Social structural behavior of deception in computer-mediated communication

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ABSTRACT

Deception essentially takes place in social interaction. While deception has been studied from the perspective of interpersonal interaction, little is known about social structural characteristics of deceptive communication. To fill the knowledge gap, this research investigates deception behavior in computer mediated communication (CMC) via the lens of social structure by answering the questions of how one deceiver socially interacts with multiple receivers and what structural characteristics can be used to delineate deception in CMC. To this end, we first conceptualize deception in terms of social structure by drawing on the interpersonal deception and social network theories. We then propose a model of structural behaviors of deception in CMC that consists of three components: centrality, cohesion, and similarity, followed by an empirical evaluation of the model with real-world data collected from a game website. The findings of this study provide new evidence that deception is a strategic activity where the deceiver juggles between the dual goals of promoting his or her deceptive agenda and avoiding detection.

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1. Introduction

Computer mediated communication (CMC) provides social benefits for individuals and organizations to create, enhance, and re-discover social ties through interactive and transparent forms of communicating and collaborating with others [1]. As the CMC technologies continuously evolve; however, online deception has become a growing threat to our society particularly due to the prevalence of online social networks, where a wealth of sensitive information could be harvested and exploited for cyber-attacks on a large number of receivers (e.g., [23,50]). In addition, deception negatively impacts group decision making process through hampering the decision making ability of others [34]. Therefore, there is an emerging need to understand deception behavior in the context of multiple receivers, which is instrumental to detecting deceptive information and uncovering malicious senders.

Deception behavior has traditionally been grouped into two main categories: verbal (e.g., negative affect) and non-verbal behaviors (e.g., facial expression) [13,22,84]. Verbal behavior is directly related to the spoken or written content and language [37,79], whereas nonverbal behavior "focuses on accessory features that are exhibited while a person is producing content" [78]. Given that text is the primary modality available in CMC, verbal behavior has been the focus of extant online deception research. Despite the availability of nonverbal behavior in CMC, it has largely been under explored in the study of online deception. There has been very limited but promising evidence for the efficacy of non-verbal behavior in online deception detection [82]. In the study, Zhou and Zhang explored and empirically confirmed keyboard,

participatory, and sequential behaviors being new channels of nonverbal cues to online deception, and called for research into new sources of nonverbal behavior of deception in CMC. To answer the call, the current study examines deception behavior via the lens of social structure.

This research looks into the context of CMC that involves one deceiver and multiple receivers. Deceptive communication encompasses back-and-forth interaction between a deceiver and receivers [51]. Accordingly, deception can be viewed as a social phenomenon where individuals are connected through interactions and embedded in a structure of such relationships. The structure of ongoing social relations can be described by social structural behavior [8], and thus are related to deceptive communication and may serve as a new source of online deception behavior. There are two fundamental questions that must be answered when analyzing online deception from the social structure perspective. First, how can we conceptualize deceptive interactions as a social structure? Second, if social structure is a channel of deception behavior display, what kinds of social behaviors can be used to discriminate deceptive from truthful communication?

To address the above questions, we first conceptualized deceptive communication as social relationships between deceivers and receivers, and then proposed a research model of social structural behaviors of deception in CMC by drawing on the underpinnings of the interpersonal deception theory and social network paradigms [6]. The model predicts that deception has impact on the sender's centrality, cohesion, and similarity in a social structure. We further operationalized the selected social structural behaviors with social network measures [64], and empirically validated the research model using real-world data collected from a game website. Results support most of the hypothesized effects of deception on social structural behaviors in CMC. Hereafter deception in CMC and online deception are used interchangeably.

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The rest of this paper is organized as follows. In Section 2, we build theoretical foundation for a social structural approach to deceptive interaction. Subsequently, we propose a research model of social structural behavior of deception. In Section 4, we introduce method design in detail, followed by data analyses and results reported in Section 5. In Section 6, we discuss the findings, implications and limitations of the research. Finally, we conclude the paper in Section 7.

2. A social structural approach to explaining deception

In this section, we argue that deception is essentially a type of social interaction, which lays the theoretical foundation for a social structural approach to explaining deception.

2.1. Deception as a type of social interaction

Social interaction is defined as a situation where an individual's behaviors are continuously reorganized by, and influence another individual's behaviors, and vice versa [61]. As a series of processes, social interaction can be broken down into three processes: motivational, interactional, and structuring processes [61]. Specifically, motivational processes indicate that individuals are compelled and driven to interact with others; interactional processes involve actual influence on each other's behaviors, signaling a course of behavior as well as interpreting both one's own behavioral signals and those of others; and structuring processes denote that social interactions are repeatedly occurring across time as well as organized (structured) in a physical space. Deception is a type of complex social interaction [58] that takes place between one or more senders and one or more receivers, and accordingly deceptive communication involves the same set of processes. Moreover, the motivational, interactional, and/or structuring components of deception have been well established in the deception literature [10,12,22].

According to the Interpersonal Deception Theory (IDT), deception is defined as "a message knowingly transmitted by a sender to foster a false belief or conclusion by the receiver" [10]. As implied in the definition, interactivity and strategic communications are the two key elements of deception in terms of the continuous influence of a sender's behavior on a receiver and vice versa. First, to varying degrees and in diverse ways, deceivers and receivers are motivated and mobilized to interact with each other. Second, the two parties mutually influence each other's behavior with or without strategic moves [58] and such strategic moves are utilized in information, behavior, and image management. During interaction processes, deceivers and receivers may signal or leak unexpected words, nonverbal leakage, strategic thinking, and emotional stress [10]. While deceivers adjust their verbal and non-verbal behaviors or deception tactics based on the receiver's feedback or response [13], receivers' perceived credibility of deceivers and their detection accuracy have continuous effect on truth bias, context interactivity, and deceivers' communication skills [11,15,81]. Substantially deception involves a series of interactive process of monitoring and adjusting communication behavior based on mutual responses or feedbacks between deceivers and receivers, and their interaction patterns are structured by such repeated interactive processes. Thus, deception exemplifies the key processes of social interaction, and social interaction is essential to deception.

Extended from IDT, deceptive communication is not just a type of social interaction but more of strategic interaction driven by deceptive intent, leading to unique patterns of deceptive social interaction. For instance, deceivers are more likely to use control attempts when they are negotiating their outcomes with their partner or when they perceive that their partner is questioning their decision [34]. IDT was originally proposed from the interpersonal context, and accordingly many studies have focused on deceptive communication in dyads. The theory has recently been extended to explain deception when the deceiver interacts with two or more receivers [51,81]. This research expands the deception literature by focusing on deception that involves a multi-way communication between one sender (i.e. deceiver) and multiple receivers.

2.2. Examining deception via the lens of social structure

Social structure has been one of the central concepts in social theory and analysis. Despite the fact that social structure has been used in sophisticated theoretical propositions or frameworks [4], there is no generally agreed upon definition of social structure; and the concept of social structure is often implicitly assumed. Fundamentally social structure is a network (structure) with a set of relations among actors in that network, and a structural approach studies social structure comprehensively by examining the patterns of embeddedness and connectedness of actors [27]. In social science, the social structural approach often refers to social network analysis (SNA) with emphasis on structural patterning in social networks (structures) [27,33,38]. SNA offers analytical and statistical methods for measuring patterns and structures of interaction among social actors at different levels of the network such as ego networks and whole networks [56].

An actor in a network can be defined or categorized by patterns of his/her relations with other actors, namely social role. To be specific, a social role is a combination of particular sets of behavioral, meaningful, and structural attributes of a social actor [67], and the patterns of those attributes of social actors are relatively stable. SNA is used to uncover the power and influence of actors and to identify subgroups and their social roles such as leaders, gatekeepers, and brokers [38,42,66]. As discussed in Section 2.1, deception involves social interaction between individuals. The social structural approach helps us to identify deception behavior by looking into the ways that deceivers interact with, influence and are influenced by receivers, either directly or indirectly. In terms of a social structural view of deception, deceivers and receivers are treated as social actors and the chain of their strategic activities is interpreted as relations in a social network. In other words, the ongoing iterative processes of cognitive and behavioral adjustments between deceivers and receivers are interpreted as links (relationships) between them.

This study aims to examine deception in group communication from the social structural perspective based on two principles: 1) the deceiver and receivers can be modeled as social actors who are motivated by goals, intentions, interests, or tasks; and 2) most deceptive interactions consist of the exchange of valued items (e.g. information or materials). Given that online deception research has been narrowly focused on verbal behavior with few exceptions (i.e., [76]), the social structural approach to deception not only provides sociological explanations for online deception but also provides a new avenue for deception detection.

3. The research model and hypotheses development

According to the social structural approach to deception, deceivers and truth-tellers are treated as distinct social roles, and their interactions, behavioral expectations, and structural relations are expected to be different. Specifically, we hypothesize that the deceiver's deceptive intent has an impact on three structural characteristics of his or her network: centrality, cohesion, and similarity. The research model is presented in Fig. 1.

3.1. Centrality

Centrality is an important structural attribute of a social network that signals potential importance, influence, and prominence of an actor in the network [28]. In other words, an actor's centrality in a network implies whether or not the actor has power or influence over other actors in the network [44]. Centrality can be manifested in the embeddedness or connectedness of an actor in a network, which allows the actor to impose constraints on or provide opportunities for social interaction [38]. Substantial evidence has shown that centrality measures can capture behavioral tactics in organizations [62,8,7]. For example, assertive