knowledge and their ability to assess it. If an individual is less certain of

some knowledge or is less confident in his or her ability to process it, it will carry less weight than other factors. Because it may take a longer time to develop accurate assessments of benevolence, the importance attached to benevolence may be low early stages in a relationship (see Mayer, et al., 1995). Individuals also are more likely to expend effort processing information they feel capable of processing (Bohner and Siebler, 1999), and therefore are more likely to ascribe more importance to those factors relative to factors they feel less capable of considering. In temporary virtual teams, the greater salience of members' ability and integrity (compared to benevolence) in trust formation (Jarvenpaa, et al., 1998; Kanawattanachai and Yoo, 2002) may be because it is easier to assess a member's ability and integrity than benevolence. Therefore:

Proposition 3d The ability to assess the deliberative route trust antecedents (ability, integrity, benevolence) moderates the strength of their impacts on a virtual team member's trust toward another member.

The Role of Risk

Perceived risk is a key factor that differentiates trust from the behaviors that require trust – the difference between the willingness to assume risk and actually assuming it (Mayer, et al., 1995). Perceived risk is situational, in that the possible gains and losses embedded in the interaction context are considered (Bierman, Bonini, and Hausman, 1969; Coleman, 1990). Contextual factors such as task interdependency, problem domain familiarity, and organizational control systems influence an individual's risk perception (Sheppard and Sherman, 1998; Sitkin and Pablo, 1992). For example, what are the institutional norms and formal rules within which team members interact? If there are strong formal or informal organizational sanctions for violating trust, then perceived risk will be lower. In general, people tend to be risk averse (Friedman and Savage, 1948) and weight the risk of loss more heavily than the potential of benefits from assuming a risk (Tversky, and Kahneman, 1974). Different people may have different perceptions of risks when presented with the same situation. For many people, the use

of ICT rather than face-to-face communication is perceived to be riskier (Robert, et al., 2009; Sarker et al., 2011), so risk may be a more important issue in virtual teams that use ICT than in face-to-face teams.

According to Mayer, et al. (1995), an individual's perceived risk moderates the relationship between trust and trusting behavior. Specifically, the level of trust is compared to the level of perceived risk. If the level of risk perceived is lower than the level of trust, the individual is more likely to engage in trusting behavior. On the other hand, if the level of risk is perceived to be higher than the level of trust, the individual is less likely to engage in trusting behavior. At some point, the level of risk may be so great that no one will undertake the trusting behavior, regardless of the level of trust they have in the other person. Following Mayer, et al. (1995):

Proposition 4a The perceived risk of the situation moderates the relationship between trust and trust behavior.

Perceived risk also influences route activation. As perceived risk increases, virtual team members have an increased desire to ensure their trust is accurate (Chen and Chaiken, 1999). This increased desire for accuracy increases the motivation to consciously and deliberately process information, and increases the likelihood of using conscious cognitive processing either through the heuristic route or the deliberative route (Chen and Chaiken, 1999). Thus:

Proposition 4b As perceived risk increases, the motivation to exert conscious cognitive processing through the heuristic route or the deliberative route will increase.

Cultural diversity, technical uncertainties, and communication discontinuities introduce greater uncertainty, less control and thus greater risk in virtual teams (Das and Teng, 2001; Kayworth and Leidner, 2000; Robert, et al., 2009). In face-to-face teams, team members maintain a sense of control via social control and coordination such as direct supervision, geographically collocation, similar backgrounds, and shared experiences (Jarvenpaa, et al, 1998). In a virtual team, these social control mechanisms may not be available (Jarvenpaa, et al, 1998;

Alnuaimi, Robert and Maruping 2010). Role overload, role ambiguity, absenteeism, and social loafing that often are observed in virtual teams (Alnuaimi et al. 2010; Chidambaram and Tung, 2005; Jarvenpaa, et al, 1998) may further increase the perception of risk. Computer anxiety due to the need to deal with the communication media (Brown, Fuller and Vician, 2004; Chua, Chen, and Wong, 1999; Scott and Rockwell, 1997) may increase risk.

Effects of Prior Trust Behaviors

As team members form trust judgments and act on them, either by engaging in trusting behaviors or not, they have the opportunity to observe the behaviors of the trustee. This observation will enable trustor to gain personal knowledge of the trustee. However, a trustor's interpretation of observed behavior is often biased by initial beliefs (Bargh and Ferguson, 2000; Dennis et al. 2012). One tends to focus on information that supports initial beliefs and discount information that opposes them (Lord, Ross, and Leper 1979; Wood, 1982); we are pre-disposed to see what we expect to see, so we interpret behavior using the beliefs that guided our behavior. Thus the effect of "neutral" information may be to strengthen the trust first formed via the automatic or heuristic route (Dennis et al. 2012).

The more extreme the trust, the stronger the bias (Prentice and Gerrig, 1999), especially since accurately assessing deliberative route antecedents (ability, benevolence, integrity) in virtual team settings is challenging (Jarvenpaa, et al., 1998). Thus, trust is affected not only by the outcomes of trusting behavior, but also by the extent to which the outcomes match the trust conveyed or not conveyed (Boyle and Bonacich, 1970; Jarvenpaa, et al., 2004). Trust colors how an individual derives meaning and ascribes personal characteristics to observed behavior that follows it (Chaiken, et al., 1999; Chaiken and Maheswaran 1994; Prentice and Gerrig, 1999).

Therefore, the first time a team member assesses trust (typically using the automatic or

heuristic route) may have a stronger influence on the trust formed later (often using the deliberative route) than prior research argues (Robert, et al. 2009). Although personal knowledge drives trust formation through the deliberative route, prior trust and subsequent behaviors influence the way in which the outcomes are perceived and knowledge is interpreted. Based on attribution theory (Jones and Nisbett, 1971), Dirks and Ferrin (2001) argue that trust influences how people interpret information: (1) “trust affects how one *assesses the future behavior* of another party with whom one is interdependent,” and (2) “trust also affects how one *interprets the past (or present) actions* of the other party, and the motives underlying the actions” (p. 456, italics original). Previous research has suggested that disposition to trust moderates the relationship between deliberative route antecedents (e.g., ability, benevolence, and integrity) and trust (e.g., Mayer, et al., 1995). In contrast, we argue that it is the prior trust (which may be significantly influenced by one’s disposition to trust) that affects the perceptions of deliberative route trust antecedents.

The same processes that bias information processing in the deliberative route may also bias processing in the automatic route. Because the habitual presumption of trust is so strong, it may take considerable disconfirming evidence to overcome the dominant trust attitude. So while the trust formed via the heuristic route may linger longer than expected when the deliberative route is active, so too may the trust formed via the automatic route.

Proposition 5a A team member will interpret behavior as more trustworthy if his or her prior trust and trust behaviors conveyed more trust.

As the trustor gains personal knowledge of the trustee, he or she is able to use the deliberative route. We have presented the routes as mutually exclusive, as is traditional (e.g., Chen and Chaiken, 1999; Petty, and Cacioppo, 1986). However, it is possible that the heuristic route and the deliberative route may be activated concurrently when a virtual team member is

just becoming capable of using the deliberative route (Chaiken, et al., 1989; Maheswaran, and Chaiken, 1991). In this situation, there is barely enough knowledge to use the deliberative route, and thus an individual may use both the heuristic and deliberative routes (Chaiken, et al., 1999).

As a motivated team member gains more personal knowledge of another team member and begins to transition from the depersonalized heuristics of the heuristic route to the personalized processing of the deliberative route, trust first formed via the automatic and/or heuristic route and the behaviors it induced linger, and influence trust formed later via the deliberative route (Bargh and Ferguson, 2000; Higgins, 1996). Individuals often use “anchoring and adjustment” as an important decision-making heuristic (Tversky and Kahneman, 1974). In the absence of knowledge, team members use prior trust as an “anchor”. Although individuals adjust to reflect the new knowledge gained from experience, they still rely on the initial anchors until they complete the transition to the deliberative route (Robert, et al., 2009).

Proposition 5b The personal knowledge gained by observing a virtual team member’s behavior enables the trustor to use the deliberative route in future trust judgments.

Team member’s assessments of others’ trust behaviors are influenced by their prior trust – their expectations about the other’s behavior, and the extent to which their experience either validates or discredits the prior trust that was or was not conferred (Bhattacharya, Devinney, and Pillutla, 1998; Jarvenpaa, et al., 2004; Kramer, 1999). If expectations match outcomes, then the motivation to use the deliberative route will decrease because there is evidence that the accuracy of trust formed via the automatic or heuristic route is sufficient (Gersick and Hackman, 1990).

Proposition 5c The motivation to use the deliberative route will decrease if the virtual team member’s trust formed via the other routes is validated by the trustee’s behavior.

DISCUSSION

We believe this paper makes three contributions: 1) it explains the relationship between swift and knowledge-based trust; 2) it offers a new perspective on trust by introducing automatic

and habitual trust; and 3) it provides a clear conceptual understanding of the relationship among these multiple routes of trust, which has been absent in the literature. By integrating dual process theories of cognition (Chaiken, 1980; Petty and Cacioppo, 1986) and theories of automatic cognition (Bargh and Chartrand, 1999; Bargh and Ferguson, 2000), our model presents a more complete picture of trust formation in virtual teams. This will help us better understand and manage the factors that influence trust in different situations and understand how the direction of causality changes over time – that is, when assessments of team members’ characteristics influence trust and when trust influences assessments of team members’ characteristics.

The use of the automatic route to explain a virtual team member’s trust formation in a new situation as well as an extremely familiar one is a new perspective to understanding trust formation. Contrary to prior research and theory, we argue that trust unconsciously enacted through the automatic route is a common form of trust formation. While some argue that *all* attitude formation is unconscious and automatic (see Bargh and Chartrand, 1999; Bargh and Ferguson, 2000), we do not take such an extreme position. We argue that conscious and unconscious trust formation exists at different stages in the lifespan of a virtual team.

In many cases, trust happens subconsciously, rather than being a conscious process. Think for a moment: over the past week, how many times did you assume trust automatically versus consciously attempting to assess someone’s trustworthiness by intentionally deliberating their ability, benevolence and integrity or noticing their organizational role or social category? Unless something motivates us, we do not consciously assess ability, benevolence and integrity or consider organizational role or social category. We believe that automatic trust formation is common for virtual team interactions, whether newly formed teams or long established ones.

Disposition to trust plays an important role in all three routes of trust formation. In novel

situations, disposition to trust drives trust that is formed through the automatic route. Disposition to trust also plays a role in activating which route is used for trust formation. Individuals with a high disposition to trust are more likely to use the automatic route because they usually presume trust in new situations (Mayer, et al., 1995; McKnight, et al., 1998). Conversely, individuals with a low disposition are more likely to see negative stimuli that trigger the motivation to use conscious processing (Schwarz and Clore, 2007; Smith, et al., 2003). Thus disposition to trust influences route selection as well as being the cornerstone on which automatic trust rests.

We believe that the model we have developed may also apply to face-to-face teams as well as virtual teams. One of the differences between face-to-face teams and virtual teams is the use of ICT-based communication, which can reduce motivation to use systematic processing and slow the process of personal knowledge accumulation. Thus virtual teams are less likely to use the deliberative route, so the other routes become more important for them. For this reason, we see the need for far more research on the automatic and heuristic routes, routes that have received less attention than the dominant deliberative route.

Implications for Research and Practice

This study has several implications for research and practice. First, we argue that virtual team members often form trust through the automatic route. If this is true, we know far less about trust formation in virtual teams than we think, because virtually no research has examined automatic trust formation. Studying automatic trust formation will be challenging because individuals are often unaware of automatic cognition (Bargh and Chartrand, 1999). Using traditional self-report techniques (e.g., surveys) appears futile because you cannot measure what someone thought if they did not consciously think. Unfortunately, when an individual is asked to explain their behavior; they often will describe their behavior as rational even if it was not. Ortiz

de Guinea & Markus (2009) suggest that the use of observation and experiments are better ways to measure automatic behavior. NeuroIS also holds promise (e.g., Dimoka, 2010) because it can measure brain activities and does not rely on conscious awareness (Bargh and Ferguson, 2000).

Second, we need a better, holistic, understanding of how trust changes over time as the routes change and how trust formed through one route influences trust formed later using other routes. Some researchers argue that the trust conveyed at the start of a virtual team is fragile, but we believe that the first impressions of trust matter deeply, because they continue to influence trust long after knowledge of team members is gained (Robert, et al., 2009). Yet we know little about the processes by which routes change and how trust from one route influences another. Jarvenpaa, et al. (2004) found that the amount of communication influenced trust only for virtual teams with low trust at the outset; communication had little impact for teams with high trust at the outset. Likewise, Sarker et al. (2011) found increased communication only improved trust for some teams. Our model argues that members of teams with high automatic trust have little motivation to assess trust unless that trust is violated, so communication that provides knowledge of members has little impact; whereas, members of teams with low trust are motivated to seek knowledge on which to form trust, so communication is important.

Third, an important question for IS researchers is, how can ICT and ICT-based work processes be designed to promote more accurate trust formation in virtual teams? Very simple, short interventions have been shown to have major impacts on attitude formation (Bargh and Chartrand, 1999; Bargh and Ferguson, 2000). Trust formed through the automatic route in newly formed virtual teams is highly susceptible to error, because it is based more on the idiosyncratic nature of the trustor and the situation than on the trustee. ICT designers (or managers) could imbed a simple 5-minute exercise designed to increase trust as part of the first steps that a newly

formed team performs. This increased trust could improve the initial interactions of team members and thus potentially have a long lasting impact over the life of the team, provided, of course, that team members were indeed trustworthy; if team members were not trustworthy, then such an intervention might have detrimental impacts on those who would be deceived.

Fourth, trust formed using the heuristic route relies on depersonalized assessments of team members. ICT-based processes can be designed to highlight appropriate cues to influence trust. Background information about prior work roles would help trigger desired stereotyping, rather than undesired stereotyping. For example, knowing that a team member has a masters degree in engineering from MIT, should have more influence than knowing she was a 25-year old female. Social networking technologies may play a role in highlighting these bases for heuristic trust.

Fifth, knowledge-based trust formed through the deliberative route is based on assessments of individual behavior. ICT-based processes can be designed to highlight a virtual team member's behavior. Trust may be enhanced by using work processes that create early opportunities for team members to display and assess ability, integrity, and benevolence, such as simple, short deliverables early on in the life of the team (Dube and Robey, 2008). Behavioral controls could also be designed into ICT-processes to make behavior more salient and thus increase its impact (Dennis, et al., 2012; Piccoli and Ives, 2003).

Finally, automatic trust formed in habitual interactions of well-established virtual teams is one of the most robust and well-informed types of trust. ICT processes could be designed to highlight situational normalcy so appropriate automatic habitual trust formation is triggered. Likewise, if a well-established team (or a team with members who have long, established relationships) moves into a new virtual environment, ICT could be designed to foster the

importation of the trust developed in past non-virtual interactions into the new environment.

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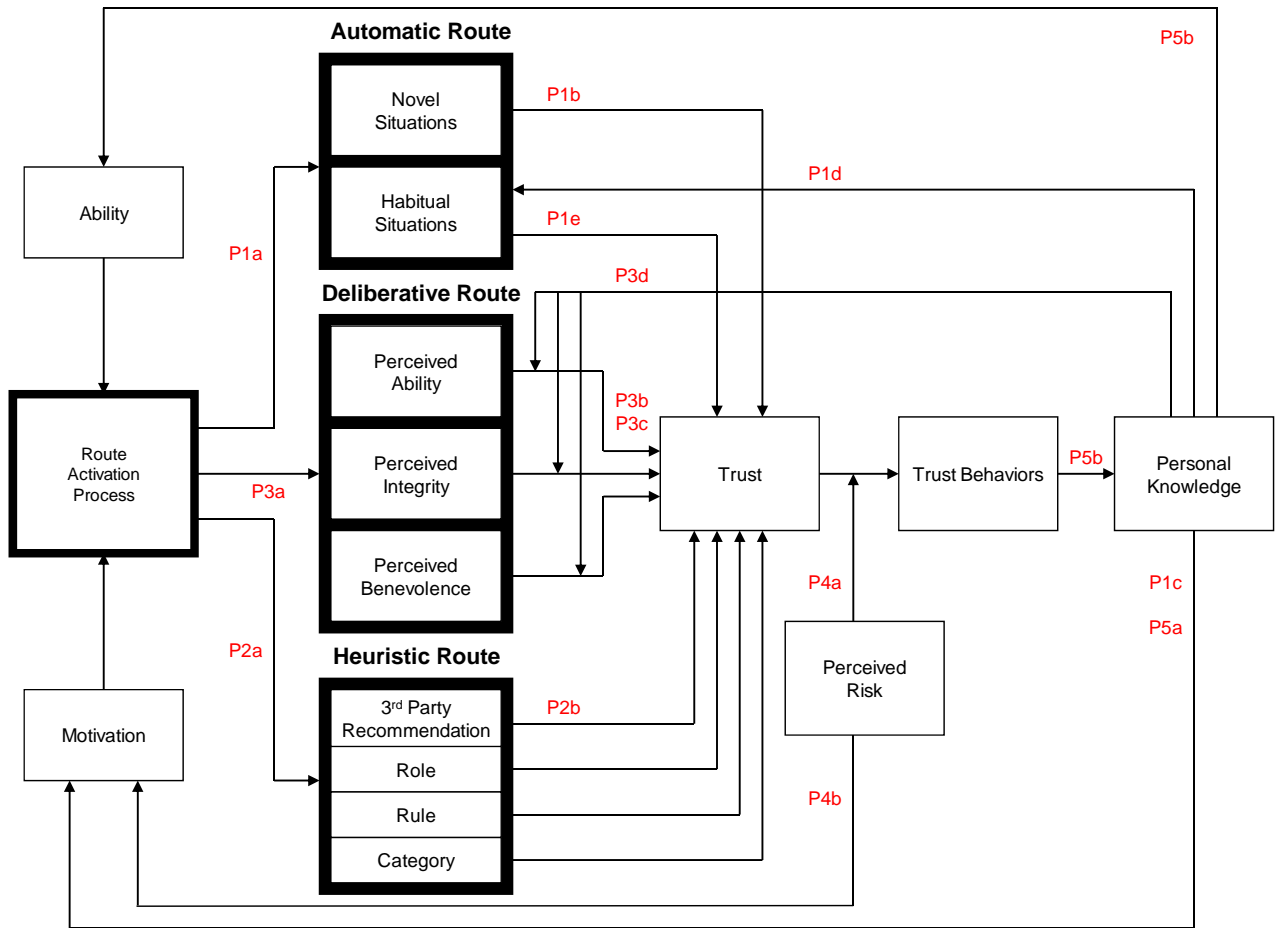


Figure 1. The Multi-Route Model

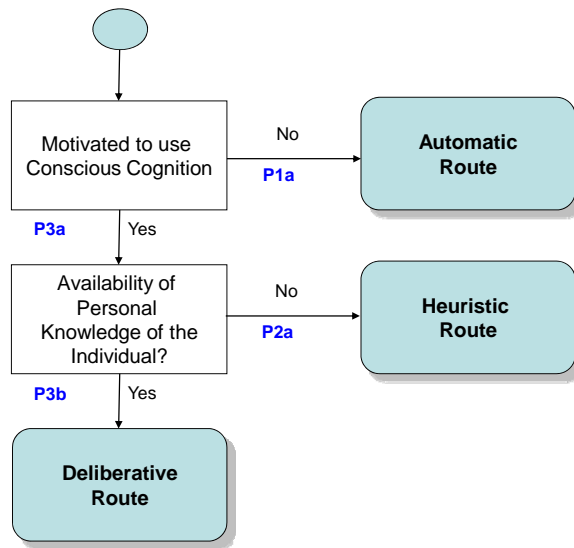


Figure 2. Route Activation Process