ON THE ORIGIN OF NONVERBAL SIGNALS OF TRUSTWORTHINESS: A MARKETING PERSPECTIVE

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ABSTRACT

Nonverbal signals are reliable. Sales signals lead to positive trustworthiness assessment. It appears nonverbal signals are part of an ESS system. Signals of positive intent are beyond conscious control of salespeople. When salespeople believe in their messaging, buyers will perceive reliable intent and trust the salesperson.

INTRODUCTION

Interesting techniques and instruments from the sub-discipline of neuro-marketing have not only provided new measures of human decision making including buyer behavior but have also revealed phenomena that had not previously been seen as important to marketing. Studies have found areas of the brain associated with product choice, celebrity endorsements, judgments about credibility assessments, brand awareness and assessments, and the perception as well as effectiveness of warning labels (for recent reviews see (Morin 2011, Fortunato and Giraldi 2014)). Neuromarketing results are emphasizing the importance of topics such as the physiology of the brain, the functionality of neurotransmitters, and the influence of hormones on buyer behavior (Lindstrom 2008). And while the outcomes of these research studies are often fascinating and thought provoking, the implications have been limited. A limitation that some have observed as being tied to these study's lack of frameworks that explain the observed results (Morin 2011).

One could argue that nowhere is this more evident than in the neuromarketing research related to professional sales. There is a building body of evidence that the outcomes of interpersonal communications in general and professional sales in particular are reliant upon more than the verbal exchange. Nonverbal expressions and movements have long history of being important in interpersonal communications. Recent findings in neuroscience suggest an even more critical role. Research indicates that a variety of nonverbal signals activate several areas in the brain (Rilling et al. 2002; Tomlin et al. 2007). Research finds that some specific nonverbal signals such as body movements (Bonda et al. 1996) or facial expression (Puce et al. 2003) activate areas of the brain associated with automatic or non-conscious processing. Other research directly links such activations to critical components of professional sales such as trustworthiness assessments (Winston et al. 2002). However, as is the case of other neuromarketing results, little insight exists into why these activations occur.

There is a need for a framework explaining why such nonverbal cues exist and why they influence important components of professional sales such as trustworthiness assessments. We suggest that the interpersonal buyer-seller context can provide unique insights for all social sciences into the theoretical foundation of why this signaling system exists. Evidence suggests this ability to non-consciously perceive and interpret intent behind nonverbal displays may not be a learned capability (Bolton 1993). Rather, humans may be 'hardwired' to detect and instantaneously interpret nonverbal signals displayed in an interpersonal exchange. The presence of these abilities in humans suggests nonverbal displays or micro-behavioral cues are part of an evolutionarily stable signaling (ESS) system (Searcy and Nowicki 2005).

This paper offers a possible explanation for the existence of an evolutionarily stable signaling (ESS) system in humans. Further, the paper examines the implications of such a system in the professional sales context. Then, this study reports the results of a test of the existence of the ESS system in a professional sales context in an experimental setting. Implications for professional sales training and sales management are at the conclusion of the paper.

CONCEPTUAL BACKGROUND

Evolutionarily Stable Signaling (ESS) Systems

The existence of correlation of nonverbal cues and brain activation is not sufficient evidence to indicate an ESS system exists in humans.The additional condition in the evolutionary biological view of signaling systems is presence of the concept of reliability. Reliability of the signal depends upon the correspondence of the meaning of the signal matching the intent of the sender. While much of the research about ESS systems focuses on animal communication, the most basic ESS model (known as the Sir Phillip Sydney (SPS) game) (Maynard 1991), develops out of human interaction. In a professional sales context the salesperson's verbal information is often judged as reliable if the nonverbal signals indicate positive intent towards the buyer.

In this model's conceptualization, a signal is reliable if the display consistently correlates with an attribute of the signaler and the receiver benefits from awareness of that attribute (Searcy and Nowicki 2005). In these models it is not necessary that the attribute or need be positive. Reliable signals of negative attributes can lead to avoidance, which may also have positive consequences for one or both parties.

Within the ESS system's evolutionary and biological framework the emphasis is upon verbal and/or nonverbal signaling between individuals. The central element to the stability of such systems is the reliability of the signals with no presumption made of conscious intention. However, inherent in much of the economic, financial, and organizational frameworks of signaling theory is the conscious or deliberate intent existing behind the signal. As will be seen, this paper relies on automatic nonverbal signals that salespeople non-consciously generate. These signals and cues occur without conscious intent. This unintentionality behind the signal coupled with the automatic nature of the signal generation suggests why we build a framework specifically around ESS systems.

Returning to the Sir Phillip Sydney (SPS) model, a series of theorists took the potential outcomes from this story and modeled other potential fitness results. From this simple model, a progression of signaling models have developed with additional complications introduced such as the potential for conflict of interests and/or the possibility of deceit (for a review see Searcy and Nowicki 2005). As with the original model, the goal of these models is to determine the level of reliability needed to sustain the signaling system over an evolutionarily relevant period. Multiple findings indicate that sustainability of any system can be demonstrated when the display is "honest on average" (Johnstone and Grafen 1993). The term "honest on average" means that ESS system will have reliable signals often enough (even with deceit) that the signal's receivers benefit more than half the time by assessing the signals. However, not all signaling systems are necessarily evolutionarily stable. Research in animal signaling systems indicates that stability needs three crucial elements; signals that reliably transmit 'true' characteristics or intent, receiver perception and judgment about the display, and the signal has relevance to fitness (Searcy and Nowicki 2005).

ESS System based on Nonverbal Cues in Professional Sales

Extensive work since the 1960s indicates the generation of nonverbal cues is automatic and beyond conscious controls (Ekman et al. 1991). Felt' smiles that match (correlate) with positive intent cannot be feigned (Ekman, Friesen et al. 1988). Reliable salesperson's smiles occur automatically when positive intent is genuinely felt. Similarly, the expression of contempt reliably signals the sender's feelings of superiority over the receiver. However, the displays of such expressions, though they are reliable, are not sufficient to establish the existence of an ESS system. The system needs reinforcing by the receiver/buyer attending to the cues with benefits to the receiver accruing more often than not by acting on the display.

That a person or a salesperson's smile leads to trustworthy assessments fits nicely into the benefit accrual necessity (Winston, Strange et al. 2002, Wood, Boles et al. 2008). According to views of evolutionary psychology, a rapid capability to assess trustworthiness that maximizes exchange outcomes could increase survivability through cooperation (Boone and Buck 2003). Reliable signals and accurate assessments increase the likelihood of these exchanges occurring, thus rewarding the inherent ability to assess accurately a partner's trustworthiness. Further, research shows these types of signals are important in the interpersonal exchanges between buyers and sellers (Wood 2006).

As a further indication of the existence of this system and its reinforcement, there is some additional research into neural structures around nonverbal signals and trustworthy assessments. Evidence from research around nonverbal signals strongly indicates that brain activations after perceptual exposure are: rapid, automatic, consistent across situations, (Rilling, Gutman et al. 2002, Heberlein and Adolphs 2004), and inherent rather than developed. Exposure to first encounter stimuli such as facial form, eye and mouth movement (Puce, Allison et al. 1998, Puce, Syngeniotis et al. 2003) as well as body movement (Bonda, Petrides et al. 1996) activate the amygdala as well as various other areas of the brain. Research strongly supports the amygdala's involvement in social judgments (c.f. (Rilling, Gutman et al. 2002) such as trustworthiness assessments (Winston, Strange et al. 2002, Grezes, Frith et al. 2004).

We suggest this recent evidence (particularly biochemical evidence) about assessment processes suggests support for the proposed existence of the ESS system around nonverbal signals in the buyer/seller exchange. The neuro-physiological structures of humans suggest a capability to attend to these nonverbal signals. It appears likely that this capability developed over generations from the evolutionary outcomes of the complex process of nonverbal signal generation, signal perception, and correct interpretation of the signaler's intentions. However, additional empirical evidence of the 'on average' correlation between signal and assessment would bolster the ESS system argument.

RESEARCH DESIGN, OUTCOMES, AND DISCUSSION

Hypothesis Development

Under the ESS system framework as proposed, the displays of a reliable smile should prime the subjects into using associative activation. Associative activation is part of the system 1 processing suggested by Kahneman. System 1 should be rapid and automatic leading to low response times. The facial display without expression (neutral) should not have led to associative activation. The processing of this display should have fallen into the system 2 processing. System 2 is slow with elaboration leading to higher response times.

H1: Subjects viewing the face with a reliable smile will have lower response times compared to subjects viewing the face with the neutral expression.

The suggestion that a 'felt' smile and a contempt expression are perceptually similar is the result of each incorporating the zygomaticus major muscle in the automatic generation of the display (Ekman 1985). The difference in displays seems centered on the symmetry across the face of the muscle movements in a display of the genuine 'felt' smile versus only one side of the face showing muscular movement in the contempt expression. Additionally, the angle of lip display is different in contempt expressions with the activation of the buccintor muscle (Ekman, Friesen et al. 1988). Perceptually, these two displays often are not consciously distinguishable by untrained observers (Ekman 1996, Ekman, O'Sullivan et al. 1999).

Exposure to the display of contempt should prime the subjects into using associative activation. Processing should be rapid, as this should activate System 1. The neutral expressions are processed in System 2. These differences are tested in the following:

H2: Subjects viewing the face with a contempt expression will have lower response times compared to subjects viewing the face with the neutral expression.

Previous research has found that the base state of subjects when informed they are dealing with a stranger is one of anxiety and inhibition (Duranto, Nishida et al. 2005). However, also according to previous research, when the subject perceives a positive cue, such as a reliable smile, that indicates positive intentions, the neurotransmitter oxytocin is released (Kirsch 2005; Zak 2005). Oxytocin release results in lower levels of anxiety and in some instances has increased feelings of comfort. If the release of oxytocin is accompanied by the subsequent release of dopamine, then feelings of happiness and pleasure also rise. Upon reflection and in this positive state, the subjects should articulate positive trustworthiness assessments of the stimuli exhibiting a reliable smile.

H3: Subjects viewing the face with a reliable smile will have higher trustworthiness assessments compared to subjects viewing the face with the neutral expression.

The result of being exposed to contempt expressions should lead to a negative assessment of the sender. The similarity of the cues, smile and contempt, likely will have opposite effects on judgments of trustworthiness. The cognitive trustworthy assessment of the sender should be lower.

H4: Subjects viewing the face with the contempt expression will have lower trustworthiness assessment compared to subjects viewing the face with the neutral expression.

The mathematical models of ESS systems all rely upon the assumption that on average the display, reception, and interpretation results in better than half accuracy. The consistent inability or unwillingness of the receiver to attend to the display will ultimately lead to the elimination of the displays. Likewise, the incorrect interpretation and assessment of reliable signals can lead to instability. The presence of positive signals with positive intent that consistently lead to the receiver inferring negative intent will eventually eliminate the signal.

The number of subjects that assessed the smile as trustworthy along with the subjects that assessed the contempt display as untrustworthy is calculated. The proportion of 'correct' assessments should be better than fifty percent to meet the '"honest on average" criteria. Evidence of this "honest on average" provides support for the existence of a stable ESS system. We look for this evidence in the test the following hypothesis.

H5: The proportion of subjects correctly identifying the intent of the signal should be significantly larger than fifty percent.

Research Design

Previous research into sales, nonverbal displays, and outcomes has had mixed results (Leigh and Summers 2002). It appears that the reliability or genuineness of the nonverbal display is essential. Feigned displays or acted role-plays likely confound outcomes. For instance, the use of video displays, where actors or participants consciously create the various nonverbal signals, would inevitably lead to feigned displays. Interpretations of feigned displays are automatic and subjects would deem the signaler as unreliable.

To overcome the unreliability of such displays, we follow the suggestion of Winston et al. (2002 p. 281) and rely upon static stimuli. This study reports on the subject's responses to a face displaying a genuine 'felt' smile, a neutral expression, or a contempt expression. The facial displays are part of the set of standard expressions as validated by the facial activation coding system (FACS) (Ekman and Friesen 1978). To bridge the neuroscience and cognitive judgment gap, we will simultaneously capture subject's cognitive responses on a trustworthiness scale and their response time as indicative of their neurological processing speed.

The associative activation processing provides some additional explanation on how the ESS system would work in the professional sales context. It appears that smiles or negative expressions such as contempt serve as primes (Bargh and Chartrand 1999, Bargh, Gollwitzer et al. 2001). Primes are external factors that can have a direct influence on judgment and behavior. The nonverbal cues create non-conscious brain processes that lead to quick, automatic, and effortless assessments. This brain process is known as associative activation (Bargh, Chaiken et al. 1992). The cues, both positive and negative, will lead to rapid responses.

Using an experimental design, subjects view to one of three treatments consisting of static views of facial expressions of emotion. After completing the informed consent, participants view the color static displays on the computer monitor. Each participant used the same computer and monitor which was outfitted with DirectRT (2006) response time measurement software. DirectRT uses ActiveX control to eliminate random response error typically associated with other measurement software and measures responses to the nearest millisecond.

The computer software randomly assigned the one hundred eleven participants (60 females and 51 males) who came from the undergraduate student body of a mid-atlantic university to one of the three treatments. The displays were from the FACS system (Ekman 1999). The subjects saw a reliable smile, a reliable contempt expression, or a neutral expression. There were eight facial displays for smile, contempt, and neutral with those randomly distributed across gender of subject and facial display.

The experiment began with a series of seven questions to familiarize the subject with using the keyboard to enter their responses. The seventh calibrating question was followed by the facial display. This display was on the monitor for one second. Following the facial expression display there were four trustworthiness questions with a likert-type response anchored by 1 strongly disagree and 7 strongly agree. The measures of trustworthiness came from a meta-analysis of trust and trustworthiness measures used in the sales literature (Wood, Boles et al. 2008). In addition to the cognitive response measures, response times wererecorded for: reading time of instructions, practice questions, length of time spent reading the scenario, and answering the four items measuring trustworthiness. Response time to the manipulation check was also recorded. The length of time reading did not vary significantly across subjects when tested by subjects' responses times.

Results and Analysis

The four items indicating Trustworthiness has a Cronbach α of .905, which indicates a high level of internal reliability. The overall test of the response time measures are significant with $F_{(2, 110)} = 8.55$; $p < .000$. The mean of the response time for the four trustworthiness assessment items in the smile treatment is 1614 milliseconds. The contempt treatment has a mean response time of 1917 milliseconds for completing the assessment items. The mean response time for assessment of the neutral expression is 2440 milliseconds. Both smile and contempt expressions are significant faster on assessment time compared to the neutral expression.

The next phase of the analysis is the examination of the cognitive response of trustworthiness assessments. The smile treatment mean rating of 4.8 for the average of the four assessment items, with the neutral treatment at 4.2 and the contempt

expression rated the lowest on the trustworthiness scale at 4.0. As predicted the smile condition has a significantly higher rating than the neutral expression. However, while the contempt expression is significantly different from the smile treatment, it is not significantly lower than the neutral expression.

The final test of the ESS model was the proportion of correct interpretations of the signals. Neutral expressions were excluded from this analysis, as there is no display to interpret. That left sixty-nine subject to assess for correct interpretations. Forty seven (47) subjects across both smile and contempt correctly interpreted the trustworthiness implications of the signal. Correct interpretation was above or below the mean as appropriate. This number represents slightly over 68% of subjects assessing the signal correctly. The standard of "honest on average" indicates better than one-half of the receivers need to attend to and correctly interpret the signal. The calculated t-statistic of 5.00 $p < .000$ indicates that this sample's proportion of correct interpretations is greater than the stable threshold.

Statistically significant results all support Hypotheses one, three, four, and five. Though Hypothesis two does not indicate statistical significance between neutral displays and contempt displays on the cognitive trustworthy assessments, this could be a result specific to the sample. The direction of the difference is correct. There is a significant difference between the trustworthiness assessments of smile and contempt displays though this was not specifically part of the original set of hypotheses. Overall, the results support of the proposed ESS system.

Discussion

To the best of the authors' knowledge, this is the first study to suggest an explanatory framework around some of the emerging outcomes of neuro-marketing. While current research suggests in professional sales that there are signals that correlate with trustworthiness assessments and brain activation, these results of been more of about reporting the phenomena and come without explanation. This study provides indications that an ESS system may underlie the relationship between nonverbal displays and trustworthiness assessments. This research suggests that nonverbal displays may go beyond being signals of affect and may rather be signals of intent. It seems likely that the stability of the signaling system is an outcome of the reliability of the display as it relates to trustworthiness intentions of the displayer. Such a system of displays offers both sender and receiver information that would facilitate cooperation and other beneficial information (Gibson 1979).

The existences of these nonverbal signals have two important implications for professional sales and sales management. First, the reliable signal only is generated by salespeople with committed beliefs. A salesperson discussing or promoting an offering to the customer is not likely to generate genuine 'felt' (or in the biological sense positive signals) displays without committed belief in the offer. The resulting feigned displays may undermine any verbal discussion. Even more challenging would be feelings of disdain or contempt about the offer or the customer. The resultant negative nonverbal displays (which are automatically generated and cannot be masked) would likely undermine the conversation.

The implication for management is clear. Existing or new product launches must gain the commitment of the sales force. The evidence is clear that underlying the expressed and cognitively aware conversation is an undercurrent of automatic and non-conscious generation of displays. This is followed by the buyers' processing and assessment of these nonverbal displays. If discordance exists between the verbal message and nonverbal intent, then that discordance will likely hinder buyer commitment. While the ESS system models allow for some short-term success with masked or feigned responses, the foundational need of "honest on average" suggests the highest return comes from investing effort and time in gaining the commitment of the sales force.

The other implication for management builds out of the underlying assumptions and descriptions of human interactions. These may be incomplete or even inaccurate attempts to articulate assessments. Assements that have their roots in the automatic processing of nonverbal displays. As an example of the difficulty associated with articulating complex judgments, consider the concepts surrounding trust and trustworthiness. The question could be asked about where this idea of trust developing over time originated. It is possible that when trying to ascertain how trust is known that the translation from an automatic and non-conscious awareness based on a nonverbal displays to a conscious articulation created an elaboration based more on a desire for internal cohesiveness of a self-image of rational cognition than an ability to accept, "I just know their trustworthy."

In the case of trust this 'mistranslation' could have led to the plethora of conceptualizations of trust. The inability to articulate non-conscious processing could explain the numerous antecedents and related constructs that have been associated with trust. We suggest all this confusion might be related to a lack of understanding of the fundamental influence of reliable nonverbal

displays on buyer seller interactions. Further, it is possible that some of these same issues exist with other nonverbal displays and the intent they may be signaling.

LIMITATIONS AND FUTURE DIRECTION

As with any experiment, study results are limited by the delicate balance between controlling error and achieving generalizability. Clearly, the study is not a full representation of a salespersons interaction. The treatments leave out many other nonverbal cues as well as any verbal interaction. Future research that can incorporate more realism while overcoming the challenges of feigned displays would help extend the research. Also additional automatic nonverbal cues should be studied. The cues manipulated in each experiment did have a basis in existing literature, these displays only represent one of a set of possible nonverbal signals that may influence buyer assessments. Likability or similarity assessments may trigger trustworthiness.

The use of static display of the facial action coding system (FACS) (Ekman and Friesen 1978) can be viewed as a limitation. Using standardized images limits some error by controlling for unequal displays. Since it is likely a signaling system exists during buyer seller exchanges, a series of experiments using reliable videotaped displays might enhance our understanding of such a system. Developing such a recording would be challenging and would need substantial verification that the displays recorded were objectively reliable.

Future research should also further examine physiological responses to trustworthiness signals. For example, will subjects exposed to positive signals demonstrate increases in oxytocin as opposed to those exposed to alternative signals? Examining areas of the brain that activate during exposure to positive and negative signals may provide additional insight. Further exploring what all automatically generated signals afford would deepen our understanding of the evolutionary roots of all communications.

REFERENCES

(2006). DirectRT v2006.2. New York, Empirisoft Corporation: Response Time Software.

Bargh, J. A., S. Chaiken, R. Govender and F. Pratto (1992). "The Generality of the Automatic Attitude Activation Effect." *Journal of Personality and Social Psychology* 62(6): 893-912.

Bargh, J., P. M. Gollwitzer, A.Lee-Chai, K. Barndollar 7 R. Trotschel (2001)."The Automated Will: Nonconscious Activation and Pursuit of Behavioral Goals." *Journal of Personality and Social Psychology* 81(6): 1014-1027.

Bonda, E., M. Petrides, D. Ostry and A. Evans (1996). "Specific Involvement of Human Parietal Systmes and the Amygdala in the Perception of Biological Motion." *The Journal of Neuroscience* 16(11): 3737-3744.

Boone, R. T. and R. Buck (2003). "Emotional Expressivity and Trustworthiness: The Role of Nonverbal Behavior in the Evolution of Cooperation." *Journal of Nonverbal Behavior* 27(3): 163-182.

Duranto, P. M., T. Nishida and S.-i. Nakayama (2005). "Uncertainty, Anxiety, and Avoidance in Communications with Strangers." *International Journal of Intercultural Relations* 29: 549-560.

Ekman, P. and W. V. Friesen (1978). *Facial Action Coding System: A Technique for the Measurement of Facial Movement*. Palo Alto, Calif.. , Consulting Psychologists Press.

Fortunato, V. C. R. and J. d. M. E. Giraldi (2014). "A Review of Studies on Neuromarketing: Practical Results, Techniques, Contributions and Limitations " *Journal of Management Research* 6(2): 201-220.

Gibson, J. J. (1979). *The Ecological Approach to Visual Perception*. Boston, Houghton Mifflin Company.

Grezes, J., C. Frith and R. E. Passingham (2004). "Brain Mechanisms for Inferring Deceit in the Actions of Others." *Journal of Neuroscience* 24(24): 5500-5505.

Heberlein, A. S. and R. Adolphs (2004). "Impaired Spontaneous Anthromorphizing Despite Intact Perception and Social Knowledge." *PNAS* 101: 7487-7491.

Johnstone, R. A. and A. Grafen (1993). "Dishonesty and the Handicap Principle."*Animal Behavior* 46(4): 759-764.

Kahneman, D. (2003). "A Perspective on Judgement and Choice." *American Psychologist* 58: 697-720.

Kirsch, P., C. Esslinger, Q. Chen, D. Mier, S. Lis, S. Siddhanti, H. Gruppe, V. S. Mattay, B. Gallhofer and A.

Leigh, T. W. and J. O. Summers (2002). "An Initial Evaluation of Industrial Buyers' Impressions of Salespersons' Nonverbal Cues." *Journal of Personal Selling and Sales Management* 22(1): 41-54.

Lindstrom, M. (2008). *Buy ology: Truth and Lies About Why We Buy*. New York, Doubleday.

Maynard, S. J. (1991). "Honest Signaling: The Philip Sidney Game." *Animal Behavior* 41: 1035-1035.

McKnight, D. H., L. L. Cummings and N. L. Chervany (1998). "Initial trust formation in new organizational relationships." *Academy of Management. The Academy of Management Review* 23(3): 473-490.

Morin, C. (2011). "Neuromarketing: The New Science of Consumer Behavior." *Society* 48(2): 131-135.

Puce, A., T. Allison, S. Bentin, J. C. Gore and G. McCarthy (1998). "Temporal Cortex Activation in Humans Viewing Eye and Mouth Movements." *Journal of Neuroscience* 18(6): 2188-2199.

Puce, A., A. Syngeniotis, J. C. Thompson, D. F. Abbott, K. Wheaton & U. Castiello (2003)."The Human Temporal Lobe Integrates Facial Form and Motion: Evidence from fMRI and ERP studies." *NeuroImage* 19(3): 861-869.

Rilling, J. K., D. A. Gutman, Z. T. R., G. Pagnoni, G. S. Berns and C. D. Kilts (2002). "A Neural Basis for Social Cooperation." *Neuron* 35: 395-405.

Rousseau, D. M., S. B. Sitkin, R. S. Burt and C. Camerer (1998). "Not So Different After All: A Cross-Discipline View of Trust." *Academy Of Management Journal* 23(3): 393-404.

Searcy, W. A. and S. Nowicki (2005). *The Evolution of Animal Communication: Reliability and Deception in Signaling Systems*. Princeton, Princeton Press.

Winston, J. S., B. A. Strange, J. O'Doherty and R. J. Dolan (2002). "Automatic and Intentional Brain Responses During Evaluation of Trustworthiness of Faces." *Nature: Neuroscience* 5(3): 277-283.

Wood, J. A. (2006). "NLP Revisited: Nonverbal Communications and Signals of Trustworthiness." *Journal of Personal Selling & Sales Management* 26(2): 197-204.

Wood, J. A., J. S. Boles and B. J. Babin (2008). "The Formation of Buyer's Trust of the Seller in an Initial Sales Encounter." *Journal of Marketing Theory and Practice* 16(1): 27-39.

Wood, J. A., J. S. Boles, W. Johnston and D. Bellenger (2008). "Item Level Meta-Analysis of Measures of Trustworthiness of Salespeople and Selling Institutions." *Journal of Personal Selling & Sales Management* 28(3): 263-283.

Zak, P., R. Zurzban and W. T. Matzner (2005). "Oxytocin is associated with human trustworthiness." *Hormones and Behaviors* 48: 522-527.