A FIRST LOOK AT
COMMUNICATION THEORY

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CHAPTER 29

The Media Equation

of Byron Reeves & Clifford Nass

Byron Reeves and Clifford Nass are members of the communication department at Stanford University and the directors of that school's Social Responses to Communication Technology project. As the title suggests, both men are intrigued by the way people interact with television, computers, and other high-tech media. Based on a research program that explores this interface, Reeves and Nass are convinced that people treat communication media as if they were human. As opposed to many of the theoretical constructions described in earlier chapters, their media theory can be represented by a simple equation.[1]

THE MEDIA EQUATION: MEDIA = REAL LIFE

Reeves and Nass' book *The Media Equation* is not a science-fiction fantasy in which computers come alive and take over the world. The authors regard computer chips, software, transistors, and digital television as inanimate objects and expect them to remain that way. What their equation does suggest, however, is that we *respond* to communication media *as if* they were alive. The book's subtitle underscores this point: "How People Treat Computers, Television, and New Media Like Real People and Places."

The practical implication of the media equation is that once we turn on a television or boot up a computer, we follow all the rules of interpersonal interaction that we've practiced throughout life. Thus the word *interface* is particularly apt when describing human-media relations. This natural social response goes way beyond occasional words yelled at the television set or our frantic plea for the computer to retrieve lost data. Reeves and Nass maintain that the media equation is so basic that it "applies to everyone, it applies often, and it is highly consequential."[2] To make their point they recommend the following test:

1. Pick any well-established finding from the research literature of interpersonal communication. (For example—"People like to be praised by other people, even if the praise is undeserved.")
2. Cross out the second reference to *people* and substitute the word *media.* ("People like to be praised by media, even if the praise is undeserved.")
3. Then test this revised proposition using the same experimental methods that established the interpersonal principle. (Design computer messages to arbitrarily praise some people for their problem-solving ability while criticizing others for their faulty strategy. Then see if users who received compliments like the machine more and think it did a better job than do those who receive the critical messages.)

When Nass ran the experiment outlined above, he confirmed that computers that flattered their users were rated more helpful and better liked than critical machines.[3] This is not an isolated finding. Together, Reeves and Nass have published over forty reports of experiments supporting their claim that people respond to media in the same way they respond in face-to-face interactions with other people. Assuming the media equation is valid, students of media effects would do well to spend some time in the interpersonal communication and social psychology sections of the library rather than relying solely on mass communication literature or the latest reports of technological advances.

BEYOND INTUITION THAT PROTESTS: "NOT ME, I KNOW A PICTURE IS NOT A PERSON"

The media equation is clearly counterintuitive. As we watch TV or surf the Net, none of us is convinced that we respond to images on the screen as if they were real. Children might mistake animated pictures of people for the real thing, but we know that they are merely *representations* of life. At best, they create only a secondhand reality. Even if others are fooled, we are not.

Reeves and Nass counter that "people respond socially and naturally to media even though they believe it is not reasonable to do so, and even though they don't think these responses characterize themselves."[4] Their rejoinder parallels social psychologist Philip Zimbardo's warning against the "not me" syndrome. Zimbardo writes that we often set ourselves apart from others by clinging to the illusion of personal invulnerability—the naïve belief that our attitudes and actions are not conditioned by situation or circumstance.[5] While a "not me" orientation preserves our belief that we are fully autonomous, that pride is dangerous, Zimbardo argues, because it reduces our vigilance to the power of outside forces to mold our lives. We thus become more vulnerable to them.

Students of communication also find the media equation strange because they are accustomed to thinking of media effects in terms of program *content*. We've already examined cultivation research that focuses on the effects of television violence and an agenda-setting analysis that monitors the types of stories covered by the news media. Other studies probe the effects of political ads, pornography, or depictions of paranormal phenomena.[6] In contrast, the media equation applies to electronic media, regardless of content. In this respect, the media equation is more similar to the technological determinism of McLuhan than to the content focus of Gerbner or McCombs and Shaw (see Chapters 24, 27, 28). Yet while McLuhan differentiates between hot and cool media, Reeves and Nass claim that their theory holds for all modern media.

Finally, the media equation defies accepted wisdom because we are accustomed to thinking of media as tools. McLuhan reinforced this idea when he said that we shape our tools, and they in turn shape us. But he probably had it only half right. Reeves and Nass strongly agree that the media affect our responses, but they think the tool metaphor leads us astray. Tools are *things* purchased at a hardware store. Tools can be picked up or turned on, and just as easily put down or switched off. We can be detached from a tool. Not so, they say, with television, computers, and other forms of virtual reality. The sights and sounds we encounter draw us in and elicit social responses that we've built up over a lifetime of human interaction. Media are more than just tools. Although Reeves and Nass realize their claim violates common sense, they insist that "media are full participants in our social and natural world."[7]

OLD BRAINS FOOLED BY NEW TECHNOLOGIES

Reeves and Nass refer to the slow pace of evolution as the reason that the human race responds socially and naturally to media: "The human brain evolved in a world in which *only* humans exhibited rich social behaviors, and a world in which

all perceived objects were real physical objects. Anything that *seemed* to be a real person or place *was* real."[8] So we haven't yet adapted to new media that not only depict lifelike images but themselves personify the characteristics of human actors. The Social Responses to Communication Technology group at Stanford maintains that the media equation holds true because of what now turns out to be a human biological limitation: "There is no neural function or anatomical region designed to help humans differentiate mediated and unmediated experience and to change mental processing accordingly."[9] Thus the media equation is an unconscious, automatic response—literally a "no brainer."

People can of course think themselves out of primitive, automatic responses to mediated experience. Reeves and Nass cite the familiar case of the visceral fear we might feel while watching a horror film. It's possible to lower our level of fright by continually reminding ourselves that "it's only a movie, it's only a movie." But this strategy takes a great deal of mental effort and makes it hard to follow the plot, so we usually don't do it. The theorists note that "the fact that the movie scared us in the first place is good evidence that media are real first, and false only after we think about it. There are vestiges of old brains in modern thinking."[10]

Thwarting the media equation is even more difficult within an interactive environment. We might think it would be easy to remember that any response from a computer was originally encoded by a programmer, but according to Nass, it's not. He ran a study showing that people consider computers rather than their programmers as the source of information on the screen.[11] In fact, he discovered that computer users don't normally think about programmers at all. They don't need to. The machine is more humanly present than the absent programmer.

Nass acknowledges that computers are different from people in a thousand different ways, but he points out that they are very much like people in a few significant ways: "Computers use language, respond based on multiple prior inputs, fill roles traditionally filled by humans, and produce human-sounding voices."[12] Perhaps that's all our slow-to-evolve human brains need:

> These extremely social cues have only been associated, up until recently, with other humans. Hence, when confronted with a machine that possesses even a few of these humanlike characteristics, it is possible that our most natural response is to behave socially toward it.[13]

PROVING THE EQUATION

In algebra, "proving" an equation means demonstrating that the terms on both sides of the equal sign are equivalent. A mathematician does this by performing the same computations to both sides of the equation in an attempt to reduce its complexity to a simple $x = x$ identity. It's a solo activity that involves no interaction with media hardware or interpersonal communication.

Proving the media equation is a more daunting task. The predicted relationship between responses to media and responses to people can best be symbolized as an $x = y$ equation. There's no mathematical logic that connects the two types of

behavior. And due to the counterintuitive nature of the theorists' prediction, it's dangerous to rely on people's introspective accounts of why they do what they do. So evidence that we do in fact interact with media (x) the same way we do with people (y) must come from empirical research. Reeves and Nass insist that "empirical methods show what otherwise would not be known."[14]

The two theorists review a variety of media experiments that they've designed to parallel well-known studies of interpersonal communication. If their media equation is valid, their results on media-human interface should match established findings of relationships between people. I've selected three areas of research connected with communication theories discussed in this text to provide a sample of what they've found. The topics are *interpersonal distance, similarity and attraction,* and *source credibility.*

Interpersonal Distance

Judee Burgoon's original expectancy violations model was designed to predict the effects of violating one's personal space (see Chapter 6). She said that unanticipated physical proximity would trigger increased arousal, resulting in heightened attention to the nature of the relationship. When this happens, *violator valence* determines whether our response will be more or less favorable than it would have been had the other conformed to our proxemic norm.

The media equation suggests that any finding validated in interpersonal communication research should hold equally true in modern media usage. So when a television picture gets "up close and personal," viewers should be stimulated and respond the same way they would if someone had walked into the room and approached to within a few inches. Reeves and Nass acknowledge that this claim seems rather far-fetched: "We can all safely say that real people don't reside inside of media or on a screen, so it shouldn't matter whether images of people make them appear close or far away. . . . After all, it's only a picture."[15] Yet the very improbability of their prediction makes it a good test of the media equation.

Participants in Reeves' experiment watched forty ten-second clips of different people talking about their favorite restaurant or their last vacation.[16] When one person looks at another person talking, the most important cue to the distance between them is the extent to which the other person's face fills the observer's field of vision. To simulate that effect in testing the media equation, Reeves and Nass controlled perceived distance in three different ways. First, they varied the distance between the viewer and the television set—four feet versus ten feet. Second, they varied the size of the screen—forty-one inches versus fifteen inches. And third, they varied the camera shot—a face filling the screen versus a full body shot, head to toe. When systematically rotated, these three variables offered eight different impressions of interpersonal distance. For example, mediated figures appeared farthest away when framed head to toe on a fifteen-inch screen at a distance of ten feet. Conversely, subjects who watched only four feet away from a face that filled the forty-one-inch screen literally had a mediated person "in their face."

Subjects' evaluations of each person in the video were rated on scales anchored with pairs of words such as *calm/anxious, pleasant/unpleasant,* and *violent/gentle.* That was the easy part. Finding a nonintrospective measure of attentiveness was tougher to do. Instead of using heartbeat, skin resistance, pupil dilation, or another nonspecific index of physiological arousal, Reeves rigged up a secondary reaction-time task that provided a measure of attention directed specifically toward the person on the screen. While watching the video, subjects were expected to press a button whenever they heard a random tone—much like the procedure in a hearing test. Because the human capacity for cognitive processing is limited (see Chapters 7, 8, and 10), the more viewers were absorbed in watching the person on the screen, the longer it took for them to react to the tone. On the other hand, a quick reaction to the sound was a reliable indicator that viewers weren't very involved with a specific speaker.

What did Reeves discover? When the figures on the screen "came too close," vigilance increased, and as Burgoon predicted, response toward their mediated presence became more intense. Mild approval became strong attraction; vague uneasiness turned into distinct irritation. In one sense, the study is unspectacular in that it merely replicates the findings of nonverbal communication research. Yet as Reeves and Nass suggest, the support it provides for the media equation is both surprising and impressive:

> People assume that a picture of a face, regardless of its size, is merely a symbol that stands for someone not actually present. But it is more. The size of a face can broadly influence psychological responses—from the mental energy required to attend . . . to thoughtful judgment of character.[17]

Similarity and Attraction

Perhaps the most well-validated principle of relational research is that perceived similarity increases attraction.[18] This law of attraction is now a standard feature of many communication theories. For example, you read earlier about Charles Berger combining two axioms of uncertainty reduction theory to create Theorem 21, a clear statement of the positive relationship between similarity and attraction (see Chapter 10). So if the media equation is really true, individuals should like a "similar" computer more than one they see as "different." To test this seemingly strange prediction, Nass and Reeves first set out to do what is almost a mantra in the field of computer design—"give computers some personality."[19]

When people judge personality, relational control turns out to be a crucial dimension. Where does the person fall on a *dominant–submissive* scale? With relatively little effort, Nass and Reeves were able to take identical computers and make one seem "dominant" and the other "submissive." They programmed the computers to offer users the same amount of help on a desert survival problem, yet to interact in different styles. Advice from the dominant computer was stated with certainty: "You should definitely rate the flashlight higher. It is your only reliable night signaling device." The submissive computer was more tentative: "Perhaps the flashlight should be rated higher? It may be your only reliable night signaling device." The dominant computer always went first and expressed a high

level of confidence in its opinions. The submissive computer always went last and expressed doubt about the wisdom of its judgments. The dominant computer was named "Max"; the submissive computer was named "Linus."

How successful was this manipulation? As it turned out, Stanford students easily identified the personality of the machines. Participants who worked with Max rated the computer as *domineering, authoritative, controlling,* and *forceful,* while those who used Linus considered the computer *submissive, timid,* and *shy.* Nass and Reeves note that this is a typical case of impression formation extending beyond the realm of human-human contact: "Our old brains automatically extrapolate when given a little hint."[20] But the theorists also add, "It is not enough to demonstrate that computers can be endowed with personality, and that people are capable of recognizing that personality; rather, it must also be demonstrated that people *respond* to computer personalities in the same way that they respond to human personalities."[21]

In order to assess user response, Nass and Reeves employed a psychological test to identify students who had personalities that were decidedly dominant or submissive. Half of these students were paired with computers that were similar in personality—dominant-dominant or submissive-submissive. The other half worked with computers that had an opposite control orientation—dominant-submissive or submissive-dominant. When the desert survival exercise was over, the results were clear. Students matched with computers that displayed similar personalities were more socially and intellectually attracted to their machines than were students working with dissimilar computers. Or to use Watzlawick's terminology (see Chapter 12), students in *symmetrical* relationships (↑↑, ↓↓) liked their electronic partners better than did students in *complementary* relationships (↑↓, ↓↑).

The similarity-attraction relationship has practical implications for computer software and hardware design. True user-friendly media are those that match the personality of the operator. This is not a one-size-fits-all proposition. Hesitant users might like a doe-eyed, paper-clip helper who appears only when summoned, but aggressive users don't. They want an assertive machine that proactively inserts numbers, automatically corrects spelling, and makes jarring noises when users are about to do something stupid. Based on people's desire for this type of compatibility, Microsoft and Macintosh would do well to offer buyers a choice between a Linus and a Max.

As consultants to Microsoft and Silicone Valley high-tech companies, Reeves and Nass were pleased to demonstrate that creating a personality for a computer doesn't require sophisticated graphics, natural language processing, or artificial intelligence. As communication theorists, they were also gratified to report additional support for their media equation:

> When machines are endowed with personality-like characteristics, people will respond to them *as if* they have personalities, despite the fact that these individuals will claim that they do *not* believe the machines actually have personalities.[22]

Source Credibility

Beginning with Aristotle's emphasis on ethical proof (see Chapter 21), rhetorical scholars have shown a continuing interest in *who* says something as well as *what* is said. That interest has been more than matched by researchers schooled in the socio-

psychological tradition of communication theory. The early Yale Attitude Studies established that the credibility of a message source has a strong effect on how listeners respond to the message (see Chapter 2). In like manner, our interpersonal communication is affected by the roles and reputations we bring to a relationship. As media theorists grounded in that socio-psychological tradition, Reeves and Nass think it also makes sense to talk about the credibility of mediated messages. The problem is figuring out who the source of the message really is. The media equation suggests that for all practical purposes, it's the electronic messenger.

If we think about it, we'll realize that the source of most news reported on television is an unseen news editor. But according to the media equation, we usually don't think about it. Even when the BBC labels the messenger a "newsreader," trying to concentrate on a faceless writer is a complicated and tiring task. Reeves and Nass conclude that "people automatically assign responsibility for messages to those who deliver them, even when the receiver knows the link is dubious. What is most *proximate* is the messenger, not someone in some other place."[23] That's why Peter Jennings, Diane Sawyer, and Dan Rather *make* news, not just report it.

Credibility is in the eye of the beholder. The news anchors mentioned above are often viewed as filling a specific social role—they are specialists in public affairs. Is it possible that viewers could regard a television set as a specialist as well? The idea seems ludicrous, yet if the media equation is right, it could be quite natural to assign a specific role to a TV. After all, viewers have already attributed expertise to ESPN for sports, CNN for news, and the Weather Channel for the latest forecast. Perhaps it's not so far-fetched to think that a television set could serve the same function. As Reeves and Nass write, "Despite some hilarity as we planned the experiment, we were anxious to see if a social role could define a box of wires and glass."[24] Their prediction was that content on a television set that is labeled a *specialist* will be perceived as superior to identical content on a television set that carries a *generalist* label.

All the participants in the study watched two videotapes. A *news* tape contained stories on business fraud, a wounded police officer, a book about suicide, and the closing of a military medical center. An *entertainment* tape contained segments from *Cheers, The Cosby Show, Roseanne,* and *Who's the Boss?* Half the participants watched both tapes on a TV set labeled "News and Entertainment Television." The other half watched the news tape on a set labeled "News Television" and the entertainment tape on a different set labeled "Entertainment Television."

Despite all logic, viewers who watched the news tape on the specialist television rated the reporters' stories as more *interesting, important, informative,* and *disturbing* than did viewers who saw the same tape on a generalist set. In like fashion, viewers who saw the entertainment video on the specialist TV found it more *relaxing* and somewhat *funnier* than did viewers who saw it on the generalist set. Viewers who watched the programs on specialist television sets even rated the clarity and color of the picture better! It takes a Machiavellian mind to figure out how advertisers might use this information to sell more TVs, but Reeves and Nass focus on the implications for their media equation:

> These studies provide perhaps the most compelling evidence yet that social responses to media are not dictated by "common sense." No viewer thinks that

> television sets have an ability to influence the content that they display. Nonetheless, people are influenced by labels, and the influence goes beyond their ability to analyze their own responses. . . . These social orientations to media indicate that it is natural for people to treat media socially, perhaps easier than treating media in any other way, including as a tool.[25]

Who is the source of a computer message when there is no proximate person presented on the screen? According to the media equation, the computer itself. This is obviously a controversial thesis, but if we actually do treat computers as if they were real people, that solid-state box is a more immediate source than any invisible programmer. Nass set up a simple experiment to explore whether computers, not their programmers, are actually considered the real source of information.[26] It is, of course, hard to demonstrate that people are not thinking about a programmer, but it's possible to see if there's a difference when one group is prompted to think of the programmer and the other group is not.

Two groups were tutored by a computer and later rated the responses they received in terms of how helpful and positive they were. One group was asked to think about the persons who programmed the computer; the other group received no special instructions:

> Half of the participants were told that they were working with programmers, and that the programmers had different ways of tutoring. They were also told that they would be evaluated by the programmers after the session. The other half were told the exact same things, but the word "computer" was substituted for "programmer." When participants worked without a programmer, the computer referred to itself as "this computer." When a programmer was mentioned, the computer referred to itself as "I."

As Nass anticipated, there was a big difference between the two groups. People who were told to think about the person who programmed the computer rated the machine as less competent and less friendly than did those who were free to imagine any information source. From this Reeves and Nass conclude that it's possible for people to think about a distant source, but only if they are instructed to do so and only at great cost. Our natural or default response is to the most immediate source—the computer.

Adding Up the Evidence

The studies described above are only a small portion of the empirical evidence that Reeves and Nass offer in support of their media equation. For example, they've demonstrated that people will identify a computer as male or female based only on its "voice," and then respond to the metal box with a central processing unit in a typically gendered way.[27] The theorists have also shown that people tend to be polite to computers and will readily consider them teammates, yet are willing to "scapegoat" them when they are "different" and the situation turns sour.[28]

None of these studies "prove" that media equal real life. There's no way to use deductive logic to establish an $x = y$ identity—the ironclad certainty that responses to people and responses to media are the same and always will be. But in terms of increased probability, inductive support in the form of empirical evidence is

mounting. So far, Reeves and Nass have yet to discover a principle of interpersonal communication that doesn't apply to our treatment of television, computers, and other sophisticated electronic media.

CRITIQUE: AN INTRIGUING ONE-WAY RELATIONSHIP

Four decades before *The Media Equation* was written, another Stanford professor published a counterintuitive theory that captured the imagination of social psychologists and communication researchers. In his theory of cognitive dissonance, Leon Festinger suggested that the best way to induce attitude change in others is to offer them only a *minimal justification* to act in a way consistent with the desired position (see Chapter 15).[29] Like Festinger, Reeves and Nass not only challenge common wisdom, they also back up their media equation with an impressive array of empirical support. The theory's intriguing predictions and evolutionary explanation should generate widespread discussion in academia.

Insights generated by the media equation have already proved valuable for computer hardware and software companies. Reeves and Nass were instrumental in developing the "personality" of Microsoft's Office 97 graphics, and Bill Gates' testimonial to the worth of their ideas is printed on the back cover of *The Media Equation*. Currently, the theorists serve as consultants to General Magic and Portico Products, working on voice recognition software. But the basic message of their work for the industry is that computers don't need artificial intelligence, natural language processing, or sophisticated pictorial representation to elicit a typical interpersonal response from the user. The media equation phenomenon plus a few simple lines of text are enough to do the trick.

Consumer advocates and scholars working from a critical tradition are much less enthusiastic about the implications of the media equation. That's because even while Reeves and Nass advise technicians on ways to enhance the human qualities of media, they hold out little hope that people can easily resist these interpersonal advances. The theorists say that *knowledge* of the media equation is only a limited defense, but they offer no other, and have yet to turn their considerable research skills to figuring out how protesters might inject a resistance variable into the media equation. A *HotWired* review focused on this "administrative" bias: "Describing research and analysis in a jolly-professor/prankish-hacker way gives *The Media Equation* a friendly personality, but make no mistake: This is clearly a book of magic, full of dark and dangerous spells to bring others under control. . . ."[30]

My concern with the media equation stems from a seemingly offhand comment mentioned only in a footnote of a Nass and Reeves journal article. In that note, the theorists acknowledge that they use a conception of *interpersonal communication* taken from social psychology rather than from the field of communication.[31] The difference is not trivial. Most social-psych research treats interpersonal communication as *one-way* communication, which is best studied within a stimulus-response paradigm. Conversely, most communication scholars define interpersonal communication as the *construction of shared meaning*, and they study the two-way flow of messages, which create common interpretations.

University of Iowa communication researcher Steve Duck uses his own equation metaphor to show how the two definitions of interpersonal communication affect similarity research. He says that people's perception of similarity is not based on the similarity of experience itself (*experience = events*); rather, it is founded on the similar construction of experience (*experience = subjective interpretation.*)[32] Duck writes that "talk about similarity is the place where similarity slides over from being an individual, perceptual object and becomes a social, relational action grounded in mutuality and jointly constructed interaction."[33]

Duck's analysis shows us that interpersonal similarity is much more complex than the mere matching of dominant or submissive personalities. In like manner, proxemic violations can't be measured with just a ruler, and credibility is still in the eye of the beholder. Reeves and Nass have obtained surprising and impressive results to support their contention that media effects parallel interpersonal effects. But until they show that the media equation works when applied to some of the shared meaning findings of constructivism, relational dialectics, or other complex interpersonal research programs, the media equation will seem more like a powerful metaphor than a mathematical certainty.

QUESTIONS TO SHARPEN YOUR FOCUS

1. The *media equation* states that our *responses to media* match how we *react in real life.* Since an equation is an *identity,* is it also true that our real-life responses match the way we react to media?

2. Given sufficient time and money, how might you prove or disprove the contention that the slow pace of *evolution* is the reason our *old brain* responds *socially and naturally* to media?

3. What experience have you had with *television, computers,* or other *new electronic media* that supports or contradicts the media equation? Why might Reeves and Nass discount your *testimony?*

4. How could media equation researchers design an *experiment* to discover whether people *create shared meaning* with a computer?

SELF-QUIZ

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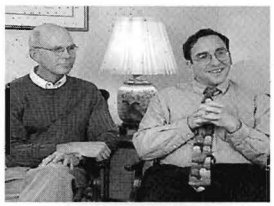
CONVERSATIONS



At the end of the interview, Byron Reeves and Cliff Nass acknowledge the personality differences that they bring to their theoretical collaboration. Reeves is measured in tone as he describes our interpersonal responses to new media. In contrast, Nass is audacious in what he says and how he says it. He insists that his job as a theorist is to push the media equation as hard as he can until the theory breaks. Both theorists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express surprise at the dramatic results of their experiments. "Something very strange is going on," Nass says, shaking his head in wonder. I had the same reaction to the unanticipated energy of our conversation.

A SECOND LOOK

Recommended resource: Byron Reeves and Clifford Nass, *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places*, Cambridge University Press, New York, 1996.

Computers as social actors: Clifford Nass and J. S. Steuer, "Voices, Boxes, and Sources of Messages: Computers and Social Actors," *Human Communication Research*, Vol. 19, 1993, pp. 504–527.

Evolutionary explanations for social phenomena: Benjamin Detenber and Byron Reeves, "A Bio-Informational Theory of Emotion: Motion and Image Size Effects on Viewers," *Journal of Communication*, Vol. 46, No. 3, 1996, pp. 66–84.

Interpersonal/media distance: Byron Reeves, Matthew Lombard, and Geetu Melwani, "Faces on the Screen: Pictures or Natural Experience?" paper presented to the International Communication Association, Miami, 1992.

User/media similarity and attraction: Youngme Moon and Clifford Nass, "How 'Real' Are Computer Personalities? Psychological Responses to Personality Types in Human-Computer Interaction," *Communication Research*, Vol. 23, 1996, pp. 651–674.

Media credibility: Clifford Nass, Byron Reeves, and Glenn Leshner, "Technology and Roles: A Tale of Two TVs," *Journal of Communication*, Vol. 46, No. 2, 1996, pp. 121–128.

Gendered media: Clifford Nass, Youngme Moon, and Nancy Green, "Are Machines Gender-Neutral? Gender Stereotypic Responses to Computers," *Journal of Applied Social Psychology*, Vol. 27, 1997, pp. 864–876.

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Mindlessness as an alternative explanation: Clifford Nass and Youngme Moon, "Machines and Mindlessness: Social Responses to Computers," *Journal of Social Issues*, Vol. 56, 2000, pp. 81–103.

Critique: Steve Duck, *Meaningful Relationships*, Sage, Thousand Oaks, CA, 1994, pp. 97–126.