2009

Deception Detection, Task complexity, and Group Member Experience in Computer-Mediated Group Settings

Gabriel Giordano
IESE Business School, giordano@ohio.edu

Joey George
Florida State University, jgeorge@fsu.edu

Deception Detection, Task complexity, and Group Member Experience in Computer-Mediated Group Settings

Gabriel Giordano
IESE Business School
ggiordano@iese.edu

Joey George
Florida State University
jgeorge@fsu.edu

ABSTRACT

Due to globalization and the increased availability of online collaboration tools, individuals are now likely to work together in settings where computers are their primary mode of communication. However, because communication characteristics are different in these settings, problems can arise, such as deception. Deceptive individuals may be difficult to detect over computer-based channels because many audio and visual cues to deception are filtered and communication tendencies are different. This paper presents two experiments where groups performed a collaborative task in a text-based, computer-mediated setting with and without confederate deceivers. The results show that deceivers were very successful in this setting, that groups performing a low complexity task were better at detecting deception than were groups performing a high complexity task, and that groups with members that had experience with each other had higher task performance but did not have higher deception detection accuracy than did inexperienced groups.

Keywords

Deception, Task Complexity, Channel Expansion, Media Synchonicity

INTRODUCTION

Increasingly, collaborative groups use computer-based communication, which is often text-based, in dispersed work environments. However, most organizations have allowed increased use of this type of communication without fully understanding its weaknesses. Computer-based communication is a significant influence on collaborative groups, because individuals' communication processes are affected by media characteristics such as the capacity for rehearsability, reprocessability, parallel communication, cues, language variety, and transmission speed, which are different in most types of computer-mediated communication than in face-to-face communication (Dennis et al., 2008). Media that are low in these characteristics are considered to be low in synchronicity, and they can be ineffective in group settings where gaining a common understanding is important, such as decision-making settings (Dennis et al. 2008). Further, individuals in these settings may be more at risk of influences such as deception due to these tendencies.

Deception is commonly defined as a message purposely transmitted to foster a false belief or conclusion in a receiver (Buller & Burgoon, 1996). While the cost of deception for organizations is difficult to quantify because it often goes undetected, there is no doubt that many occurrences of deception are important to businesses. The cost of just one activity related to deception, fraud, was estimated at $660 Billion a year in the U.S several years ago. (Bishop, 2004). The prevalence of another type of deception, falsified resumes, is evident from the estimate that 25% to 67% of applicants falsify their resumes and attempt to back up those falsifications in job interviews (Prater, 2002). In work groups, deception often comes from individuals having differing values from their work groups, conflicting instructions from superiors, and unreasonable expectations. These influences lead to role conflicts (Putnam & Stohl, 1996), which individuals often alleviate with the use of deception (Grover, 1993).

Unfortunately, most deception research has focused on non-interactive and non-group situations (Buller & Burgoon, 1996), and it is not very applicable to many business settings since the tasks studied did not represent the interactive, computer-mediated group settings where individuals now often work. In order to understand how to minimize the impact of deception in these settings, researchers must first understand individuals' basic deception detection tendencies. Our question is: *Does group members' experience with each other and task complexity affect their deception detection accuracy and task performance in a low-synchronicity computer-mediated setting?*

LITERATURE

Interpersonal deception theory (Buller & Burgoon, 1996) presents an integrated view of how the interactive deception and deception detection process works. It first recognizes that deceptive individuals are often unable to maintain normal behavior and leak cues that reveal their deceptive intentions (Ekman, 1992). This generally happens when deceptive individuals either fear that their deception will be detected or when they divert cognitive energy away from their effort to behave normally (Miller & Stiff, 1993). Once deceivers leak cues to deception,

receivers may become suspicious. If receivers recognize a deceiver's abnormal behavior, they might listen more attentively, ask for clarification on certain issues, or evaluate the truthfulness of information that was transmitted more carefully. This process is iterative throughout a communication event. A key tendency in this process is the truth bias (McCornack & Parks, 1986). The truth bias is a general attitude that individuals are being truthful. Communicators often do not question information by default since they don't expect deception. Once individuals realize that deception is possible, they are often not as naïve as they are by default.

Computer-Mediated Communication

Another important influence on the deception and deception detection process is the communication channel. Media Synchronicity Theory (Dennis et al., 2008) recognizes several characteristics of media that affect their ability to support group processes: transmission velocity, the potential speed of interaction supported by media and their ability to allow feedback; symbol sets, the capability of media to send differing information symbols, cues, and language elements; parallelism, the number of information channels (e.g., audio, text) media can simultaneously sustain; tailorability, the ability to tailor or customize a message to its recipients; reprocessability, the ability of media to store and retrieve messages for later access and examination; and rehearsability, the capability of media to allow participants to review and edit their messages prior to and during a communication interaction.

The two fundamental group processes that media support are conveyance and convergence (Dennis et al., 2008). Conveyance is the sharing and transmission of information, and convergence is the process of processing information and building shared understanding. Media with low synchronicity, such as a wiki, are better at supporting conveyance activities, or information sharing processes, because the point of these processes is to simply transmit and share information, and these types of media allow for more time to interpret information and develop responses, with fewer distractions. Media with high synchronicity, such as face-to-face, are better for convergence activities, because in these processes there is need for fast, interactive, and rich communication in order for individuals to interpret information and come to a common understanding based on that information.

Unfortunately, many cues to deception are not transmitted through modern communication media that are low in synchronicity. Because of the limited number of cues available in text-based computer-mediated communication, such as e-mail or instant messaging, deception detection may be much more difficult to detect in these settings. Social presence theory also highlights the importance of media synchronicity to deception detection (Short, Williams, & Christie, 1976). According to social presence theory, cues, and the perceived distance between communicators, can lead to a feeling of realness, or social richness, which can then affect communicators' behavior. Social presence is important to deception detection because a lack of perceived realness causes communicators to not focus on communication cues as much as in a "real" situation (Burgoon, Buller, Dillman, & Walther, 1995).

Also important to individuals' communication tendencies over different media is time. Over time, communicators gain experience that changes their communication style over different communication channels. According to channel expansion theory (Carlson & Zmud, 1999), experiences with a communication channel, a messaging topic, an organizational context, and communicative co-participants lead to the development of knowledge bases that can be used to communicate richer messages on a communication channel. For example, communicators who have experience with each other can encode messages into a format that is specific to an individual, allowing richer and more efficient communication through a channel. Many researchers predict that communication partner experience, communication partner familiarity, and baseline knowledge of a communication partner lead to overall better deception detection accuracy (Anderson, Ansfield, & DePaulo, 1997; Brandt, Miller, & Hocking, 1980; Feeley, DeTurck, & Young, 1995).

Task Complexity

One of the most visible influences on group processes, including deception and detection, is the complexity of one's task (Goldman-Eisler, 1968). Individuals facing a high-complexity task need to participate more actively in their task and handle more task processes, and they will likely be presented with more information than individuals performing a low-complexity task (Wood, 1986). Because of these tendencies, a complex task often results in an information overload, which happens when individuals are confronted with more information than they can handle. An information overload causes individuals to subconsciously process information that is clear and easily accessible before processing ambiguous and partially hidden information (Lewis, Goodman, & Fandt, 2004), and this will likely reduce their deception detection accuracy.

HYPOTHESES

Hypothesis 1: Groups facing a high-complexity task will be less accurate at detecting deception than groups facing a low-complexity task.

Hypothesis 2: Groups with a low-complexity task will have their performance more affected by deceivers than will groups with a high-complexity task.

Hypothesis 3: Computer-mediated groups with members that have experience with each other will be more accurate at detecting deception than groups with members that do not have experience with each other.

Hypothesis 4: Computer-mediated groups with members that have experience with each other will have higher task performance than groups with members that do not have experience with each other.

METHODOLOGY

Full experiment details are available upon request

In order to test our hypotheses, we conducted two experiments that simulated virtual collaborative decision-making settings where group members individually gather information and then come together to make a decision. The experimental task was a computerized strategy game named StrikeCOM. StrikeCOM is a multiplayer computer game which was designed and built at the University of Arizona (Twitchell, Wiers, Adkins, Burgoon, & Nunamaker, 2005). The object of the game is for a team of players to methodically search a game board for a fixed number of targets, which they attempt to destroy on their final turn. The game includes a built-in text messaging area that allows for computer-mediated communication between players. In the experiments, we manipulated the complexity of the game (by changing the setup of the game board) and the experience that group members had with each other (by using either newly formed groups or established class groups). Also, groups were looked at with and without deceivers. The deceivers had a goal that was opposite that of the rest of the group, and their goal was not known by the other group members. Lastly, all non-deceptive participants were given a written warning about the danger of deception in their game-play packet, so that they would be aware of the possibility of deception. Data were collected by looking at teams' scores in the game, their communication transcripts, and by using questionnaires following the experiment.

FINDINGS AND CONCLUSIONS

Full statistical analyses are available upon request

Overall, we found that 37% percent of the participants in the study were able to correctly judge deceivers as being deceptive. This number highlights the difficulty of detecting harmful deception in a text-based, computer-mediated group setting, where a number of cues to deception are not present. The low number is also likely due to the fact that communicators likely felt a low level of realness in the communication setting, due to the low level of social presence, which caused them to pay less attention to the behavior of deceivers.

Hypothesis 1 was related to task complexity and deception detection. As hypothesized, we found that deception detection accuracy varied based on task complexity. Groups performing the high-complexity task had lower deception detection accuracy than groups performing the low-complexity task. Groups performing the high-complexity task were likely facing information overloads that stemmed from the cognitive demands of the task as well as the demands from the complex group setting. One of the tendencies of individuals facing information overloads is the delay of processing ambiguous information, such as cues to deception. This tendency would cause participants to fail to recognize the limited number of cues to deception that were present in the computer-mediated setting.

Also important was the fact that the high complexity task was a poorer fit for the low synchronicity communication medium than was the low complexity task. The complex task included more information that needed to be shared, processed, and evaluated as a group, which was difficult to do with the text-based communication system that groups were using. This likely caused individuals to focus much of their decision-making process on information that they individually gathered, and not on a shared understanding of their whole groups' findings. The number of questions that groups asked during their tasks supports this idea. Groups with the low complexity task exchanged an average of 15 questions during their task, while groups performing the highly complexity task only asked an average of 9 questions ($t=2.235$, $p < .04$).

Hypothesis 2 looked at task complexity and the deceiver's impact on group performance. We unexpectedly found that experienced groups performing the low complexity task had their group performance more influenced by deceivers than did experienced groups performing the high complexity task. Groups with the low-complexity task were likely more affected by deceivers because the baseline groups performing the low-complexity task without a deceiver were not facing any significant obstacles, and so they were able to perform at a much higher level than any of the other groups. Individuals in these groups weren't facing information overloads, which allowed them to process the task information that they needed to perform their task effectively. The baseline groups with the high-complexity manipulation had a significant obstacle (the complexity of the task) that hindered their performance, and so the difference between their performance and the high-complexity groups with deceivers was not as large. Even though deceivers might have affected some of the groups with the high-complexity task, the task alone caused them to perform poorly in the computer-mediated setting, and so the impacts of the deceivers were minimized. This result highlights the negative effect deception can have on computer-mediated groups that have the ability to perform their task at a high level without deception.

Hypothesis 3 looked at group member experience and deception detection accuracy. We found that experienced computer-mediated groups did not have higher detection accuracy than inexperienced groups, and so Hypothesis 3 was not supported. We expected that experienced receivers would have an advantage in a group situation since they would be able to share information more efficiently and richly over text-based media, which could have led to increased group suspicion, in addition to being able to detect irregularities in deceivers' messages since

they were familiar with their communication style (Vrij, 2000). However, the relational truth bias likely counteracted these effects. The truth bias would have caused receivers to be hesitant to label their group members as deceivers with the limited information that they had from the computer-based communication they received.

Hypothesis 4 looked at group member experience and task performance. As expected, groups with experienced members had higher task performance than groups without group member experience. Groups with experience were likely more able to share task based information, coordinate their activities, and come to a common understanding, since they were able to send richer messages over the computer-based medium than were inexperienced groups. The difference in communication style between experienced and inexperienced groups was highlighted by the fact that groups with experience members used significantly more shorthand communications than did inexperienced groups. Experienced groups used an average of 10 shorthand communications (which were identified as abbreviated text phrases in the communication stream), and inexperienced groups used an average of 5 shorthand statement during their tasks, which was significantly less than the experienced groups ($t=2.224$, $p < .04$).

Since experienced groups were effectively coordinating their searches, sharing their findings in the game, and understanding each other's information, they were able to overcome bad information. Even though experienced groups were more able to overcome the bad information provided by deceivers, they did not realize the deceptive intent of deceivers. These findings are important because it could mean that group member experience is the best short-term strategy for overcoming the effect of deception in computer-mediated groups; however, it may allow deceivers to go undetected and could lead to future problems stemming from the same deceiver.

Conclusions

Individuals lie on a daily basis (Vrij, 2000), and unfortunately, extensive prior research has shown that humans are poor detectors of deception (Miller and Stiff, 1993). With the increased use of computer-based collaboration technologies, the risk of serious deception in decision-making groups is at a new high. This study showed that deceivers with goals opposite those of their groups can significantly reduce their groups' task performance in computer-mediated settings. We found that even if groups were warned about potential deception, deception detection accuracy was low, and group task performance and deception detection accuracy were more affected in certain settings. Specifically, computer-mediated groups performing a low complexity task were better at detecting deception than were groups performing a high complexity task, and groups with members that had experience with each other were better at performing their task, even with deceivers present, but were not better at detecting deception than were groups without experienced members. If organizations recognize situations where deception is possible and group performance is at risk, they can take actions in advance to minimize the negative effects of deception. This may be particularly vital with inter-organizational top management teams and in other settings where groups are making important decisions in dispersed settings. These actions might include breaking down a task into several smaller tasks, making sure that groups have had adequate task training, and adding members to a group, to reduce the affect of task complexity and minimize the chance information overloads, as well as making sure that groups have had several face-to-face experiences together before performing tasks in computer-mediated settings, so that media with low synchronicity will be less of an obstacle and deceivers will have less influence.

REFERENCES

1. Anderson, D., Ansfield, B., & DePaulo, B. (1997). Love's best habit: Deception in the context of relationships. In P. Philippot, E. Feldman & E. Coats (Eds.), The social context of nonverbal behavior (pp. 1-46). Cambridge: Cambridge University.
2. Biros, D., George, J., & Zmud, R. (2002). Inducing sensitivity to deception in order to improve decision making performance: A field study. MIS Quarterly, 26(2), 119-144.
3. Bishop, T. J. F. (2004). Report to the nation on occupational fraud and abuse. Austin, TX: Association of Certified Fraud Examiners.
4. Brandt, D., Miller, G., & Hocking, J. (1980). The truth deception attribution: Effects of familiarity on the ability of observers to detect deception. Human Communication Research, 6, 99-110.
5. Buller, D., & Burgoon, J. (1996). Interpersonal deception theory. Communication Theory, 6, 203-242.
6. Burgoon, J., Buller, D., Dillman, L., & Walther, J. (1995). Interpersonal deception: IV. Effects of suspicion on perceived communication and nonverbal behavior dynamics. Human Communication Research, 22(2), 163-196.
7. Carlson, J., George, J., Burgoon, J., Adkins, M., & White, C. (2004). Deception in computer-mediated communication. Group Decision and Negotiation, 13(1), 5-28.
8. Carlson, J., & Zmud, R. (1999). Channel expnasion theory and the experimental nature of media richness perceptions. Academy of Management Journal, 42, 153-170.
9. Dennis, A., Fuller, R., & Valacich, J. (2008). Media, Tasks, and Communication Processes: A Theory of Media Synchronicity. MIS Quarterly, 32(3), 575-600.

10. DePaulo, B., Lindsay, J., Malone, B., Muhlenbruck, L., Charlton, K., & Cooper, H. (2003). Cues to deception. Psychological Bulletin, 129(1), 74-118.
11. Ekman, P. (1992). Telling lies: Clues to deceipt in the marketplace, politics, and marriage (Vol. 2). New York, NY: W.W. Norton.
12. Exline, R., Thibaut, J., Hickey, C., & Gumpert, P. (1970). Visual interaction in relation ot Machiavellianism and an unethical act. In R. Christie & F. Geis (Eds.), Studies in machiavellianism (pp. 53-75). New York: Academic Press.
13. Feeley, T., DeTurck, M., & Young, M. (1995). Baseline familiarity in lie detection. Communication Research, 12(2), 160-169.
14. Ferris, G. R., Treadway, D. C., Kolodinsky, R. W., Hockwarter, W. A., Kacmar, C. J., Douglas, C., et al. (2005). Development and validation of the political skill inventory. Journal of Management, 31(1), 126-152.
15. Goldman-Eisler, F. (1968). Psycholinguistics: Experiments in spontaneous speech. New York: Doubleday.
16. Grazioli, S., & Jarvanpaa, S. (2000). Perils of internet fraud: An empirical investigation of deception and trust with experienced internet consumers. IEEE Transactions on Systems, Man, and Cybernetics, 30(4), 395-410.
17. Grover, S. (1993). Why professionals lie: The impact of professional role conflict on reporting accuracy. Organizational Behavior and Human Decision Processes, 4(3), 478-495.
18. Lewis, P., Goodman, S., & Fandt, P. (2004). Management: Challenges for tomorrow's leaders. Mason, OH: South-Western.
19. McCornack, S., & Parks, M. (1986). Deception detection and relationship development: The other side of trust. In McLaughlin (Ed.), Communications Yearbook 9. Beverly Hills, CA: Sage.
20. Miller, G., & Stiff, J. (1993). Deceptive communication. Newbury Park, CA: Sage.
21. Poole, M. (1983). Decision development in small groups: A study of muliple sequences in decision making. Communication Monographs, 50(3), 206-232.
22. Poole, M., & Baldwin, C. (1996). Developmental processes in group decision making. In R. Hirokawa & M. Poole (Eds.), Communication & group decision making (second ed., pp. 215-241). Thousand Oaks, CA: Sage.
23. Prater, T. (2002). Lies, lies, and more lies. SAM Advanced Management Journal(Spring), 9-36.
24. Putnam, L., & Stohl, C. (1996). Bona fide groups: An alternative perspective for communication and small group decision making. In R. Hirokawa & M. Poole (Eds.), Communicaiton and group decision making (2nd ed., pp. 147-178). Thousand Oaks, CA: Sage.
25. Schick, A. G., Gorden, L. A., & Haka, S. (1990). Information overload: A temporal approach. Accounting Organizations and Society, 15, 199-220.
26. Schneider, S. C. (1987). Information overload: Causes and consequences. Human Systems Management, 7, 143-153.
27. Short, J., Williams, E., & Christie, B. (1976). The social psychology of telecommunications. New York, NY: John Wiley.
28. Sproull, L., & Kiesler, S. (1986). Reducing social context cues: Electronic mail in organizational communication. Management Science, 32(11), 1492-1512.
29. Stiff, J., Kim, H., & Ramesh, C. (1992). Truth biases and aroused suspicion in relational deception. Communication Research, 19(3), 326-345.
30. Tuckman, B. (1965). Developmental sequence in small groups. Psychological Bulletin, 63, 384-399.
31. Tuckman, B., & Jensen, M. (1977). Stages of small group development. Group and Organizational Studies, 2, 419-427.
32. Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. Science, 185, 1124-1131.
33. Twitchell, D., Wiers, K., Adkins, M., Burgoon, J., & Nunamaker, J. (2005). StrikeCOM: A multi-player online strategy game for researching and teaching group dynamics. Paper presented at the Hawaii International Conference on System Sciences, Big Island, Hawaii.
34. Vrij, A. (2000). Detecting lies and deceit: The psychology of lying and the implications for professional practice. Chichester, England: John Wiley and Sons, LTD.
35. Wood, R. (1986). Task complexity: definition of the construct. Organizational Behavior and Human Decision Processes, 37, 60-82.
36. Zmud, R. (1990). Opportunities for strategic information manipulation through new information technology. In J. Fulk & C. Steinfeld (Eds.), Organizations and Communication Technology (pp. 95-116). Newbury Park, CA: Sage.
37. Zuckerman, M., & Driver, R. (1985). Telling lies: Verbal and nonverbal correlates of deception. In W. Siegman & S. Feldstein (Eds.), Nonverbal communication: An integrated perspective (pp. 129-147). Hillsdale, NJ: Lawrence Erlbaum.