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Towards a Theoretical Framework for Listening Fidelity Research

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Abstract

This paper presents a theories-based framework for expanding listening fidelity research among scholars in the human sciences. A brief history of listening fidelity development and related measurement issues is provided. A variety of social science areas are then identified that would gain significant insight when listening fidelity research is included with their dominant research and theoretical areas. Revision and expansion of the foundational propositional statements of the listening fidelity theoretical framework are presented and followed by suggestions for the expansion of listening fidelity research to include new and diverse communication situations and technologies.

Keywords: Listening fidelity, judgment accuracy, information processing, theoretical framework.

Powers and Witt (2008) proposed a model of communication fidelity (CF) containing source-oriented and receiver-oriented constructs called basic communication fidelity (BCF) and listening fidelity (LF), respectively. Specifically, BCF refers to the degree to which speakers are able to accurately convey their cognitions to listeners (Powers & Lowry, 1984). Similarly, LF indicates the extent to which listeners are able to reproduce the cognitions of speakers (Mulanax & Powers, 2001). That is, both BCF (Powers and Lowry, 1984) and LF (Mulanax and Powers, 2001) have been conceptually defined in terms of the degree of congruence of mental images held by sources and their receivers following any communication episode. Despite their similarities, each construct is distinct with BCF designated a source skill and LF regarded as a characteristic of receivers. Although previous CF research has focused largely on source-oriented phenomena, the role of LF in reducing misunderstandings in social and professional contexts around the world clearly merits further elaboration. The purpose of the current essay is to discuss the LF research paradigm, present the basic assumptions of the LF construct and to describe how studies of listening fidelity may be conducted within several emerging research paradigms. The paper will conclude with a discussion of how the LF construct may be expanded to include new technologies and diverse modalities of human communication.

Listening Fidelity as a Communication Research Paradigm

Components of Listening Fidelity

Among the more intriguing aspects of LF are its major components, namely, listening, communication events, and cognition. *Listening* can be defined as the interpretation and retention of auditory symbols, or alternatively the interpretation of auditory and visual symbols. Consequently, the argument that the concept of listening should be expanded to include auditory, visual, and textual symbols is conceptually sound. With the emergence of digital technologies that utilize multiple sensory channels, either singly or in combination, means that one may even include haptics as part of the listening thereby extending LF research to blind, hearing impaired and other disabled individuals. Consequently, exploring LF across sensory channels may be a challenging but ultimately valuable pursuit for listening scholars.

When investigating LF, the context of the *communication event* relative to listening must be identified along with other parameters. For example, some adjustments in perceptions of a single face-to-face interaction can occur later following a period of pondering and reflection. As a result, these alterations in point of view may increase or decrease communication fidelity and should be examined separate from the level of accuracy achieved during the initial period of communication activity—irrespective of what that might have been. Thus, measurement of LF must be fitted to the context and timeframe of the communication event.

Cognitions can also undergo change during the communication event itself. Multiple competing cognitions often arise from a single communication event either through internal decision-making or as a function of incongruous behaviors emitted during communication. Also, receivers may not have cognitions relative to some aspect of a speaker's behavior or generate incorrect cognitions while listening that result in a continuing series of erroneous cognitions—all within that single communication event.

Although the term cognition is defined as a "mental image," it would not be out of bounds to suggest in some cases multiple cognitions reflecting the same concept compete with each other for dominance. Under these conditions, mental images will evolve over time and be replaced as individuals attempt to rectify their inner perceptions with external realities. Because they are a fundamental aspect of LF, the manner in which the cognitions of the source and receiver are assessed is critical to measuring individual LF.

Measurement Issues

Since Mulanax and Powers (2001) proposed LF as an extension of BCF, scholars in this area have focused on developing a reliable and valid measurement of the construct. Communication fidelity is operationally defined as scores on a modified version of Brilhart's (1965) geometric forms test that Powers and Lowry (1984) adapted for use in interpersonal communication research. In this procedure, speakers describe a series of geometric forms to a group of receivers or judges. Each receiver's drawing is then compared against the original image for accuracy with the resultant score serving as an estimate of an individual's communication skill. To assess a speaker's communication fidelity, scores on the geometric forms test are averaged across all receivers for that speaker. Likewise, these procedures can be used to ascertain the decoding skills of receivers. That is, a video recording of a speaker describing a series of geometric forms is played to listeners who, in turn, attempt to represent the forms as a drawing. However, in this case the communication skill of the speaker has been established by a panel of experts who further certify that the stimulus presentation contains all the information necessary for an accurate reconstruction of the original drawing. Each individual's LF level is reflected by their score on the geometric forms comparison test. As described, these procedures represent examples of interpersonal judgment research (Rosenthal, 2005), in which one or more receivers attempt to infer or detect the states or cognitions of speakers as reflected by language and behavior. Judgment studies have been conducted in a variety of contexts including the behavioral manifestations of specific speaker states, such as speech anxiety (Finn, Sawyer, & Behnke, 2003), nonverbal communication (Davidenko, 2007), and clinical diagnoses (Shaner, Bring, & Strender, 2004). However, the vast majority of judgment studies have examined either the precision with which sources communicate themselves to others or the judgment accuracy (Rosenthal, 1987; Spengler, et al, 2009) of receivers, constructs analogous to BCF and LF, respectively.

In establishing its concurrent validity, LF was related to receiver apprehension but was not a function of potentially confounding variables such as gender, listening style or locus of control (Fitch-Hauser, Powers, Hansohn, & O'Brien, 2007). Powers and Bodie (2003) have recommended continued development of this measurement tool by establishing norms and a standardized cognitive stimulus that would allow investigation of an array of related variables. Fitch-Hauser and Powers (2006) further elaborated on the measurement of LF and proposed expanding it to include a variety of potentially fruitful lines of research including cognitive types, contexts, cultures, and languages. Fitch-Hauser and Powers (2008) have discussed cultural factors in some detail while incorporating numerous related areas into the concept of LF. For example, Powers, Cook, Fitch-Hauser, and Worthington (2008) reported that Anglo students had higher LF scores than students of Hispanic origin when the stimulus materials were presented in English. Differences such as these have clear implications for cultural and linguistic studies of effective listening when a second language is dominant.

By manipulating listening time, speed of speaker delivery, and word count, several versions of the communication fidelity measurement tool have been constructed representing low, moderate and high LF potential. As expected, the moderate difficulty version produced a more normal distribution than the High LF potential version with appropriate directionality of scores demonstrated for both measures. The low LF potential stimulus did yield lower mean accuracy scores than either the moderate or high LF versions. Both moderate and high LF measurement tools were correlated with dimensions of the Watson-Barker Listening Test

(Watson & Barker, 1988). The LF measurement procedures presents a valid and reliable measure that taps aspects of the listening construct not detected by other instruments.

Basic Assumptions of Listening Fidelity

Listening Skill and Human Development

As LF theory has evolved so, too, have assumptions about humans and their orientations toward communication and listening. For example, Powers and Witt (2008) describe the underpinnings of the broader construct of communication fidelity that have bearing specifically on LF theory. Over time, humans learn to interpret messages and make decisions that maximize self-perceived positives while minimizing self-perceived negatives (Higgins, 2000). As individuals mature, they realize that accurate interpretation of information is important in achieving those ends. Moreover, listeners learn that many messages are designed to create cognitions that only benefit the sender or otherwise misrepresent the speaker's true intentions. Similarly, because interpreting the messages of others is often influenced by a receiver's own self interest, maturing listeners conclude that their own interpretations may not accurately reflect what the source intended to convey. Factors such as these operate at some level within each communication event as part of the overarching goal to maximize positives and minimize negatives. Consequently, the ability to decode information accurately tends to increase with maturation and improves self-regulation.

Theories-based Propositions

Viewed through this developmental perspective, several basic propositional statements both summarize and drive research in LF. The following propositions revise and extend those previously discussed by Powers and Witt (2008). Several established theoretical perspectives were used in this process including attribution theory (Heider, 1958), cognitive complexity (O'Keefe & Sypher, 1981), action assembly theory (Greene, 1984), empathic accuracy (Ickes, 1993, 1997) (Ickes, Simpson, & Orina (2005), and Kenny's (1994) social relations model of interpersonal perception

> *Proposition 1: Listening fidelity is a function of the sensory and neurological capabilities of receivers. That is, greater information reception and processing resources held by receivers improves the potential for achieving high listening fidelity.*

From this perspective, information processing capabilities include visual and auditory acuity, normal neurological transmission, memory, and rational decision-making.

> *Proposition 2: Listening fidelity is a function of the receiver's awareness of the socio-cultural, relational, and contextual factors influencing the source and the communication event. Hence, the more receives are aware of these elements during communication, the greater the potential for achieving high listening fidelity.*

Factors such as the language, cultural, socio-relational, geographical, affective, and temporal knowledge and environments within which communication takes place (e.g. Hall, 1976) impacts LF.

> *Proposition 3: Listening fidelity is a function of the receiver's knowledge and predispositions relative to the target and the target's cognition. Conversely, the potential for listening fidelity diminishes in communication events involving new acquaintances or when conversation topics or concepts are unfamiliar to the receiver.*

The more that is known about a source and topic, the more likely a receiver is to accurately reproduce the cognitions of the source. Likewise, knowing another's predisposition relative to the topic under discussion allows receivers to more appropriately interpret emotional or abstract cognitions. The converse is also presumed in the following proposition.

> *Proposition 4: Listening fidelity is enhanced when listeners receive messages compatible with their knowledge base and communicating style. Thus, listening fidelity is greater when the message contains signals and symbols consistent with the recipient's cognitive framework and knowledge of denotative and connotative meanings. The use of unfamiliar concepts and/or unfamiliar language will reduce the listening fidelity of a communication event.*

Fifth, this last proposition stems from the realization that effort and arousal fluctuate from moment-to-moment.

> *Proposition 5: Listening fidelity is a function of motivational resources, including vigilance and the effort necessary to accurately reproduce and retain source cognitions. Thus, the more adaptively motivation is applied, the greater the potential for high communication fidelity.*

An underlying component of motivation is arousal or physiological activation (VaezMousavi, Barry, Rushby, & Clarke, 2007). That is, in addition to the intention to listen effectively or pay attention, motivation involves physiological reactions that promote heightened awareness or vigilance of listeners. In the majority of cases this means an increase in arousal when compared to baseline or resting conditions. Specifically, optimum performance generally occurs at moderate levels of arousal with lower performance expected at the extreme ends of the activation continuum (Watters, Martin, & Schreter, 1997). One possible explanation for this phenomenon is that low levels of arousal do not adequately support listening performance while high arousal cannot be sustained over time, particularly when the task is difficult. Thus, based on the well-established inverted-U shaped function of performance and arousal (Yerkes & Dodson, 2007), the prospects for LF will be enhanced when the motivational resources of the recipient, such as arousal, are sufficient and appropriately allocated for information processing tasks.

New Frontiers of Listening Fidelity Research

Although each of the preceding propositions play a role in LF, the most critical of these appear to be associated with physiological and cognitive processing skills followed closely by motivation to achieve high fidelity. Coincidentally, other social scientists have begun to explore similar research agendas that dovetail with LF concepts and methods. Of particular note is the work of scholars in such diverse fields as behavioral genetics, family studies, gerontology, medicine, and interpersonal communication. The following section describes how each of these social science areas would gain significant insight from the inclusion of LF research with their mainstream efforts.

Developmental and Family Studies of Listening Fidelity

Listening fidelity is a function of individual differences in cognitive ability that likely result from developmental processes and gene-environment interactions. About forty percent of human cognitive abilities (Jensen, 1998), such as intelligence (Plomin, 2003) and speed of information processing (Vernon, 1989), are inherited. Recently, Schrodt and his associates have proposed that family communication patterns also shape the course of mental, emotional, and social development including sense of well-being (Schrodt & Ledbetter, 2007), communication competence (Schrodt, Ledbetter, Jernberg, Larson, Brown, & Glonek, 2009), and information processing ability (Schrodt, Witt, & Messersmith, 2008). Reported effect sizes for these studies

are considerably lower than for those involving heritability. Taken together, however, these findings are consistent with those of behavior geneticists who frequently observe that the impact of genes outweighs that of shared environments such as families. Because a substantial proportion of variation in human behavioral traits is neither solely the function of genetics nor environment (Turkheimer, 2004), many individual differences in human information processing stem from so called *gene-environment interactions* (North & Martin, 2008) that occur throughout the lifespan.

Cognitive abilities related to communication have been examined through the study of twins reared together and those reared apart. Beatty and his fellow researchers (Beatty, Heisel, Hall, Levine, & LaFrance, 2002; Beatty, Marshall, & Rudd, 2001) have shown how the study of twins often reveals the developmental processes that affect communication. In these studies, pairs of fraternal (dizygotic) and identical (monozygotic) twins are identified and further classified as having been reared in the same home environment or reared apart. Measures are taken on the variables of interest for each pair of twins and variances attributable to heritability and environment (shared versus non-shared) are then computed. Similar to studies of other cognitive abilities, measuring LF among twins would reveal the degree to which home environment influences listening skill versus that of genetic inheritance. For example, a finding that twins who are reared together have higher LF than those reared apart would further support the Schrodt team's contention that shared family environment promotes the development of mental ability. Additionally, a comparison of LF across types of family communication patterns would provide greater insights into how experiences in the home help to shape communication skill. Consequently, LF should be great interest to family communication scholars and others studying the development of individual differences in cognitive ability.

Gerontology and Allied Medical Studies of Communication

Listening fidelity is a function of the sensory and neurological capacities of receivers. Listening can be defined as the interpretation and retention of auditory and visual symbols. Thus, listening relies on the senses of sight and hearing that in turn depend on the structure and functioning of the human nervous system. No behavior or cognition can occur without nervous system activity. Accounting for this principle, which has been called *nervism* (Strelau, Angleitner, & Newberry, 1999), further implies that impairment of one or more senses may reflect diminished capacity of or injury to the nervous system. In many cases, these reduced capabilities have consequences for human communication, such as receiving ability. Obvious examples of this idea include normal loss of hearing or visual acuity with advancing age. That is, one should reasonably expect aged listeners to present lower LF scores than their younger adult counterparts. Just as LF should increase with maturation from childhood through adolescence, decreases in listening ability should be detectable in elderly adults due to physical changes in the sense organs. However, more profound conditions could be examined in light of LF.

Language processing and visual stimuli are distributed throughout both hemispheres of the neocortex (Clarke & Zaidel, 1994). Among individuals with normal brain function, words and images flow seamlessly back and forth through the *corpus callosum*, a nerve conduit linking left and right hemispheres that facilitates information processing. Performance on the LF geometric forms comparison test involves both language and visual stimuli. As a result, LF necessarily requires activity in both cerebral hemispheres and the corpus callosum. In some clinical populations this pathway has been damaged or surgically severed as a treatment for uncontrolled epileptic seizures. Because research among these affected populations is vital to understanding how to improve their quality of life, studies of listening fidelity with brain

damaged patients would be fundable under a number of current National Institutes of Health grant programs (www.ninds.nih.gov). Thus, LF research should be of interest to scholars in a variety of allied medical fields including gerontology and neurology, in addition to communication.

Social Relations Analysis of Listening Fidelity

Listening fidelity is affected by the relational dynamics that exist between speakers and listeners. Fifty years ago, Laing (1960) published his tour de force work, *The Divided Self*, in which he examined the various dimensions or facets through which one may perceive self and others and the effects of these perceptions on mental well being. His treatise, which influenced a generation of scholars and psychotherapists, raised the problem of reciprocity in interpersonal relationships, such as, 'does smiling more at others mean that others will smile more in return'? Reciprocity of this type is a potential confounding variable for all interpersonal communication research, including listening, and leaves many vital questions unanswered. Specifically, to what extent is the listening fidelity of particular individuals a function of the BCF of those speakers with whom they interact? Conversely, do speakers have higher levels of BCF with high LF conversation partners than they do with low LF partners? Depending on the answers offered for each, how might one disentangle listening and speaking competence to gain a clear picture of interpersonal communication? The inability to accomplish this task inevitably weakens the confidence scholars might place in any study of communication within dyads. Of course, continued use of the standard geometric forms test mitigates this issue, at least until studies of LF in actual dyads begin to emerge. Brilhart (1965) reported only weak correlations between speaking and listening skills as tapped by the geometric forms test.

Kenny's (Kenny & Nasby, 1980; Miller & Kenny, 1986) social relations model was advanced as an answer to the problem of reciprocity among conversation partners. To accomplish this, participants are assigned to have conversations on at least two occasions with each of several conversation partners. Measurements are taken on every occasion that a dyad interacts and these data are arranged in a Person x Person matrix. Row, column, and cell variances are then used respectively to estimate actor, partner, and relationship effects on variables of interest. Likewise, in a social relations analysis of LF, participants would alternatively explain a series of geometric forms to conversation partners and receive similar instructions from others. The resulting data analysis could well answer many of the issues raised by Powers and Witt (2008) including identifying the specific cognitive and information processing skills that affect LF and BCF, understanding the role of skills development in LF, and the correlation of communication fidelity with variables such as motivation, immediacy, homophily, and communication apprehension. Social relations analyses accommodate round robin, block, half-block and nested designs and the large number of studies using Kenny's methods have proved the usefulness of this approach in a number of fields, including communication (Bonito, 2006; Sawyer & Behnke, 1996). Consequently, studies of LF should be of interest to interpersonal scholars, especially those who prefer to conduct experiments collect direct observations within dyads.

Expanding the Listening Fidelity Construct

There are other associated factors and issues that have emerged recently and portend new directions for future thinking and research. For example, although cognitions have been identified as "concrete" and "abstract," a better classification scheme might result from the role that particular cognitions play in LF. That is, constructing a category system for cognitions based on the individual differences of listeners. For example, little is known of the impact of human

factors such as cautious appraisal, suspicion, and maturation upon LF. What factors drive individuals to increase or decrease their levels of caution or suspiciousness of others? How might these situations, conditions, personality traits, and even mere maturation affect LF over time? Establishing measurement tools for each additional application and area relative to the cognitive classification is a primary consideration preceding research into each area. Once the measurement issues are resolved, work can proceed on hypothesis-testing and question explorations in and across various contexts and delivery methods. Furthermore, the stability of the five propositions require further examination as well as the means to impact development of individual LF skills in the various contexts.

Measurement metrics and processes may alter as a function of newly developed technologies. The means of "delivery" of the message may play an important role; even more so with the advances in communication technology. For example, we now have at least the following message delivery means:

- Audio Only—Electronic via radio, web connection, cell phone or land-line telephone.
- Audio Only—Face-to-face.
- Audio/Visual—Electronic via web video conferencing, television, cell-phone.
- Audio/Visual—Face-to-face.
- Visual Only—Electronic and face-to-face with language symbols (e.g. sign language for the deaf).
- Print/Visual Only—Paper means via letters, newspapers, magazines, etc.
- Print/Visual Only—Digital via Web pages, text messages, television under scrolls, etc.
- Haptic Only—Blind and deaf receivers who process incoming information via haptic codes

Language and other linguistic elements should also become primary research targets, particularly when considered within the dynamics of cultural-bound communication systems. The goal here would be to improve lower levels of LF potentials that are bound by language and culture. Ultimately, advances of this type would be implemented in lower levels thereby improving elementary and secondary education. Similarly, context may play a role in LF. For example, it would be wise to generate knowledge related to LF across a wide variety of specific contexts to produce a summative indicator of an individual's general or overall LF.

The following areas are likely focal points for further LF research in line with those established within the communication fidelity theoretical framework (Powers & Witt (2008):

- Development of new measurement methodologies and technologies that provide accurate access to cognitions within various classifications and typologies.
- New operationalizations of both concrete and abstract cognitions beyond geometric figures and self-image cognitions.
- Exploration of the role of conscious and non-conscious cognitions as well as one's intent to receive and interpret communicative behaviors.
- Examination of simultaneous, multiple cognitions and dynamically evolving cognitions.
- Investigation of the degree of LF needed under different circumstances to successfully accomplish specific goals.
- Identification of specific cognitive and information processing skills that affect an individual's potential to achieve the level of LF required for a successful communication event.

- Evaluation of the role of skills development in communication events across differing physical environments, purposes, number of participants, and participant characteristics.
- Evaluation of the interaction orientation and skills of receivers in communication event contexts where the opportunity to use those skills play a role in the ultimate development of the receiver's final cognition.

Finally, the future researchers may expand the LF construct by developing criteria for selecting participants for studies of specific communication events. Likewise, examination of factors such as multitude of behaviors involved in message creation and delivery, simultaneous nature of such behaviors, clarity for identification of specific auditory and visual and textual symbols, speed of message delivery, information processing speed, and other factors related to potential information overload. Correlations between CF and other communication-oriented variables such as motivation, clarity, immediacy, apprehension, and homophily would be of interest to communication scholars and those in other areas of academic study, as well.

Conclusion

Previous research has not established whether the basic LF theoretical assumptions operate independently or conjunctively (Powers & Witt, 2008). A related issue for future researchers pertains to the extent that the preceding propositions suggest additive or multiplicative or interactive models of LF. Recent advances in structural equation modeling combined with creative research designs specifically adapted for dyads should provide a fruitful line of research (Kenny, Kashy, & Cook, 2006). Future research will shed light upon the significance of each proposition and its power to explain and predict LF outcomes under varying experimental conditions.

Once a solid foundation for generating LF knowledge has been established, advances in theory and research can be best obtained through the development of a unique coordinated team approach. For example, merely establishing a LF Website area may well provide the clearing house whereby like-minded scholars comment on research findings, recommend directions for future research, and discuss the emerging issues of the field. Likewise, the website could further stimulate LF research by providing a means for accumulating findings and making datasets available to colleagues.

Research and theoretical developments that cross over the traditional boundaries of social science disciplines will greatly expand knowledge of the LF construct. For example, a recent study published in the *Proceedings of the National Academy of Science* reveals that similar patterns of brain activity between speakers and listeners occur during successful communication (Stephens, Silbert, & Hassom, 2010). As this technology is further developed, the potential to reach further into comparisons of speaker-listener cognitions without the utilization of language descriptors will emerge. It is clear that combining the knowledge and perspective of psychologists, sociologists, semanticists, linguists, physiologists, communication researchers, and other professionals associated with understanding human symbolic communication will advance understanding of the listening fidelity processes. This understanding will ultimately be transformed into pragmatic applications that will impact misunderstandings around the world. The scope of LF research is bounded only by the imagination of scholars determined to promote human understanding especially in times such as these in which clarity is most critical.

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