DECODING NONVERBAL ABILITY: A THEORETICAL MODEL FOR THE ACQUISITION OF NONVERBAL DECODING SKILL

by

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ABSTRACT

Nonverbal communication adds multiple layers of meaning to social interaction above that conveyed by words. The comprehension of these nonverbal messages depends on individual ability which varies greatly between individuals. Variation in nonverbal communication ability and the variables of influence that have been associated with it over decades of research are the topic of this research project. Variables that have been correlated to nonverbal communication skill were used to develop a theory for the development of this skill and construct an evidence-based theoretical model that provides an explanation for nonverbal skill acquisition and variability. This model was also analyzed for further implications about related theory and research.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

APA	American Psychological Association
ASL	American Sign Language
CPI	California Psychological Inventory
ILC	Internal Locus of Control
NDS	Nonverbal Decoding Skill
RWA	Right Wing Authoritarianism
SDO	Social Dominance Orientation
STEM	Science, Technology, Engineering, and Mathematics
WHO	World Health Organization

CHAPTER ONE: INTRODUCTION

The ability to communicate and understand each other is a particularly nuanced skill in humans. This skill is generally acquired during the early years of life, and includes subtle, ambiguous, and continuously evolving content in the form of words, gestures, and a variety of other signals that can be used simultaneously to convey information. These layers of communication are constructed of elements that vary enormously across groups and between individuals. Each culture apparently contains equally complex communication systems with unique patterns and arrangements of words, signs, and symbols. Perhaps like any other skill, communication is acquired non-uniformly between individuals, leading to variation in the ability to understand and communicate proficiently.

In efforts to understand what causes this variability in the understanding of communicative messages, researchers have repeatedly conducted studies to collect a range of demographic and personal variables in conjunction with assessments of the ability to understand nonverbal messages like facial expressions or body language. These studies have sampled across a number of different variables such as culture, race, sex, gender, age, personality, socioeconomic status, and childhood environmental factors. The variation in ability to understand the content of nonverbal messages is consistently correlated to many such variables, each of which become an object of interest and analysis. For example, scores on a nonverbal comprehension test that correlate to the variable “relationship quality” would lead to an analysis of implications; how might

relationship quality be related to the development of communication skills? The researcher may theorize that children who are better at nonverbal communication are able to use those abilities to develop better relationships throughout their lives, or researchers may theorize that having been exposed to healthier relationships leads to better communication skills in general. It may also be the case that other, unmeasured variables are acting upon both nonverbal skills and relationship quality to cause the observed correlation. One may even theorize that there is a reciprocal, or circular chain of influence between variables, causing them to increase or decrease together. As theories such as these are suggested by researchers, more routes of investigation open up for future studies—too many such avenues for all of them to be explored exhaustively. The result is a collection of correlational data, interesting ideas, and unanswered questions.

In most of these correlational studies, the variables related to nonverbal communication skill are given some form of brief theoretical commentary. Some studies collect several variables, look for interactions between them, and hypothesize how the variables of interest may operate together. What is not known is the overall story that would be created by looking at a large collection of variables from across the literature simultaneously and developing a theory that explains how the entire system of interacting variables influences nonverbal skills. Even those studies which do bring together results from across a large collection of the published literature focus mainly on statistical analysis (e.g., Hall, Andrzejewski, & Yopchick, 2009) with little attempt at a cohesive explanation or new theory, choosing to focus instead on analyzing which of the variables seems most significant or interesting and worthy of further investigation. These types of studies continue to accumulate data and statistical analyses, but there is insufficient

theoretical work to understand what it all means. When theories are proposed in such studies, they concentrate on only a few variables while summarizing the remaining results in tables of statistics, perhaps due to the constraints of journal publication or the daunting complexity of the system of variables. Attempts that have been made to create unified explanations for nonverbal communication abilities tend to default to well-recognized models about learning, memory, or development (Greene, 2003), rather than to utilize the large body of research available to construct novel insights or new theoretical constructs.

A theoretical explanation that was built from and attempted to unify results from across the literature would have greater explanatory power than any one of the existing theories or variables alone. A theory of this kind would also have potential to explain unexplored interactions between individual variables, since it would consider them in its construction. This theory would also have the benefit of potential generalizability to other communication skills. For example, if it is known how one learns to understand nonverbal communication, perhaps it can be better understood how one acquires spoken language, sign language, writing skills, musical or mathematical skill, etc. The purpose of this project was to construct such a theoretical model, a model developed from a collection of research that has been conducted on nonverbal communication ability.

The first step in this project was to collect the variables that have been correlated to nonverbal communication skills in order to understand how these variables interact and how they feed into the development of nonverbal communication ability. This project involved theoretical and evidence-based discussions which included any information that became relevant during the discussion—such as how the variables were measured and

what they mean, their relationship to nonverbal communication, and their relationship to other variables of interest. The analysis also looked for larger themes among the interactions, with the intention of finding a more comprehensive theoretical explanation for the entire system.

The examination of prior research ultimately led to the conclusion that childhood and early developmental factors were central to answering this question. Causal explanations for the entire system of variables were found in childrearing practices, which influence the development of both nonverbal skill and the collection of related variables, including moral behavior and personality traits. Specifically, the levels of control and support behaviors put forward by parents can have a powerful impact on later competencies. As will be shown, well-intended intrusive parental behavior can negatively affect social and moral development, while decreased presence of caregivers can lead to improvement in a range of skills.

The consequences of childrearing practices in early development offer a new explanation for how the skills and behaviors examined in this project are related to NDS. The model constructed during this process draws causal connections between childrearing practices and the child's later social behaviors and abilities. Following the presentation of this new theoretical model, potential implications for other areas of research are discussed. In the next chapter, current theories used to interpret NDS research are reviewed for the reader, followed by a description of the research method for this project.

A Clarification of Concepts

Nonverbal communication and nonverbal behavior are both terms commonly used in this area of study. The difference may not be clear during this discussion without a clarification. A nonverbal behavior, such as scratching one's nose, may be considered to nonverbally communicate something or not by either the sender or the receiver of the message, making it ambiguous whether or not such a behavior is communicative. At the very least, many communication scholars agree that a behavior must be observed or received at some point in order to be considered communication (for a review of different theories see Littlejohn, 1999, Chapter 1). A behavior exhibited by a message *sender*, in the absence of a *receiver*, would not be said to have communicated something because no one has received a message, consciously or otherwise. This project is focused on communication rather than behavior, so the research that follows is biased towards the perception, observation, or understanding (i.e., decoding) of messages rather than the behaviors that may be perceived to send that information.

A more pertinent reason to focus on message reception, rather than sending, is that the determination of skill in message sending relies heavily on accurate perception and understanding to determine if the sender has conveyed what they intended. Only a skilled receiver can reliably determine a skilled sender. It is also difficult to measure deficiencies in the sending of nonverbal messages because the lack of observer comprehension can always be blamed on poor communication skills at the receiving end. Increased comprehension of sent messages by the receiver, on the other hand, can compensate for a lack of skill in the sending of messages and can be objectively verified through replication across a variety of tests, regardless of the skill level of the sender.

Finally, one of the reasons to restrict this project to the receiving end of nonverbal messages was to limit the scope of the project.

The perception (or receiving) and understanding of nonverbal messages is referred to as decoding, so throughout this project I may refer to the "accurate decoding" of nonverbal behaviors, or how an individual is determined a more- or less-skilled decoder of that content by objective assessment to determine their ability level in comparison to others. The scores on these tests are a measure of nonverbal decoding skill (NDS), which is the variable being modeled in this project.

What qualifies as a communicative nonverbal behavior is very broad across the literature examined here. Since even unintentional behaviors can convey nonverbal information, many researchers agree to include in this category everything that can communicate information except written and spoken words (Knapp, 1972; Matsumoto, Hwang, & Frank, 2016). Examples of nonverbal behavior examined in the research discussed below include postures, facial expressions, situational contexts, voice qualities like pitch and tone, emotional responsiveness, and combinations of unspecified behaviors used to deduce relational information like how two interactants know one another. NDS assessments may use any of these communication channels, depending on the test construction. The variables of focus in this project tend to have been verified across multiple such tests, making their correlation to NDS fairly reliable.

Justification

Nonverbal communication is frequently covered as a topic of study in academic disciplines such as business, psychology, and communication, in addition to other subject areas within the fields of biology, anthropology, and law enforcement. However, these

fields typically focus on variables particular to an individual's present circumstances, personality, or demographic variables when examining NDS. This project redirects explanations for NDS acquisition towards childhood environmental factors. Specifically, I conclude that one's NDS competency, social development, and moral reasoning are more strongly determined by the effects of early parenting behaviors than by later adult circumstances such as career choice, recreational pursuits, or demographic variables. This implies that researchers in the fields mentioned above would benefit from exploring alternative explanations for adult outcomes by investigating early environments and parental interactions. The hope for this study is that researchers in these fields may turn greater attention toward the effects of parenting, and that they will consider and test the ideas presented here in order to arrive at new insights about learning, child development, skill acquisition models, and NDS in particular.

New theories in this area can impact current applications and offer new answers to existing problems, illuminating flaws in current practices or opening new avenues for exploration. Any changes in the field of NDS research will have implications for the understanding of communication in general: how humans interact, understand each other, and coexist. Current theories used to interpret NDS research findings have a similar range of influence. The next section provides a survey of such theories and how they are used to understand NDS.

CHAPTER TWO: CURRENT THEORETICAL PERSPECTIVES

Current explanations for NDS come from a variety of disciplines and include mechanisms related to learning, memory, psychology, physiology, evolution, and early development. In each instance of a particular variable (e.g., "relationship quality") being correlated to NDS, one of these known mechanisms is used by researchers to explain the correlation or interpret results of the study. It was unclear before beginning this project which (if any) of these mechanisms would retain explanatory power when looking at the larger collection of correlated variables as a system of interconnected influences, so all relevant perspectives and research are considered potentially useful in the course of the discussion.

Five of the more common theoretical perspectives used to explain nonverbal communication abilities are discussed here. These perspectives cover basic learning models, social learning models, a co-development perspective of skill acquisition, mirror neurons, evolution and genetics. I illustrate how each of these perspectives is currently used to explain NDS by discussing them in terms of an example correlated variable "relationship quality." This variable is positively correlated to NDS, indicating that people who have better quality relationships tend to perform better on assessments of NDS (Hall et al., 2009). The perspectives described below provide slightly different explanations for such a correlation. For that reason, the theory used by a particular researcher to interpret their data may seem arbitrary; some theories only provide slightly better explanations for a phenomenon than others. A new theory or model that can

adequately account for a large collection of these correlated variables, in a way that gives insight to the larger system of interactions, is the purpose of this project.

Learning Models

Current explanations for NDS in adults are heavily concentrated on childhood learning models which also form the basis of adult learning models (Greene, 2003). These learning models focus on memory and generally involve two basic steps: the learning of associations and learning to generalize those associations from experience (Haviland-Jones, Gebelt, & Stapley, 1997). First, one makes sense of information by forming an initial association and then learns to apply that association to other similar instances. A proposed third follow-up step involves repetition of use which leads to increased speed and accuracy of applying the generalization (Greene, 2003). To illustrate these steps: *acquisition* of a communication rule might include the realization that when a particular person is "cowering," the person is "afraid." The later *refinement* of that skill involves the experience of other instances of cowering, to develop the generalization that this behavior comes in many forms from many individuals or that "cowering (in general) = fear (in general)," with the recognition of such instances naturally increasing in speed and accuracy through *repetition*.

Learning models are used to explain NDS by suggesting that exposure to nonverbal communication stimuli and repeated application of the learned association result in increased NDS. An implication of using the learning model to explain NDS would be that limited social exposure beginning in childhood may cause communication deficiencies. In the example correlated variable "relationship quality" one could use the learning model to create an explanation for the positive relationship between NDS and

relationship quality. Such an explanation might be that better relationships put one in a position to interact more often and learn communication rules with regular feedback, which improves or speeds up the nonverbal learning process according to the learning model. Relationship quality could have continuous effects on NDS throughout life, meaning that improved relationships in later life could have a positive impact on NDS, or that poor relationships could negatively affect NDS.

Another way to use learning models to interpret a correlated variable might be to discuss how increased NDS might improve learning in other areas that influence the variable of interest. For example, NDS may affect how one learns to develop, maintain, and nurture relationships, which then leads to the observed positive correlation with relationship quality. Being high in NDS may also increase the speed with which one first notices an interpersonal phenomenon, providing valuable information for relationship maintenance. The next step in the learning process is learning to generalize, which might be sped up by increased NDS, allowing faster identification of similar behaviors across diverse individuals and resulting in higher quality relationships of various kinds.

Related research on learning suggests that there must be minimal biological pre-requisites for NDS (Keating, 2016b). The observation and comprehension of visual signals requires functioning eyes and visual processing. The learning and comprehension of audio signals makes similar demands on the ears. If smell and touch are considered signals, one could infer more biological requirements associated with these senses. In addition to basic sensory systems, a working memory and cognitive skills would be necessary to deal with this information. The term “biological preparedness” is used to refer to the hard-wired ability to express the traits that allow for these accurate

perceptions and the interpretation of those perceptions. The steps of learning—acquisition, refinement, and repetition—rely strongly on the proper development of sensory organs and the brain, so anyone without these properly functioning systems would be at a communicative disadvantage. Learning models are therefore influenced by other systems as well.

The three-step learning model described above provides a general explanation for one's ability to understand nonverbal messages that relies on experience and basic biological preparedness. Learning models are meant to be widely applicable as an explanation for skills acquisition, so the application to NDS is an easy one to make. Exposure to information leads to rule formations, and repetitive exposure to similar instances leads to increased recognition. The implication for NDS from this type of explanation is that those with more exposure to the stimuli (nonverbal messages) and those with properly functioning biological systems would be better at understanding nonverbal messages. Increased exposure or experience should lead to increased NDS.

Social Learning

Social learning is a different form of learning than the memory model described above. It focuses on a different mental process than basic memory formation, suggesting instead that NDS is acquired through socialization that is heavily dependent on culture and social environment. Social Learning Theory involves a psychological modeling process, whereby an individual can learn to understand the consequences of a behavior by watching the performances, punishments, and learning of others around them (Bandura, 1971). These observations allow the individual to form mental models of behavior that

can be used to direct future actions and can also be used to strengthen or weaken prior learning.

The key steps in the process of social learning are similar to those found in the general learning model described above. First, the attention to stimuli drives the choice of information being observed. Next the distinctive features of the observation are differentiated from each other, followed by correlating or associating the information into categories of similar events. Lastly, the information is organized into "easily remembered schemes" (Bandura, 1971, p. 21) for later use. This process is considered to take place unintentionally, as a psychological learning response in social situations.

In terms of the example variable "relationship quality," an association with NDS could be explained by social learning in a couple of ways. One explanation is that better relationship quality places one in a position to better observe reliable and consistent behaviors, improving the type of psychological models one is able to internalize. These reliable and healthy models assist one to predict future behaviors and better understand the world around them in ways that a person with poor relationships may not be able to achieve. The other type of explanation possible from social learning models is related to the influence NDS would have on the psychological modeling process. NDS would affect the ability to perceive, understand, and learn from observed interactions in the immediate environment. The psychological modeling process used in social learning would therefore be affected, allowing a nonverbally skilled observer to better learn how to maintain high quality relationships just by observing the relationships in their environment. Also, someone with lower NDS would not learn as well from observing

others, decreasing the benefits of psychological modeling that might help them improve their relationships and better navigate the social world.

A social learning perspective provides an explanation for NDS based on input from observed interactions in the environment. If one has limited exposure to information, then one has less information on which to build psychological models. Exposure or direct experience is a key variable in skill acquisition under this theory (Bandura, 1971). Without prior observation or experience, an individual is less prepared when first encountering a situation. A social learning perspective of skill acquisition would then support the importance of a childhood environment that exposes the child to a variety of observable interactions from which to learn. Being around other people, having friends, and being able to observe the interactions of family members would increase an individual's ability to navigate future social situations. This perspective places heavy emphasis on social exposure for the acquisition of NDS.

Co-development of Language and Gesture

Another perspective of NDS development suggests that verbal and nonverbal communication skills co-develop; that is, the understanding of physical expression or gesture, and the later understanding of spoken language, may both rely on the same cognitive processes during development (Cartmill & Goldin-Meadow, 2016). Clear and comprehensible gestures and expressions are used by infants and toddlers prior to proficiency in spoken language, but are used to augment and stand-in for linguistic meaning during spoken language development. This combination of gesture and language during the early years of life is so tightly connected that infant delays in the use of

gesture are an early sign of spoken language delays (Sauer, Levine, & Goldin-Meadow, 2010).

Implications commonly drawn from this interaction between language and gesture are that the same cognitive mechanisms are required for both verbal and nonverbal communication skills. This would suggest that proficiency in either area should be associated with proficiency in the other, with increased skills augmenting each other through either childhood or adult learning. Similarly, deficiency in either verbal or nonverbal communication may be a sign of deficiency in the other. The cognitive mechanism suggested by this perspective is one that determines proficiency in the learning and understanding of information of multiple kinds simultaneously.

This simultaneous learning suggests that verbal and nonverbal language may be better understood as one language. For example, children who were delayed in spoken language compared to their peers were caught up one year later if they were performing at a normal level with gesture proficiency, but their peers who were deficient in gesture failed to catch up in spoken language (Thal, Tobias, & Morrison, 1991). This suggests that being able to communicate with gesture allowed children to catch up with spoken language as if the two skills were different subparts of the same language system. Because gesture occurs earlier in development, it can be used as an early warning of disorders like autism, that include a range of other communicative deficiencies (Cartmill & Goldin-Meadow, 2016). Deficiency in gesture is an early signal of general language delay.

Additional skills that appear to be connected to these communication systems include general social abilities and interaction skills. Some researchers have attempted to

draw the connection that social competence and communication ability are just a part of an even larger system of co-developing skills for dealing with and understanding other people later in life (Keating, 2016b). This would mean that skill level would manifest in a variety of communication competencies. Some authors have described these intersecting abilities as a dynamic systems model that requires adequate socialization processes in order synthesize information from a variety of sources such as emotion, expression, and personal interactions (Keating, 2016b), all of which are heavily reliant on exposure to interaction.

Interaction during childhood is when these associations are formed, labels are created for acquired knowledge, and the child learns to self-regulate their own behavior based on feedback (Buck & Miller, 2016). This means that the co-development perspective of skills acquisition drastically increases the importance of the childhood environment. The emphasis on childhood environment follows suit with most other models that attempt to explain nonverbal communication skills (Greene, 2003).

One important component to child development is an increased plasticity of neural pathways that allows for easier skills acquisition during key developmental phases called “critical periods,” when lifelong competencies are developed and solidified, including those related to NDS (Zeidner, Matthews, & Roberts, 2009). The personal interactions that occur during this sensitive time have been suggested by several studies to have permanent effects on the ability to recognize communicative responses in others, as well as affecting more general brain maturation and development (e.g., Taylor, Parker, & Bagby, 1999; Schore, 2001). Exposure to the right information during the critical

period allows for skills development and brain growth. The time limitations of the critical period may be the limiting factor that requires the co-development of skills.

As an explanatory mechanism in the illustrative variable "relationship quality," the early co-development of verbal and nonverbal language skills might explain the correlation because better relationships could provide the opportunity for more verbal language practice, especially when these skills are first developing. Poor relationships might provide less exposure and therefore less practice for spoken language learning, impacting the co-development of NDS. Another interpretation of a co-development perspective might be that someone with higher NDS would also have better verbal communication, which would assist in the creation of better relationships through improved communication.

The co-development perspective of communication skill acquisition suggests that a varied system of informational input allows for greater proficiency in multiple skills, as they supplement each other in the learning process. This view also implies that skills are more connected than is typically imagined, with environment so influential that it affects the learning of skills not apparently related to the information coming in. This perspective suggests that a more complex and, perhaps, less-controlled environment may be more ideal to the natural learning process than an organized and controlled one, since it may be unpredictable which types of information will augment the learning of related skills.

Mirror Neurons

The next perspective of NDS acquisition explored here is an innate, hard-wired, physiological mechanism proposed by some researchers to explain the ability to understand others and their actions. Communication of emotional responses in infants is

usually believed to have come pre-packaged because, directly after birth, infants readily express recognized signals of internal states like fear, anger, and sadness without any prior exposure to stimuli (Haviland-Jones et al., 1997). The theory behind mirror neurons suggests that, in addition to hard-wired emotional expressions, humans have a hard-wired ability to understand the internal states of others based on the information being perceived, verbally or otherwise.

The research behind this perspective comes from studies on macaque monkeys that showed the same neurons fire both when individuals conduct an action, like picking something up with their hand, and when that individual perceives the same action being conducted by another (Keysers, Thioux, & Gazzola, 2013). The neurons that fire under both conditions are referred to as "mirror neurons" because they behave the same way whether it is the self or a perceived other exhibiting that behavior. This mechanism is commonly generalized to more complex human behaviors in order to provide an explanation why one person may feel pain while watching another person feel pain. That is, mirror neurons are often used to explain feelings of sympathy, empathy, or a general understanding of the internal states of others.

Mirror neurons are a biological mechanism, so this perspective suggests that understanding others is biologically hard-wired, at least to some degree. However, there is evidence that observed actions elicit more response when one has previously conducted the action for themselves (Cannon et al., 2014) and that just being familiar with the action can increase the mirror neuron response (Liew, Han, & Aziz-Zadeh, 2011). This means that prior experience is important to this mechanism. The mental storage of an individual's experience with an action is triggered by the observation of another going

through the same experience. The implication is that if one had no experience with sadness or pain, one may be less likely to "catch" those feelings by being around another person via the mirror neurons. Conversely, if one had experienced much sadness in their life, they may automatically be negatively affected when surrounded by unhappy people. A varied history of feelings and experience would lead to a greater ability to understand the perspectives and feelings of others. This ability would be physiological and not well-controlled. It is believed to create in the observer an effortless sense of knowing the feelings of others that may feel as if they are experiencing that feeling themselves. This physiological response to others would create a heightened awareness of others' internal states during the observation of nonverbal behaviors. This is very different from the type of understanding that one acquires through intentional, conscious effort to empathize with and understand another person.

In terms of the illustrative example variable "relationship quality," the existence of mirror neurons may suggest that relationship quality is associated with NDS because NDS would positively correlate to one's range of social experience and having more social experience would assist one to find and maintain better quality relationships. Any experience that increases the range of one's emotions and interactions should also increase the mirror neuron response that connects to an internal awareness of social situations.

This perspective on how one understands the feelings and internal states of others is used to explain a range of emotional responses human beings feel in the presence of others, but the research behind mirror neurons is still far behind the theoretical claims related to empathetic responses in humans. Regardless of the state of the research, this

perspective offers an interesting explanation for how individuals may understand what another person is thinking just by observing them. Experience is important to mirror neurons, which suggests a varied set of experiences would lead to a better understanding of others and therefore increased NDS.

Evolution and Genetics

From an evolutionary perspective, nonverbally communicated messages can make information available to other organisms which could increase their ability to survive or reproduce. This information can come in any form; sight, sound, smell, touch, taste, or situational contexts. Nonverbal signals in animals are sometimes broadly defined as anything that results in some change in another individual (Smith, 1977). Individuals that best understand these subtle messages would know faster than others when situations were dangerous or beneficial, which would increase their survival or ability to reproduce—also called *fitness*. The adaptive situations considered affected by nonverbal communication include confrontation avoidance, sensing danger, finding food, and coordinating action among group members (Keating, 2016a). In other words, the understanding of nonverbal cues is driven by immediate social goals and motives that satisfy basic needs (Fiske, 2010) which may be used to forecast expectations and future behaviors of others (Fridlund & Russell, 2006). From an evolutionary perspective, nonverbally skilled individuals have increased fitness in a variety of situations and contribute more offspring to the next generation, genetically selecting for the ability to understand nonverbal information over time.

This perspective of nonverbal communication does not require that messages are genuine. Sometimes a false message will increase survival by achieving the same goal as

an honest one (e.g., signaling false strength; Keating, 2016a). This means that the ability to fake a nonverbal signal could also increase one's survival and therefore be selected for over time. False information may lead to somewhat of an arms race between the ability to accurately perceive a message and the ability to fake a message (e.g., Mokkonen & Lindstedt, 2016). For example, it would be beneficial to appear strong in order to avoid fighting, but those who could accurately perceive when this was a false signal of strength would easily gain an advantage, so there is also room for the evolution of nonverbal communication skills that are sensitive to false information.

At the level of specific types of nonverbal human signals, like smiles or frowns, many studies have shown there are universal human expressions that convey the same meaning regardless of race or culture (Keating, 2016a), and the muscles required to produce these expressions also appear to have been selected for in humans (Waller, Cray, & Burrows, 2008). This cross-cultural work suggests a set of nonverbal signals that may have been genetically selected or hard-wired to display particular feeling states to other individuals. However, the comprehension of additional, subtler cues such as culturally relative innuendo and symbols would still need to be learned.

Non-innate signaling that requires learning in the environment can still be driven by genetic selection because the genes that predispose one to acquire that understanding with greater speed and accuracy may also be selected for. The selective advantage would then be given to those with better sensory perception, neural functioning, or other cognitive advantages. These adaptive traits would be selected, but only in environments that made greater perception and neural processing beneficial (Super & Harkness, 2002). Such an environment would include greater danger, greater competition, or some type of

stressor that naturally benefited individuals who were able to survive because of their more accurate perception or cognition.

In the case of the example variable, "relationship quality," the evolutionary perspective may explain a positive relationship to NDS through a genetic predisposition to associate with others, form communities, and contribute offspring to the next generation. If NDS is selected for, increased NDS would increase one's ability to form high-quality relationships, making them more likely to survive because of cooperation or mutual assistance, and eventually be more successful at producing offspring. Similarly, relationship quality may be feeding into the genetic mechanism that allows one to learn culturally specific means of communicating, therefore assisting in the acquisition of nonverbal communication rules.

An evolutionary perspective of NDS provides one explanation for the observed human universality in nonverbal messages and their meanings (e.g., Liszkowski, Brown, Callaghan, Takada, & de Vos, 2012)—universality which would allow for better decoding of nonverbal information between individuals from across an entire species. Evolved mechanisms would include expressive behaviors and the sensory and neural mechanisms required to make sense of them when observed in others. A history of unpredictable environments and other selective pressures would result in the selection of increased abilities to decipher information from available cues that could increase the ability to survive. Over the course of one individual's lifetime, this may manifest in a hard-wired ability to learn novel message systems as they arise and to use that information to better navigate the social or physical environment.

Additional Perspectives on Nonverbal Learning

The theories and perspectives described above have consistently been used to understand and interpret research findings in nonverbal communication. In this section, I will describe some efforts that have been made to construct more precise explanations for the development of NDS and where such explanations typically occur in the literature. Unlike the perspectives mentioned above, which are taken from other areas of study, the explanations described here are particular to nonverbal communication. I will first discuss a prior model of influences and then explain why such models are rare through a brief explanation of prior meta-analytical work in this area.

The model shown in Figure 2.1 describes different levels of influence at the individual level that may affect NDS, according to Zeidner et al. (2009). Biological and temperamental predispositions combine with social interactions to influence the development of NDS and related emotional competencies. Primary influences in this system are genetic predisposition and interactions with infant caregivers, both of which are considered most influential in how the individual will respond in later social interactions. These primary variables influence both nonverbal learning and also the development of other variables such as peer interactions and self-awareness. These variables in turn influence how learned rules are used, the development of self-regulation, the effects of media exposure, and impacts upon other general abilities. The variables in the model exert mutual influence on each other as the individual becomes more strategic in their learning of rule-based associations through social interaction and insight-based regulation of emotion (model adapted from Zeidner et al., 2009). The competencies later

expressed by children, according to this model, are determined by a combination of biology and environment.

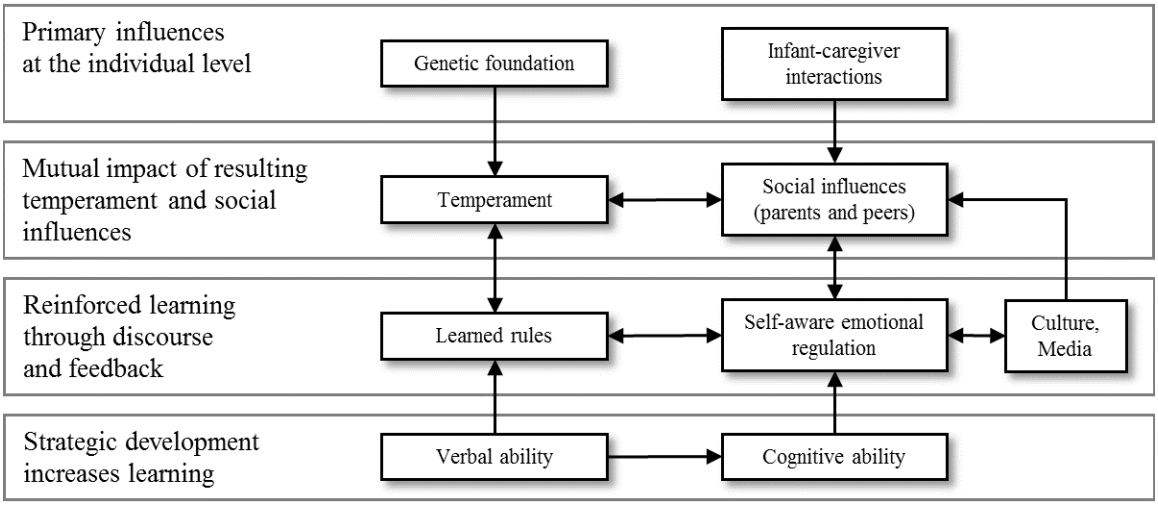

Figure 2.1 Model of influences on nonverbal communication ability. Adapted from Zeidner et al. (2009, p. 145).

This model is limited in its ability to contribute new insights or causal explanations. Neither genetics nor environment are disputed by researchers to be influential at the individual level. While the model is able to more particularly address the topic of NDS, it does not appear to be much more specific than any of the theories described above. However, it does synthesize prior theories fairly well. Such a synthesis is possible because the theories discussed above are not mutually exclusive. Many, if not all, of them could be true at the same time. This model may therefore be a way of visualizing their interactions, but it does not provide additional insight into the causal forces acting on the system.

Another issue with this model is that it does not appear to take into account any of the research on individual factors that have been correlated to NDS (e.g., relationship quality). The model orders the components of influence that are assumed to be of

importance but does not explain causal relationships that would be necessary for the variables of interest in this project. For example, the variable "relationship quality" might be easily placed within the model at various locations—infant caregiver, parent, peers, etc.—but it is unclear how this relationship quality influences the system in any way more illuminating than the influences suggested in the theoretical discussions undertaken above.

A different type of model might be one that was constructed by analyzing the research on variables correlated to NDS. The closest to such a model is frequently just a cluster or list of known influences, lacking in specific hierarchy or organization that would inform inference-making or theoretical explanations for any new information that might be proposed to influence the system. A visual model that merely depicts information in non-informative displays, such as the model depicted in Figure 2.2, for the related ability of emotional intelligence, does not explain how specific variables interact with the system. These models appear to be limited to whether or not certain variables *are* in the system, making the model no more helpful than a list of information.

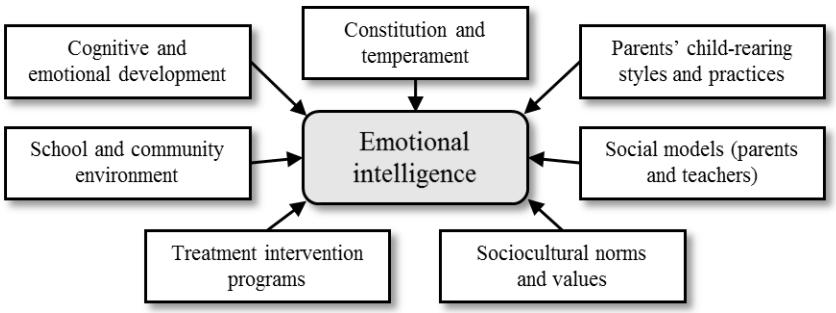

Figure 2.2 Variables influencing emotional intelligence. Adapted from Zeidner et al. (2009, p. 163).

In addition to these types of models, there have also been several meta-analyses conducted over the last several decades that have compiled the research on nonverbal

communication. The meta-analyses most informative to this project have gathered variables that are associated with NDS and analyzed them for statistical significance. Individual studies included in such meta-analyses usually look at only a few variables of interest and are therefore inadequate for developing a comprehensive theory. For example, one recent meta-analysis examined what type of information was assessed in individual studies on nonverbal skills and found that most studies examined only a few aspects of nonverbal communication, such as identifying emotions or situational contexts, while being similarly limited in how many expressive channels were being examined (e.g., eyes, faces, body language; Boone & Schlegel, 2016). The purpose of the study that reported these findings was to run a statistical analysis to determine what types of studies were most common in nonverbal research, so the attempt to construct a theoretical explanation for NDS was a peripheral discussion point. However, the authors did come to a theoretical conclusion that the mechanism influencing the variables may be similar to the mirror neuron mechanism described above, relying on mimicry and the embodiment of observed behaviors. How any particular variables in the system may interact with each other to influence learning at the individual level or cause changes in NDS seemed to be beyond the scope of the paper. This failing of meta-analyses is common because the construction of novel theory is usually not the purpose of such an analysis.

An earlier study that attempted to synthesize research findings in a way similar to the goal of this project, looked at the relationship between variables in the areas of cognition and learning (Ackerman, 1988). The author found three broad principles for the system, which were proposed to be the governing variables of all learning: pre-determined intelligence, speed of improvement through repetition, and psychomotor

ability for accuracy. This proposed simplification of influential variables into groups of influence helps to construct explanations for new information. For example, both pre-determined intelligence and psychomotor ability have hard-wired biological components. This means that Ackerman's explanation for the connection between cognition and learning relies heavily on biology or genetics. If new information is found to influence the relationship between cognition and learning, a genetic explanation for that information could be explored first, since that explanation has already provided order to the system of influences.

More on topic with the purpose of this project is the meta-analysis performed by Hall et al. (2009) to collect psychological, social, and demographic variables correlated to NDS. In most of the studies collected in their meta-analysis, NDS was measured with one or more of several recognized tests. These tests provide proficiency scores which the authors statistically analyzed for correlation to any other personal information or demographic variables collected about the test subjects. The causal themes drawn from this collection of research were that childhood environment and experiences requiring repeated nonverbal communication practice were both likely to cause increased NDS. There is some work throughout the paper to examine specific variables of interest for how they might directly influence NDS, but the authors concluded that more work needed to be done in order to understand the causal mechanism at work between these correlated variables and NDS. Other meta-analyses in this subject area have had a similar focus on identifying and collecting significant variables, while making minimal effort to build a comprehensive causal theory or model for NDS (e.g., Davis & Kraus, 1997; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979).

I contend that more statistical work or data collection is not necessary in order to make sense of the data. What is needed is to identify the causal explanations that have been called for by prior researchers (e.g., Hall et al., 2009). One assumption of this project is that there are more than enough prior studies and collected data to carry out this work. The intention of this study was to move beyond a focus on data collection and toward theory building. The studies mentioned above, and those that were collected throughout this project, form a body of literature that serves as a foundation from which to begin exploring possible interactions in the development of NDS. Further data is explored below as the discussion warrants and the work is extended in order to bring these variables together into a theoretical model or explanation for how the associated variables are influencing the acquisition of NDS. This is not a mathematical model, nor a rigorous meta-analysis; but rather an exploration with the goal of asserting a new explanation that reveals new answers and proposes new questions. A more detailed explanation of this process is described in the following sections.

CHAPTER THREE: METHOD

In order to explain how someone becomes proficient in NDS, a theoretical model was developed for this project from a collection of research findings published during the last several decades. Personal attributes correlated to NDS, such as one's "relationship quality," were investigated for how they may be influencing NDS. The results of this investigation directed the discussion towards childhood environmental factors, which became the primary factors used in the model to explain the development of NDS.

The method used for this project was exploratory and theoretical. Smagorinsky (2008) suggests that in projects where exact outcomes of the work are unknown ahead of time, that the method section be used to describe what occurred after the fact. For example, rather than to decide categories for data ahead of time, this type of project would allow categories to evolve during the process and to have that process explained afterwards in the method section. This procedure was employed in the construction of the method section for this project. An exploratory method was best suited for this project because it allowed room for new avenues of research to be developed as the investigation progressed. That being the case, the method section here describes a process with some fixed points and some more fluid.

Data Collection

The data of interest to this project were individual characteristics (variables) that have been correlated to performance on assessments of NDS. To simplify this discussion, these NDS scores may be referred to as the *dependent* or *response* variable and the

personal attributes that have been correlated to these scores may be referred to as the *independent* or *predictor* variables, though this designation should not be taken to imply causation. The predictor variables are often collected from research participants before or after NDS assessments and include demographic or other personal information such as a participant's "relationship quality." Results are then statistically analyzed to determine if predictor variables are significantly correlated to NDS scores. Some of these variables are from other types of assessments, like personality or IQ tests, which may be given in tandem with nonverbal assessments. In recent years, there have been several published collections of such variables in meta-analyses (Hall et al., 2009; Hall, Mast, & Latu, 2015; Murphy, Mast, & Hall, 2016). These works collect previously correlated variables and assess them for statistical significance across multiple studies to see how well they may predict NDS. This project sought to find new explanations for these statistical correlations, so recently published reviews of prior work on NDS were used to jumpstart this investigation, which remained open to insights from additional studies as the exploration continued.

Initial data (variable) collection was guided by the recently published *APA Handbook of Nonverbal Communication* (Matsumoto et al., 2016), which reviewed methods of measuring NDS and discussed many significantly correlated variables that have been identified by one or more assessment methods in a chapter on nonverbal sensitivity (Riggio & Darioly, 2016). The benefit of this source is that correlated variables hi-lighted by the authors tend to be significant across population samples, conducted by reliable research methods, and accepted by the research community, making it a good starting point for a theoretical discussion. This chapter also mentions a

few related reviews for further investigation (e.g., Hall et al., 2009; Ickes, 2009) which were independently examined for additional variables.

After this initial collection of variables was conducted, brief descriptions and definitions for each variable were collected and discussed. Most of the variables were found in the *Encyclopedia of Social Psychology* (Baumeister & Vohs, 2007), which also contains within most definitions other additional variables that tend to be correlated to the predictor variable. Although these peripheral variables are not necessarily directly correlated to NDS, they were also collected in order to inform the discussion and gain a better understanding of influences that may be acting upon NDS. In cases where the predictor or other variables were not found in the *Encyclopedia*, a literature search was conducted to locate a source that defined the variable and reviewed its connection to other traits of interest. Each additional variable found to be related to the predictor variables during this process was open to further investigation in a similar manner during the analysis described in the next section. This means that some data collection continued throughout the process.

The manner of initial data collection described here is not exhaustive. The studies that acted as a starting point for this project may not have been representative, and research methods for individual studies were not investigated for errors. The sources that began this process were published in peer-reviewed journals or texts and are authored by researchers that are well-respected in this area of study; it was assumed on their authority that these initially collected variables were a satisfactory starting point for a theoretical discussion. The initial variables collected are not the only topics of conversation, as the

process branches out and away from this initial collection of information to explore other findings.

Data Analysis

The analysis of variables for this project entailed a discussion of possible interactions and associations based on information collected from the literature. Predictor variables were examined for how they may be associated with NDS based on a discussion of their definitions and past related research. The analysis of these variables revealed several themes, as discussed throughout Chapter Four. The process achieved a deeper understanding of the variables, suggested a host of potential interactions, and revealed possible explanations for why particular variables are correlated to NDS. The conclusion, reflected in the model formation, was that childhood environment is influencing the majority of variables.

Throughout this process, additional variables of interest were identified and brought into the conversation, especially if it was conceivable that something else was driving the system. These variables arose primarily during the variable definition and discussion process. For example, exhibiting hostility to perceived threat is related to several predictor variables, including self-esteem, locus of control, and neuroticism. This means that hostility to perceived threat may be meaningful to the system and was included in the discussion of traits associated with NDS. Variables brought into the conversation in this way were explored for theoretical influence and potential in assisting with a unified explanation for what initially appeared to be a chaotic assemblage of influences on NDS.

During this investigation, apparent contradictions among the variables appeared and required explanation. For example, while “relationship quality” is positively correlated to NDS, “being more in love” is negatively correlated to NDS (Hall et al., 2009). Relationship quality and being in love may appear on the surface to be similar, but my analysis explains how they are not and that their difference is meaningful to this project. Apparent contradictions were examined in this way, with the expectation of arriving at new insights that inform the understanding of the larger system.

To summarize the examination of variables described thus far: the variables were first defined and discussed individually and then in combination with other variables that are similar in order to find major themes of influence, such as “concern for others.” This is a useful process for understanding complex systems of interactions because by understanding the smaller, decomposed parts of a system and how they operate, solutions can be uncovered for the larger whole (Morris, 1970). The result of this analysis was a description of potential interactions and additional variables that are theorized to govern the system. In particular, factors of childhood environment arose repeatedly as a possible source for most variables in the system.

The progress throughout this project was exploratory and subjective. There are no rubrics for finding new explanations for things, so intuitive leaps are often required. However, it would not be accurate to refer to the end product as “interpretive” or “subjective” on this account, because the goal of this project was to assert an objective claim about NDS that could be empirically and statistically tested. In short, the final product of this project is stated as assertively and objectively as possible, but proceeds to that end through subjective inquiry—the conjecture and guesswork that feed science.

The data collection and analysis for this project included a discussion of predictor variables with significant correlations to NDS, definition and description of the variables in relation to each other, and an examination of additional variables as the discussion explored new possible interactions—all while addressing problems of causation and any insights found along the way. Each of these pieces of information were used to inform the theory construction process described below.

Theory Construction

Theories do not typically arise from a proposed method, but appear to originate off-paper in the minds of theorists and only appear as finished products after unplanned processes occur. For example, Darwin can hardly be said to have proposed in detail how he would travel about, engaging in observations of various critters with the intention of formulating specific deductions about them, culminating in a cohesive theory that could (in one sense) explain all life as we know it. And it would be silly to have expected such a proposal ahead of time. Steps can be enumerated from an investigation of the process after the fact, but that does not mean that if those steps had been followed at the outset that the conclusion would have been the same. With that in mind, what this section provides is a description of the major steps that took place during the process of theoretical model building for this project. This includes three steps: first, a discussion of causal claims and how they inform the process; second, how the system was simplified in order to assemble the model; and third, what implications were drawn from the model after its construction.

Causal Claims

In order to explain how the predictor variables were related to NDS, causal claims were made. The relationship between two variables *x* and *y* might be that *x* causes an increase, a decrease, or no change in *y*; or that *x* and *y* are related in some more complicated way, perhaps acted upon by a third variable. More importantly, the information collected during the analysis leads to some proposed explanation of *why* these variables are related in such a way; the *why* is the justification for the theorized causal interaction. The causal claims made throughout the discussion of collected research suggested childhood factors were causing the reported correlations in the system of variables. How those variables interact with NDS in adulthood was therefore a confusing place to start. Causation was further explored from the perspective of childhood environment.

According to Reynolds (1971), causal claims are the natural product of research-based theory creation. Reynolds describes data-driven theory as an attempt to discover and identify the "real" patterns in nature, patterns which are difficult to determine due to the large number of undiscovered variables in living systems. The data collection and analysis in this project included an effort to identify these undiscovered variables and simplify them into workable units. Identifying causal relationships between the variables simplified the focus of the model on the specific theme of childhood environment.

It was important that all steps in the model-building process were informed by existing research because the model is attempting to explain why these correlations are observed. Empirical relevance is important to the process because deductive arguments can be made which are capable of evaluation by other researchers (Blalock, 1961). That

is, decisions should be determined by available information and a logical process that others can evaluate and test.

Assembling the Model

The first step in assembling the model was determining which variables were primary, direct influences on the system and which were indirect or intermediary. For example, a variable like "child-rearing practices" is known to determine change in both popularity and concern for others, which are both correlated to NDS. This suggests that child-rearing practices are more influential on the system than either of these predictor variables, even if child-rearing practices had not been previously correlated to NDS. Decisions were made, in situations such as this, to focus on the variables that appeared to be most influential on the system. In this case, child-rearing practices continually emerged as a driver of the system.

Another type of simplification occurred if a chain reaction of influences was suggested by the published research. If several predictor variables were connected in this way to influence NDS, then the decision was made to concentrate attention on the head of the chain reaction. For example, if child-rearing practices influences relationship quality, which influences openness to experience, which influences NDS; then the most attention would be directed to the variables closest to the start of this chain reaction. Such decisions were justified as they occurred, but ultimately resulted in simplifying the model by reducing the number of variables considered to be causally affecting the system.

As counter-intuitive as it may seem, the more complex the system, the simpler the explanations should be to explain the connections between its parts (Blalock, 1961). This is because, when systems are interconnected, there are frequently external variables or

influences that govern or predict large portions of the system. Luce (1970) says the best explanations for a system are able to account for the greatest number of unique variables. Causal interactions were simplified during this project in a way that developed a theoretical description of the entire system that was simple, without losing its ability to explain the large number of unique variables involved. The process of simplifying the system by identifying variables that exert the most influence therefore continued until the system became simple enough to suggest one or more new explanations for NDS. This remaining set of primary influences, focused heavily on child-rearing practices, were used to construct the model represented below both graphically and verbally as a set of influences on NDS.

One particular goal of this process was to avoid vague, over-arching explanations such as "child environment." While it may be the case that many variables are related to child environment in some way, to say that child environment influences any or all of the predictor variables is not a conclusion that informs future work. Novel connections and explanations were sought throughout this process and especially at steps attempting to simplify the system by investigating recent literature, including new theory and scientific findings. An explanation that stated "child environment is important," or something similar, would not have been helpful or informative. The goal here was to investigate alternative explanations for interactions and arrive at new possibilities for understanding the human experience. Specifically, to explain *why* these influences were exerting the observed effect on NDS.

At the completion of this model-building, theoretical explanations had been discussed for the entire set of interactions in the system, culminating in a theoretical

model for what causes variation NDS. These individual explanations were broad in their application to the entire system of variables, but particular in their application to even the smallest of identified interactions between individual variables. Each theoretical causal connection was formulated through a series of logical processes based on the related, published research. Theoretical explanations were examined as described in the following section for potential application to other research or theory.

Model Extension

At least two things were addressed after completing the process of creating a theoretical model. The first was to summarize and explain the model in terms of how it was derived from the collection of variables that initiated this project, including how the ultimate claims of the model are consequences of evidence initially collected on the correlated variables. This involves a deeper explanation of the model's major conclusions. The second item to address was how the model related to other major theories or areas of research, including hypothetical consequences of the model and if it answered any other questions outside the scope of this project.

The theoretical construct created by this project was intended to have value outside the system under investigation here (nonverbal communication). Ashby (1970) called the completion of a theoretical model only a temporary completeness because the model should be explored for how it may be used to understand other systems. For example, the theoretical explanation for the system of interactions that result in NDS may also explain some other system, such as spoken language learning and mathematical or musical ability.

Similarly, since this same system of predictor variables has been used by other researchers to describe response variables other than NDS, the explanatory theory developed here was examined for how it applies to those related response variables. For example, emotional intelligence has been used as a response variable for this system, which includes the ability to manage one's own emotions (Goleman, 1995). This means that it was productive to theorize how the explanatory theory constructed by this project explains the development of emotional management skills, which in turn has implications for how a variety of mental disorders may develop.

The theory and corresponding model of interactions developed by this project provides an explanation for how the collection of correlated variables found in the research literature can predict or explain NDS. A model particular to this area of research has not been developed. Current explanations rely instead on well-known theories from other areas of research. The abundance of research on the topic was more than sufficient to provide the building blocks for a new theoretical model. The explanation for NDS developed here was informed by the research, compared to other current theories, and applied to other skills or systems that are similarly lacking in novel, data-driven theory. This theory is stated in assertive terms that can be assessed by future researchers for relevance and accuracy.

CHAPTER FOUR: RESULTS AND ANALYSIS

In this chapter I discuss the process and the results of variable collection, discussion, and analysis that were described above. There were multiple potential areas of investigation revealed throughout this process which were each given attention as they arose.

Many of the variables correlated to NDS suggest positive or negative outcomes for individuals at the high or low end of the NDS spectrum. This means the correlation is easier to make sense of by discussing individuals who might exist at the extremes, rather than an average person. For example, a positive correlation to relationship quality is best understood by examining the implications of having high or low relationship quality *and* the corresponding level of NDS. However, trying to understand the correlation by discussing a person with average relationship quality and average NDS is difficult. The reason for this difficulty is that one can often quickly understand examples of high and low representatives of a given trait, as well as locate the research discussing them, but to find an *average* representative or to even know what "average relationship quality" would look like is a bit confusing. For this reason, throughout this project there is a focus on either end of the NDS spectrum and the consequences for an individual with the corresponding traits. It is important to remember that, although this discussion focuses on the extremes, most people are average and do not exhibit the collection of traits I propose to exist at the extreme ends of the NDS spectrum.

Initial Variable Collection

As described above, the variable collection for this project began with a recent review of published literature which provided the initial variables and information needed to explore and locate additional variables during the subsequent analysis. The chapter on nonverbal sensitivity in the *APA Handbook of Nonverbal Communication* (Riggio & Darioly, 2016) is relatively short, concisely describing various methods of assessing NDS, some major predictor variables identified by each test method, and other issues related to NDS. The most frequently used tests are discussed, with assessed communication channels that include audio, video, combinations of both audio and video, still images, a variety of situational and relational contexts, and self-assessments. Definitions for NDS within this chapter include a variety of abilities, such as correctly interpreting the meaning of nonverbal cues, reading a person's traits, detecting deception, recognizing adherence to social norms, sensitivity to subtle appearance cues, and recognizing emotions and feelings in others. More information on these various communication channels and the tests used to assess NDS can be found throughout the APA handbook (Matsumoto et al., 2016).

The major variables that have been correlated to NDS, according to Riggio and Darioly (2016), are included in Table 4.1. This collection also includes some additional variables located in some of the most recent reviews on the topic mentioned by the authors (e.g., Hall et al. 2009; Ickes, 2009). This was only an initial collection of variables and not intended to be exhaustive. Table 4.1 does not include all the variables that have been correlated to NDS in the published literature, but these variables do serve as an adequate starting point for the analysis that follows. In the next section, these

variables are defined, explored for relationships with each other, and other potential variables are identified and brought into the discussion as interactions are explored.

Not everything that is associated with NDS was useful to this project. As mentioned by Riggio and Darioly (2016), lie detection is highly unpredictable. Respondents usually score little better than random chance at detecting lies, and professionals who might be expected to be proficient, such as law enforcement and federal officers, polygraphers, and psychiatrists, are no better than the average person at detecting a lie. For these reasons, lie detection is typically not included in recent studies on this topic and I did not include it in this project.

Table 4.1 Initial Collection of Variables Correlated to Nonverbal Decoding Skill (NDS; Hall et al. 2009; Ickes, 2009; Riggio & Darioly, 2016)

Positively correlated to NDS		
Internal locus of control	Self-monitoring	Female (vs Male)
Perceived relevance of test	Feelings of inadequacy	Married with toddlers
Age	Relationship quality	Healthy personality
Better adjusted personality	Popularity as children	Self-esteem
Openness	Conscientiousness	Extraversion
Need for social support	Emotional stability	Sense of responsibility
Empathy	Sympathy	Compassion
Nurturance	Acquaintanceship	Affiliation
Tolerance	Foreign travel	Cultural adjustment
Communality	Healthy relationships	Having religious values
Dance experience	Sports performance	Business performance
Effective leadership	Prior musical training	ASL proficiency
People-oriented	Feeling personality type	Artistic-aesthetic interests
Empathy and social support seeking	Physiological synchrony to negative states	Less-difficult childhood temperament
Moderately strict father figure	Parental agreement on childrearing practices	Physician labeling patients as anxious or depressed

Fine arts majors (vs STEM)	Business administration majors (vs STEM)	Doctors with more satisfied patients
Rated as more effective workers	Positive evaluation by co-workers	Rated by superiors as better clinicians or teachers
Peer-ratings as more interpersonally sensitive	Other-rated as assurance seeking	
Negatively correlated to NDS		
Aggressiveness	Anxiety	Social Anxiety
Depression	Neuroticism	Introversion
Shyness	Loneliness	Exhibition
Autism	Schizophrenia	Alcoholism
Family expressiveness	Feeling hurried	Other-rated as hurried
Bullied by childhood classmates	Duration of marriage (after 1-2 years)	Mothers have joint custody (vs full custody)
Abusive husbands (when judging wives)	Being more in love or obsessed with love	Other-rated as rebellious or non-conforming
Over-estimating one's value to others on the team		

Variable Definitions, Themes, and Analysis

The following section illustrates how the correlated variables listed in Table 4.1 are defined and understood, summarizing what is generally known about them from prior studies in order to develop an understanding of the system I am attempting to model. The discussion begins with the most frequently correlated and well-documented variables related to NDS. As variables are introduced into the discussion below, they are defined and explored for implications, expanding into discussions of similar traits and abilities that are either already correlated, or that are hypothesized to be impacting the system. Much of the following discussion starts with basic information or definitions taken from the *Encyclopedia of Social Psychology* (Baumeister & Vohs, 2007), with additional

sources located as terms and interactions are explored in greater detail. From this exploration of variables, general conclusions are drawn in an effort to begin to simplify the conversation and focus in on elements of interest for the theory construction that follows.

The Female Advantage

This discussion begins with the variable that is considered one of the best documented and consistent correlates to NDS; the so-called "female advantage," that women consistently perform better on NDS assessments than men. Further information regarding this difference can be found in Judith Hall's book *Nonverbal Sex Differences* (1984). In her extensive review of the topic, Hall found that, although women perform better than men, when masculinity and femininity were assessed independent of sex, the more masculine of both sex were the better decoders, with correlations to masculinity becoming more positive with age and correlations to femininity becoming more negative with age. Other interesting differences were that women with more liberal and less traditional views of women's roles were better at decoding and that women are generally more likely to overestimate their NDS ability in self-reports.

One theory put forward for sex differences in NDS is that positions of oppression cause individuals who are deprived of power to become more alert (Hall, 1984). As Hall reports, that theory is not supported by other studies examining similarly oppressed populations, including studies comparing white majority to black minority populations in America, which failed to find a significant difference in NDS. Similarly, more liberal and masculine women score higher on nonverbal assessments than those holding more traditional women's roles, also contradicting the oppression hypothesis. The cause of

women's increased scores likely originates elsewhere than in a position of inferiority or oppression.

One variable found to affect the test score difference between men and women is "perceived relevance of test" (Mufson & Nowicki, 1991), which is correlated to increased NDS scores. Researchers were able to eliminate the score difference between men and women by telling men that their score would reflect their social competence. The sex difference observed in regular studies may exist because men may often be less interested in appearing to understand and accurately interpret emotions and feelings than women. Many of the nonverbal assessments described above rely primarily on emotion-based stimuli, requiring men to pay attention to and admit their observations, which may not be a pattern of behavior they have been socialized to feel as comfortable with as women. They may be performing less well because that is what is expected. Women have also been shown to perform worse on assessments if they are primed to believe they should be worse at the skill measured (Martens, Johns, Greenberg, & Schimel, 2006). This motivational influence on assessment scores is considered a highly plausible cause of the sex difference in NDS, since other researchers have had success in eliminating the sex difference after motivating test takers to perform better on assessments by offering them money (Klein & Hodges, 2001). Given this collection of findings, I will not be considering sex or cultural oppression as significant causal factors in the development of NDS.

However, the correlations to masculinity and a more liberal view of women's roles (Hall, 1984) warrant further consideration. The explanation for these correlations may lie in a closer examination of other variables correlated to NDS, such as the negative

correlation to aggressiveness. These correlations suggest that a person high in NDS is low in aggressiveness and high in masculinity, so there must be different masculine qualities that correspond to increased NDS than aggression. In studies that assessed a variety of traits related to gender stereotypes, NDS scores were positively correlated to responsiveness to others' needs (Bronfenbrenner, Harding, & Gallwey, 1958). Combined with the extraverted and independent traits identified during the variable collection described above, this suggests those with high NDS would be more assertive in general, especially in taking care of others. Bronfenbrenner et al. (1958) also conclude from their studies that empathy is an "unequivocal" aspect of NDS, which would make aggression a predictor of nonverbal deficiency. Indeed, NDS is positively correlated to empathy, sympathy, and compassion (Table 4.1). My suggestion is that masculinity may correlate to NDS as a result of assertive care-taking behaviors and independence that individuals high in NDS may exhibit.

The conclusions I take away from this discussion are that women perform better on NDS assessments because they are more motivated to appear knowledgeable about emotions and feelings; or, to put it in another way, men are de-motivated to do so. This would mean that the sex difference in NDS is a side-effect of social pressure to perform as expected. This effect is very small, but significant and predictable (as reviewed in LaFrance & Vial, 2016), suggesting that there may be similar minor effects in the system resulting from perceptions of stereotypes affecting NDS scores.

While NDS is not correlated to femininity, it is positively correlated to a variety of helping, nurturing, and affiliative behaviors. These traits are the next topic of discussion.

Concern for Others

NDS is associated with a concern for other people, with positive correlations to variables like compassion, empathy, sympathy, and other types of positive people-oriented characteristics like affiliation and communality (see Table 4.1). Keltner and Goetz (2007) defined compassion as feeling for another's suffering and wanting to assist them. These feelings can override the desire to avoid personal harm, creating feelings of forgiveness and the perception of commonality between the self and the perceived other. According to the authors, compassion "amplifies the sense of common humanity" (p. 160), which is distinguished from empathy—to truly understand another and mirror their feelings. Between the two traits, an individual would possess understanding of another's feelings and the perception that they shared a common humanity, making it easy to assist someone in need. Hodges and Myers (2007) clarified the definition of empathy to involve the responses one has to perceiving another's experience, understanding their position as if experiencing it for oneself. This may also help to explain the positive NDS correlation to tolerance, since understanding another's position would make it more difficult to demonize them.

The forgiving nature that corresponds to these traits implies less favorable traits for those low in NDS. As discussed by Exline (2007a), those who avoid forgiveness often do so in order to enjoy the benefits of victim status. They can end up encouraging those around them to assist in their demonization of others. Those who are more forgiving, according to Exline, are more agreeable and get along easier with others. Those less likely to forgive tend to be neurotic or focus on negative events, and feel entitled, seeing themselves as superior and therefore more defensive of their rights. High NDS seems to

shield one from assumptions of superiority, as their perception reveals commonalities between themselves and others. The person high in NDS is likely to think more carefully before acting when those actions have consequences for others.

In contrast to empathy and compassion, sympathy is more of an expression, a way of being *moved* to help others (Hodges & Myers, 2007). Studies conducted by Oliner and Oliner (1992) found that sympathetic acts were more likely from those who felt empathy for those in need, felt personal responsibility for those in need, and had a strong sense of self-efficacy—the belief that their actions would produce results, which is another trait correlated to NDS in the form of internal locus of control (ILC). This constellation of terms (empathy, sympathy, compassion) is often used interchangeably throughout the research, as definitions change over time, with researchers occasionally using the term "empathy" to refer to any number of related qualities depending on researcher preference or convention (as discussed in Decety & Ickes, 2009). The collection of these traits, regardless of what terminology is used to refer to them, trace a path of understanding others, wanting to help them when needed, and feeling obliged to follow through on that urge with the belief that one's actions will be effective. These behaviors may be partially responsible for the related positive NDS correlations with relationship quality, feeling (vs thinking) personality types, and being generally people-oriented and prosocial.

Empathy is frequently discussed in connection with NDS in the research, so it warrants further investigation here. Hatfield, Cacioppo, and Rapson (1994) discuss empathy as a cause of mimicry via emotional contagion when observation results in a mimicked response, such as when one person smiles unintentionally from perceiving another's smile. Chartrand and Bargh (1999) showed that strangers are often

unintentionally mirrored, resulting in smoother interactions and increased liking between interaction partners, with empathic individuals showing greater mimicry. Chartrand and Bargh called this the *chameleon effect* because the individuals change their behavior to match their environment. Mimicking of facial expressions is suggested to occur in as young as 10-week old infants (Haviland & Lelwica, 1987). This mimicry is unintentional and appears to be genetically hard-wired. It is correlated to empathy which supports the idea that empathy may also be partly genetic. The correlation between empathy and acts of sympathy or compassion may then be potentially hard-wired, which would be in agreement with the extensive literature on the altruistic behavior thought to have evolved in order to maintain cooperation and build communities among groups of people (e.g., Dugatkin, 1999). A genetic basis for mimicry suggests a genetic basis for NDS. If the prior analyses are correct, then humans should be predisposed to perceive commonalities in others, show empathy, and help each other.

Attempting to draw a causal claim from this, when prosocial behaviors may develop in infancy, is difficult. Prosocial behavior is voluntary behavior intended to benefit others. More precisely, Eisenberg (2007) includes helping, sharing, and providing comfort as prosocial behaviors, which are caused by any variety of either selfish or altruistic motives. The term “prosocial” is therefore similar to many other traits found to be positively correlated to NDS. As a specific trait, prosociality has also been independently correlated to both empathy and NDS (e.g., Strayer & Roberts, 2004). If one were to compare the sort of helping behavior that might be expected from someone high or low in NDS based on these traits, those high in NDS would be more likely to assist in situations where it does not benefit them, when no one is watching or it is taboo.

These behaviors may also develop at a relatively young age, since infants at 12-months already have shown the ability to warn others of negative expected outcomes (Knudsen & Liszkowski, 2013). It could also be a result of mimicking observed prosocial behaviors, as supported by studies on children that resulted in either increased aggression or peaceful behavior after observing adults behave that way (Bandura, Ross, & Ross, 1961). Mimicry may be one initial mechanism for learning to care for others, perhaps quickly developing into an emotionally-driven imperative.

Concern for and helping those in need seems to be highly compatible with the NDS correlation to religious values. Religious values measured by research studies are a different construct than religious belief; religious values are abstract and represent ideal goals and conduct (Rokeach, 1968), or having a meaningful relationship with the universe (Spranger, 1928), rather than any specific beliefs connected to a particular religion. Religious values have been significantly correlated to lowered anxiety and depression (Mirzamani & Mohammadi, 2003), two traits which are also low in those with increased NDS. Religious values may assist in maintaining a positive outlook. These studies tend to suggest that having a religious value system is what correlates to the most positive outcomes.

Those high in NDS also appear to help others from an internal motivation rather than adherence to social norms. Perhaps they have developed an internal, abstract, or intuitive understanding of morality than that imposed by external influences or what is typically found in canonical systems of moral rules. Being internally driven to help others may also make them more likely to “do the right thing” in situations when typical conformers will do nothing, or less likely to join organizations that dictate moral

structures by rote (i.e., churches or political organizations). Members of religious organizations, for example, may be more likely to declare stronger support for prosocial behaviors like helping and sharing, but they behave no differently in their actualized helping behaviors than regular members of the population in laboratory studies and their religious identity can contribute to ingroup-outgroup thinking (Exline, 2007b). Such behaviors are somewhat opposed to the traits positively correlated to NDS.

Related traits correlated to NDS include communality, when an individual extends their sense of responsibility to assist those around them without expectations of reward (Clark, 2007), and affiliation, or associating and belonging with others (Rose, 2007). NDS is also correlated to a desire for prosocial behaviors to be reciprocated, a desire for empathy and social support, and engaging in assurance-seeking behaviors (see Table 4.1). Those high in NDS appear to desire the company of others who exhibit their same behaviors and have a similar capacity for empathy. This is not surprising, considering the common tendency for people to seek out and associate with like-minded individuals, sometimes called the "similarity-attraction effect" (Reis, 2007); but it may be more difficult for the empathic person to "find their people" when individuals in groups tend to conform to and privilege their in-group above others, a behavior the nonverbally skilled person would avoid.

At the opposite end of these correlations, one could inquire as to the connection between low NDS and a decreased need to belong, coupled with a decreased concern for others and increased feelings of adequacy. This problem is just as interesting. For example, perhaps individuals with low NDS would be less skilled at perceiving messages of dislike or scorn, making them more likely to assume they are liked or have been

accepted as a member of a group. They may also be less likely to help others simply because they do not perceive others' needs. This individual would be less directed by others' feelings and reactions because they do not perceive them. They might also tend to make assumptions about others' internal states which are false. This could explain the negative correlation between NDS and being more in love or obsessed with love (Table 4.1), since obsession may require a false romantic image of one's partner. Incorrect assumptions about others could also cause any number of social or professional problems for those with low NDS. This may be why performance and competency in multiple domains is correlated to higher scores in NDS.

The conclusions I would draw from this section are that people high in NDS have a more internally motivated drive to help others, as opposed to moral behaviors done for the benefit of an observer, or to adhere to a rule or law. Their desire to help others is supported by their tendency to perceive commonality between themselves and others, where a less-perceptive person might look for differences in order to justify in-group out-group behaviors. Those high in NDS should therefore be less likely to feel superior or entitled, and more likely to understand even those who they disagree with. Their internal motivation also likely causes them to turn any negative self-reflections or evaluations into positive forces which allow them to overcome negative feelings and improve themselves. For these reasons, they are likely to be valued by the group; they help others, understand other perspectives, and attempt to fit in without agreeing mindlessly to group consensus or acting to hurt others within the group, perhaps contributing alternative opinions in ways that avoid offense.

A poor nonverbal decoder may stand out in a group due to their poor social skills and inability to recognize and learn from their mistakes or misconceptions. This set of behaviors may explain why those low in NDS are more likely to be rated as non-conformists while internally they are more rigid adherents to what they perceive as the group norms. The same issues likely occur in their romantic relationships where they become obsessed with the idea of being in love but fail to adequately maintenance others in the relationship, explaining the negative NDS correlation to loneliness.

In general, the correlated variables discussed throughout this section appear to most likely be consequences of NDS level or that NDS somehow causes a variety of related traits to co-evolve. There are several additional variables correlated to NDS which can also explain success in social circles and personal life. These are the topic of discussion in the next section.

Knowledge of Oneself

Several variables positively correlated to NDS are related to knowledge of the self and a better understanding of how others respond to the self. These variables include self-monitoring, conscientiousness, self-esteem, and (internal) locus of control. According to Rawn (2007), high self-monitors tend to be more behaviorally sensitive to situations, modifying their behaviors based on context. Low self-monitors, on the other hand, tend to be more consistent in their behaviors across contexts, with expressed behaviors being dictated more by their personality traits than by the environment. Increased NDS would allow one to tailor their behaviors appropriately to situations and poorer NDS would make this more difficult because one would not even recognize what the appropriate behaviors are. For this reason, a low self-monitor may exhibit a more consistent

representation of themselves and appear insensitive, while a high self-monitor will adapt their behaviors to the situation and audience, appearing to fit in. As a result of the high self-monitor's ability to adapt, their social groups tend to differ; they may have different types of friends in different situations. Correspondingly, low self-monitors are more likely to have one stable group of friends who all have similar traits. Rawn also describes the high self-monitor as better at expressing internal states and actively suppressing inappropriate emotions than low self-monitors. High self-monitors are more likely to suppress mimicry around those they are not affiliated with, while low self-monitors do not exhibit differences in mimicry based on affiliation. However, this attention to interaction partners does not correspond to deeper romantic relationships for the high self-monitor, who is more likely to experience casual relationships with less commitment and intimacy. Many aspects of the high self-monitor correspond to other traits that are positively correlated to NDS, making the positive correlation between NDS and self-monitoring unsurprising. Being able to perceive others accurately may be straightforwardly related to accurately perceiving oneself.

Another major trait associated with self-awareness is locus of control. As described by Twenge (2007a), those with internal locus of control (ILC) tend to believe they have more control over their destiny or fate. This attitude aligns well with self-monitors, who exhibit strong ability to control how they are perceived in social gatherings and tailor their behavior to the way they wish to be perceived, controlling the perceptions of others. Twenge further distinguishes differences between internal and external locus of control in terms of power; those with external locus of control believe that some powerful other is controlling their fate. Those with ILC, who perform better on

nonverbal assessments, believe they are more responsible when negative outcomes occur, perhaps because they are able to perceive how present outcomes resulted from prior actions. They are less likely to be depressed, anxious, lose self-control, or be overwhelmed by stressful situations. ILC is also a strong predictor of school achievement, predicting minority achievement in school better than any other demographic variable. The explanation for this relationship, described by Twenge, is that those with ILC study harder because they believe it will have an effect, whereas those with external locus of control do not believe their actions will affect the outcome, blaming negative outcomes on variables out of their control. ILC individuals are also more likely to take control of their health, and are therefore less likely to suffer from negative health outcomes. It is an interesting trait because it shows how strongly the power of belief in one's own ability can affect life outcomes. Those with high NDS may acquire ILC because they understand how to manipulate their situation in the social environment and are therefore more likely to be in control of others' perceptions of them.

Additional studies on locus of control mentioned by Twenge (2007a) include findings that men have more ILC than women, whites more so than minorities, and older people more than younger people. Power in general is suggested by these trends to be related to ILC, but the effect of age may be caused by observed generational differences which also have significant effects on locus of control. Recent assessments of college students show them to have significantly more *external* locus of control than prior decades, corresponding to increased blaming of others for problems, increased rates of anxiety and depression, and more parental interference with decisions made by teachers and professors (Twenge, 2007a). One inference I might take from these studies is that the

recent college-aged generation is generally poorer at NDS than prior cohorts, since several of these variables or behaviors are negatively correlated to NDS.

Culture has also shown an effect on locus of control, with traditional (religious or interdependent) cultures exhibiting more externality, and independent cultures being more internal. This is thought to be the cause of some observed differences between whites and racial minority populations which have somewhat more traditional value systems (Twenge, 2007a). Independence requires more individual problem solving and decision-making, perhaps creating a connection between ILC and the ability to predict consequences of future actions. Traditional cultures, on the other hand, may engage in more cooperation and community dependence, explaining the tendency of these cultures to have more external locus of control. This may mean that locus of control can also predict group membership and identity, with more external individuals being more likely to identify with the group. NDS is positively correlated to participation in community, but not to traits that support defining oneself in terms of the group. This implies that more traditional communities may still contain individuals with high NDS, but that they would likely have an independently formed identity.

These cultural and generational effects suggest that independence may have some relation to NDS. Independence, however, seems to have very different side effects determined by pre-existing personality traits. For example, a person who is driven towards prosocial behavior, like the skilled nonverbal decoder, may be driven to become more independently prosocial; but someone more selfish may simply exhibit more selfish behaviors independently (Utz, 2004). This research suggests that independence merely

augments other personality traits, perhaps making them more obvious and therefore causing the observed correlations.

Some of the trends corresponding to locus of control may suggest on the surface that there is also no causal effect of ILC upon NDS because locus of control shows opposing trends to those observed in NDS. That is, for ILC, men and whites score higher, but for nonverbal assessments, women score higher and there is no effect for race. However, given the evidence discussed in earlier sections, that motivation can affect scores, I would argue that whites and men are more motivated to appear in control, having lived with this cultural assumption throughout life in most of the cultures tested by these assessments. This motivation to appear as they are "supposed to" appear, I would argue, is enough to skew their responses to certain types of assessments. I will therefore continue to consider ILC an important factor despite these few, easily explained contradictions.

The conscientiousness variable is another personal trait that relates to self-control and awareness. Conscientiousness is measured as part of the Big Five Inventory of personality traits (Piedmont, 1998). The Big Five traits shift somewhat over the lifetime, with conscientiousness increasing with age, and leading to striving for higher standards, better self-discipline, being orderly, deliberate, and dutiful (Löckenhoff & Costa, 2007). This personality trait goes well with the self-control exhibited by those with high self-monitoring and ILC. In agreement with the findings for self-monitoring mentioned above, conscientiousness is also reported by Löckenhoff and Costa to correspond to healthier behaviors and longer lives. Additionally, those low in conscientiousness tend not to plan ahead and establish clear life goals, being more careless and disorganized in

their habits and choices. It may be that having goals assists one in being conscientious and careful, while naturally requiring some form of organization in order to both make and achieve those goals. NDS may have a reciprocal relationship with conscientiousness since a skilled decoder would be able to perceive social consequences of actions and therefore be more careful and organized in their behaviors; being more conscientious may, in turn, cause one to attend more closely to the nonverbal behaviors of others.

Self-esteem is another trait correlated to NDS that can affect health and success. Self-esteem should not be confused with feelings about appearance or body image, in what Twenge (2007b) calls a common "nonpsychologist" mistake. While the nonverbally skilled person tends to be physically healthier, one should not mistake their increased self-esteem in this discussion to imply anything about body image or appearance, which have not been correlated to NDS. According to Twenge (2007b), self-esteem is related to better knowledge of oneself and one's preferences. Persons high in self-esteem know more of their likes and dislikes, are better at self-rating, are happier, more emotionally stable, have more relationship confidence, have greater persistence, and are more likely to take credit for their own successes. Black Americans score higher on self-esteem than White Americans, with Hispanic Americans scoring only slightly lower than whites. Similar to the findings on ILC presented above, cultural difference appears to be more responsible for this variation than race. Cultural differences are a stronger predictor of self-esteem than race, gender, or income (Twenge, 2007b). However, NDS is not correlated to cultural or racial differences, so it is likely that NDS and self-esteem have a unique relationship, with NDS helping to develop positive self-perceptions and deepen self-knowledge. The tendency for the nonverbally skilled to have ILC and increased self-

monitoring may help them to feel good about themselves, knowing that they can control their position in life.

Twenge (2007b) makes some effort to distinguish high self-esteem from narcissism, or inflated sense of self. Self-esteem is described as a potential measure of how one feels accepted by others, arising from a sense of love and belonging. Narcissists can score high on measures of self-esteem because they believe they are better in their achievements than others. However, narcissists are aware that they are not friendly or moral people. They lack empathy, and are more likely to put people down, cheat, and respond aggressively to threat. Individuals with high NDS tend to behave very differently, guided by empathy, due to the variety of personality traits discussed throughout this project. Narcissists lack such traits but are likely to rate themselves highly in assessments which means that narcissism and other similar traits can confound results on assessments due to the individual's lack of accurate self-perception. The type of self-esteem exhibited by the narcissist corresponds to those traits which correlate to lower NDS. The healthy form of self-esteem relates to accurate self-perception and empathy. This means that NDS does not necessarily cause self-esteem, but self-esteem may be a side effect of these other related positive life outcomes typical of a more skilled decoder.

The conclusions I would draw from this section include that those high in NDS are more likely to be in control of their life and health, having more drive, discipline, and self-control than those with less NDS. This collection of traits may also explain the negative association between NDS and feeling hurried; people with higher NDS are just in better control of their lives. For this reason, they will likely be more successful in noticeable ways, such as school or career achievement. Independence and internal

motivation have arisen multiple times thus far, suggesting a strong likelihood that someone high in NDS is less likely to be persuaded or manipulated, less likely to go along with a poor group decision, and therefore less likely to regret past actions. Empathy may drive those with high NDS to self-sacrifice, but this self-sacrifice must align with personal goals, which they are strongly driven to achieve. For this reason, nonverbally skilled people may cultivate a personal objective of living and working for the benefit of others, which would explain why they perform well at school and work. Achievement goals must have some internal motivation in order to be attained. The independence of those with increased NDS makes their appearance of social conformity (chameleon effect) in groups interesting, a behavior that is discussed in greater detail below.

Additional Positive Traits

There are a few remaining personality traits correlated to NDS which may affect an individual's interactions with others. The positively correlated traits include openness to experience, extraversion, tolerance, and a generally healthy personality. Openness to experience and extraversion are both measured as part of the NEO Personality Inventory-Revised (Piedmont, 1998), commonly used to assess the Big Five personality traits mentioned above. The Big Five traits are openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Löckenhoff and Costa (2007) describe those who score high in the trait of openness as curious and imaginative, with broad interests and willingness to embrace new ideas, sensitive to imagination and aesthetics. They do well in creative professions and have a richer emotional life. For the person with high NDS, this openness may contribute to participation in diverse social groups, which are easily navigated due to their other prosocial traits. A broad set of creative interests

may also lead to membership in diverse communities where they would quickly make friends.

The creative interests typical of the open personality type are also independently correlated to NDS (Table 4.1), including artistic-aesthetic interests, prior musical training, dance or sports experience, and increased likelihood to major in Fine Arts (vs STEM-related fields). Since those with increased NDS seem to be successful in a variety of ways, perhaps they may be driven towards more artistic majors and interests in order to be near other open and expressive personalities. Other traits that have been correlated to creativity include a tendency to create for the sake of personal enjoyment rather than external motives, having less investment in romantic relationships than professional ones, having higher divorce rates than the general population, being less susceptible to pressures of conformity, and being more independent (Simonton, 2007). Most of these traits have already been brought into the conversation because they correlate to other variables of interest or correlate to NDS directly, meaning that creativity is highly compatible with increased NDS.

Even the creative person's higher divorce rates correspond to NDS after the discussion above. One might assume that independence is a primary issue in these relationships, but it has been suggested by some studies that high NDS itself may be damaging to relationships, hypothetically because other people may not wish to be accurately perceived (Rosenthal & DePaulo, 1979). Their independence and internal motivations may also make it difficult to for those with increased NDS to maintain the communicative partnerships required for a relationship. There is also reason to believe they would be less likely to have lasting damage if the relationship fell apart, due to their

healthy personality traits and lack of investment. A more average decoder's fear of consequences of a failed relationship may be the necessary motivation to keep a relationship together, meaning that less independent people might put forward more effort to make things work. An independent personality, by its very definition, is not likely to support the interdependence that fosters typical romantic relationships.

Creativity in general has also typically been considered a highly independent behavior. In one research study, individuals who were first given a task where they read words related to autonomy performed better on creative tasks with partners, showed more empathy to each other, and (ironically) felt closer to each other than individuals given neutral words before the task (Weinstein, Hodgins, & Ryan, 2010). The act of creativity may somehow require independence of thought. Why autonomy was found to increase empathy is also interesting, but somewhat of a mystery.

Independence may be more specifically defined by self-confidence, self-acceptance, ambition, and being driven—traits that were all correlated to creativity in a meta-analysis by Feist (1998). However, Feist also found creativity was related to hostility and impulsiveness, which are not positive correlates to NDS and stand in opposition to several of its correlates. This suggests that only certain types of creative people may be nonverbally skilled; that is, creativity is not likely a cause of NDS, but it may somehow be a byproduct of this other constellation of personality traits. However, it is difficult to discard the idea that a creative mind may be the precursor to proficiency in any number of skills, since creativity has been associated with intelligence in a number of studies (Batey & Furnham, 2006).

Furnham and Nederstrom (2010) found additional traits positively associated with creativity include extraversion and having high verbal and numerical reasoning. Furnham and Nederstrom suggest that extraversion may be connected to creativity for the same reason as being in a good mood, rather than a bad mood, in that the mind works better when engaged with the world. This engagement with the world may be a causal factor leading to increased NDS, but it is difficult to rule out the possibility that increased NDS is what leads to increased engagement with the world. According to Löckenhoff and Costa (2007), those high in extraversion also tend to have more romantic partners, with less investment per relationship, similar to those traits correlated to creativity and other NDS correlates.

Genetic predisposition could be the causal factor influencing both extraversion and NDS. McCrae and Costa (2003) theorize that the Big Five traits (including extraversion) are genetic predispositions because these traits tend to remain fairly stable over the course of one's life, although people often learn to modify their external behaviors to hide their predisposition and fit in. The lifetime stability of these traits is identified in children as young as elementary school and becomes well-established by adolescence. Major life events tend to have only small and inconsistent effects on these traits. Because four of the Big Five traits are significantly correlated to NDS, there may be some support for the argument that genetic influences are at play, or that one's level of NDS is developed or set within the first years of life, leaving permanent effects on later attempts to learn or improve—much in the same way one's first language affects the sounds and grammar of languages learned later in life.

The positive correlation between tolerance and NDS has been briefly discussed already. The tendency of those with increased NDS to associate with multiple, diverse groups of people, to blend in with them, and to show empathy and compassion towards others without expectation of reward are all highly suggestive of a tolerant individual. There are many definitions for tolerance so it seemed best to use the definition from the original literature to correlate this variable to nonverbal skill. Tolerance was measured in some of the original literature that discovered this correlation with the California Psychological Inventory (CPI; Gough, 1957). The definition of tolerance used by the CPI is made from the collective traits of permissiveness, acceptance, and nonjudgmental attitudes and beliefs (Gough & Bradley, 1996). Those who score high on this trait tend to be intelligent, broad-minded, and nonjudgmental; those with low scores on this trait tend to be dissatisfied, narrow-minded, rigid, and authoritarian (Megargee, 2009). The authoritarian personality type is someone who prefers strong rulers and complete obedience to authority, as measured by a scale meant to predict prejudice and racist behaviors (Nelson, 2007).

Importantly, tolerance is not equated to a willingness to associate with diverse groups, but rather the permissiveness, acceptance, and nonjudgmental feelings that may or may not result in associations with diverse groups. Those who attempt to appear tolerant by associating with diverse groups are not necessarily tolerant. Likewise, those who associate only with one type of group are not necessarily intolerant. However, what might be predicted is that the outgoing on open behaviors of those high in NDS would result in their associating with diverse groups, while those low in NDS would be more likely to have limited associations.

Empathy and concern for others may be associated with tolerance by definition, but there is a more interesting explanation for the correlation between tolerance and NDS. The ability to accurately perceive and understand another person, seeing what is common between oneself and others, is likely to make it difficult to hold unexamined prejudices against others. The correlate of tolerance then provides another explanation for the connection between NDS and empathy. It is not just to perceive the other, but to understand them, forgive them, and know them as an equal human being that may be causing many of these correlated variables. To truly, completely, and accurately perceive the other, then, is to care.

Some expected opposite behaviors or traits to tolerance might be prejudice and discrimination. A review of the literature by Sibley and Duckitt (2008) found several personality traits correlated to prejudiced behaviors. Prejudice was measured in the form of Right Wing Authoritarianism (RWA; Altemeyer, 1981) and Social Dominance Orientation (SDO; Pratto, Sidanius, Stallworth, & Malle, 1994), which are considered social attitudes rather than personality traits. RWA is a strong predictor of political, social, and ideological attitudes, as well as intergroup behaviors, general prejudice, and ethnocentrism. SDO captures attitudes about group behaviors and hierarchy. Many of the findings in Sibley and Duckitt's (2008) meta-analysis agree with traits discussed above; prejudice as measured by these scales was negatively correlated to agreeableness and openness to experience, as might be expected. The NDS correlate "cultural adjustment" seems somehow related to these behaviors, since acclimating to a foreign culture or fitting in appropriately to one's own culture would both require the accurate perception of

behaviors, the openness to experience change in one's own behavior, and the willingness to get along with other people.

Some findings from other studies that may not be as predictable are that individuals with more tolerance can tend to be more critical of political leaders, a behavior thought to be a result of low authoritarianism (Gołębiowska, 2009). A tendency to criticize political leaders may also be associated with less prejudice towards one's in-group or the status-quo, meaning that a person with low tolerance would be more likely to justify and defend a current leader if it re-enforced their group identity or political party. Increased NDS seems to suggest lowered dogmatism, meaning the nonverbally skilled person may be more likely to initiate change or propose alternative approaches when something isn't working, both because of their empathy towards those that may be affected and because they are also lacking in the conformity that would prevent them from speaking their mind or having those opinions. Because they are internally motivated, they would likely propose helpful ideas with less regard for what powers might be upset or overturned, especially given the related correlations to extraversion, creativity, and a variety of prosocial traits.

Discrimination is another related term not likely found in a person with high NDS. Anderson (2007) defines discrimination as "treating a person differently from other persons based on group membership and an individual's possession of certain characteristics" (p. 253). This behavior would be more likely from a person with low NDS, since those with higher NDS are more likely to have tolerance and openness, and be more likely to perceive commonalities between individuals. Increased NDS may be at odds with inherently discriminatory practices.

The conclusions I would make from this discussion include that NDS is likely associated with a general openness about people and ideas, a willingness to embrace and understand others, and an independent spirit. Those with more NDS likely have interests and associations that are broad and internally motivated, with meaningful personal connection and engagement. They would be less interested in whether or not others perceive or reward their behaviors. Tolerance and internal motivation combine to create an interesting personality type that can associate with many groups of people without conforming to the group and becoming a passive supporter. Ironically, their relationships are higher quality but less serious and more causal than those with lower NDS who exhibit greater conformity to others. It appears most likely that the causal connection for many of these traits is that NDS is responsible for the correlation; that is, increased NDS causes increased tolerance and low NDS encourages more discriminating or prejudiced behaviors.

There are several traits correlated to NDS which imply that those with low NDS may exhibit a collection of what are considered negative behaviors for one to exhibit, such as neuroticism, anxiety, or prejudice. Authoritarianism, exclusivity, privileging one's own group above others, and being closed or narrow minded and dogmatic are usually considered negative traits, but are common human behaviors. These types of "negative" traits are the next topic of discussion.

Additional Negative Traits

This section will cover what might be called the more negative personality traits that have been associated with NDS. In addition to those which have already been discussed (e.g., intolerance, prejudice), this section will include a discussion of

aggression, anxiety, and depression. Most of these variables are negatively correlated to NDS, meaning that someone low in NDS will be more likely to exhibit them. This supports the narrative that has emerged throughout this analysis that those with higher NDS have a heathier and more beneficial personality type. Aggression was brought into the discussion earlier as the female advantage in NDS was discussed, but the full meaning of this trait has yet to be examined.

According to Bushman and Thomaes (2007), human psychology research typically considers aggression to refer to behaviors intended to do harm to someone who wishes to avoid it. Aggression corresponds to increased feelings of shame and hostile expectations of the world which increase aggressive behavior because individuals who are more hostile make less fair judgements of the actions of others, seeing hostility where none was intended and reacting aggressively in response. This is more common from prejudiced individuals, and clearly appears to be the sort of behavior that increased NDS would prevent because misinterpretation requires decoding inaccuracy.

Despite much research and claims that support the idea of aggression being culturally learned, other research reported by Bushman and Thomaes found that children 1-3 years old spend far more of their time committing aggressive acts than any other age group or demographic. It may be the case that humans can culturally "unlearn" aggression, but to claim that culture teaches aggression in the first place appears to be a slight misinterpretation. Even hardened criminals were found to be less aggressive than this age group, although the level of "serious" harm committed may be very different—not for lack of toddlers trying. One may imagine that a lack of proper input, or perhaps growing up in an environment that exhibits similar aggressiveness (as a toddler), may

make it difficult for a child to grow out of this behavior. This narrative is supported by the evidence provided above, that infants appear to have some genetic predispositions to mimic observed behaviors and that conditioning during childhood can affect what types of behaviors they exhibit.

Neuroticism, another of the Big Five traits introduced above, is also negatively correlated to NDS. Neuroticism is highly compatible with aggression because it is a measure of how much a person sees the world as distressing, threatening, and unsafe. Kwon and Weed (2007) report highly neurotic people to be more emotionally reactive, anxious, tense, withdrawn, more likely to feel dissatisfied with their lives, and more likely to have physical and psychological problems. Interestingly, there is some support for a genetic influence in neuroticism, with twin studies supporting heritability at 40-60%, with the remainder of individual variation explained by differing environments. While they can be highly defensive and poor at problem solving due to lack of understanding the world, being highly neurotic may be beneficial for survival in the right doses. However, the neurotic are more likely to turn to aggression to solve their problems, which is detrimental to cooperation. Highly neurotic individuals also find lack of social conformity distressing and so are unlikely to engage in extreme antisocial behaviors (Kwon & Weed, 2007).

These individuals can likely still function as members of a group and may attempt to keep things working, rather than to upset the system. Dissatisfaction with their life may prompt them to justify their position by assisting in norming behaviors with others in their social group. The neurotic personality type may be too anxious to act alone, but they

may be especially supportive of a more hostile and defensive contingent within a group. These behaviors are also well aligned with the traits of authoritarianism and prejudice.

Similar correlates to NDS that fit directly into this collection of behaviors are anxiety, social anxiety, introversion, shyness, and loneliness. Anxiety is considered to occur in response to perceived threat which can include perceived potential harm, not just to oneself, but to self-esteem or self-worth (Arkin & Rucks, 2007), making it a potential motivator of aggression. Perceived threats to one's in-group may be similarly motivating. Social anxiety is somewhat more specific, defined by Kowalski (2007) as emotional distress in interpersonal situations, to the extremes of fear or panic. The situations that trigger this reaction include public speaking, interviews, dates, casual gatherings, and other potentially stressful situations. This type of anxiety may result from the individual with low NDS having a more difficult time deciphering the responses of others.

As Cheek (2007) explains, shyness is related to social anxiety, but is most likely elicited by situations requiring interactions with strangers or authority figures. Most people report feeling shy at some point or in some situations, but only a small percentage of the population report either that they never feel shy or that they feel shy enough to refer to it as a personal problem. Those who report never being shy are generally considered antisocial, which means it is unlikely to be a trait of those with high NDS. The type of shyness referred to here is more common as a typical reaction; it is less extreme and situational. The behaviors reported by Cheek as typical of shyness include quietness, gaze aversion, and awkward body language when interacting with strangers—what one might expect from those with low NDS.

In groups of people with which they are comfortable those with low NDS may appear confident and comfortable even though they fail to grasp the subtleties of audience responses. Lack of nervousness may make them appear more confident and comfortable even though they fail to grasp the subtleties of tailoring one's behavior to the situation. This confidence may even be perceived by others as charisma which assists in the use of persuasive tactics, although they are likely lacking in empathy and concern for others, which means their statements, arguments, or claims should be considered with greater suspicion. Moreover, their rigid, narrow-minded, and aggressive stance would likely make this type of person a good advocate or representative for organizations because they would pursue their goals with little self-doubt. Their failure to conform by tailoring their behaviors to their audience, resulting from low NDS, may be perceived as a signal of strength and receive respect.

Scrutiny, skepticism, and open criticism of persuasive arguments may be important for basic survival in light of this interpretation, since an over-confident and un-empathetic person could easily persuade a group to support them and enjoy the power that results. The empathetic voice of dissent in such situations may then serve as a needed counter-balance if one could have their voice heard. This would be a high-risk behavior, since it would require defecting from one's own group, explaining why the individual with high NDS would need to be internally motivated in order to push forward against the norm—being in the group but not "of" the group, so to speak.

Authoritarianism, shyness, aggression, and neuroticism may combine to make a very volatile personality type, explaining the low NDS of abusive husbands who are particularly poor at reading their own wives (Table 4.1). The related tendency for those

who are poor at NDS to be rated by others as more rebellious or non-conforming, and high in exhibition may also be due to the traits discussed here, as the shy or awkward individual attempts to gain support or approval from others without the social skills to understand what behaviors will successfully improve their status or be accepted.

Social deficits may be a major cause of the negative NDS correlations to loneliness and depression. Hawkley (2007) defines loneliness as the feeling that one's relationships are not living up to what one desires. Being alone is different from loneliness because it is possible to be alone without being lonely and to be lonely without being alone. As reviewed by Hawkley, loneliness is associated with traits like depression and poor social support, neuroticism, introversion, social inhibition/shyness, low self-esteem, and sadness, all of which are negatively correlated to NDS. The type of person that is emerging as having lower levels of NDS may experience the unfortunate feeling of being lonely while in a group and not able to understand why. They may wish to improve their inclusion within the group but fail to grasp social rules required to achieve the respect or friendship of others. They may even blame their lack of inclusion on other members of the group rather than try to remedy the situation, creating a downward spiral that exacerbates their inability to fit in and provides them with an excuse to dislike their peers.

Attachment theory is sometimes used to explain the cause of loneliness as being the result of poor childhood behavior that eventually causes others to reject them, resulting in damaged social skills that increases loneliness in later life (Bowlby, 1979). This is a similar unfortunate cycle where one's isolating behavior causes increased social negativity that furthers isolation. The NDS correlate of depression includes related

negative feelings of worthlessness, pre-occupation with past failings, the misinterpretation of neutral events, and inappropriate self-blame (American Psychiatric Association, 2013), that may further antagonize these negative reactions. Those with higher NDS levels, on the other hand, are popular as children and exhibit their nonverbal ability early on (as discussed above) preventing the initiation of such a negative cycle of behaviors to develop.

The negative NDS correlation to alcoholism suggests additional negative, reactive behaviors of self-harm may accompany deficiencies in social skills. Philippot, Kornreich, and Blairy (2003) explain both sides of the possible causal connection between alcoholism and NDS. On the one hand, many studies have shown that alcoholics suffer from a variety of social and interpersonal problems, including violence, in many aspects of their lives. These problems are often argued to lead to alcoholism as a coping mechanism. Alcohol consistently reduces anxiety in laboratory experiments, but also appears to lead to negative consequences for family members. The authors argue that the connection between alcoholism and social problems is not so simple, as verified in a series of experiments where they showed that individuals undergoing abstinence can perform similar to control groups in NDS. The authors therefore suggest a negative feedback loop develops for those with poor NDS, who may drink to cope with something troubling in their lives, create increased tensions while drunk which they cannot resolve later due to their poor social skills, and then find more reason to drink in the future because of these increased interpersonal problems. Alcoholism may be a potential side-effect for some people with poor NDS; however, the other negative variables correlated

to NDS suggest that a variety of similarly poor choices may also accompany NDS deficiency.

Several of these "negative" traits may be genetically influenced. At least two of the remaining negative correlates to NDS, autism and schizophrenia, have been suggested to arise from genetic predispositions as evidenced by the identification of specific genes which appear to play a role in these pathologies (for a review, see Carroll & Owen, 2009). The negative correlation between NDS and autism should hardly be surprising, given that autism is primarily diagnosed by assessing NDS and social abilities (American Psychiatric Association, 2013; World Health Organization, 1992). Schizophrenia, on the other hand, appears to have a more complicated relationship to NDS.

It is unclear if the negative correlation between schizophrenia and NDS is a result of actual decoding impairments or a byproduct of attentional problems. People of all ages who either already have or are at high risk for schizophrenia perform worse at judging emotional expressions, social interactions, and matching faces (Perez & Riggio, 2003). However, as with the effect of motivation in sex differences mentioned above, studies offering monetary reward for performance on these assessments have removed the significant effect of schizophrenia on NDS (Penn & Combs, 2000). This supports the conclusion provided earlier, that motivation to perform well on NDS tests can influence a variety of results; a schizophrenic may simply find it more difficult to concentrate without an incentive.

A final disorder to discuss, and one corresponding to low empathy, is psychopathy. Psychopaths are in part defined by a lack of empathy, an inability to love, and unresponsiveness in relationships (Cleckley, 1988), including deficits in emotional

recognition and NDS (Dolan & Fullam, 2006; Newman, Brinkley, Lorenz, Hiatt, & MacCoon, 2004). Despite their ability to manipulate others with pathological lies and a seeming total lack of regret (Hare, Forth, & Hart, 1989), they are not any better at detecting lies themselves (Martin & Leach, 2013). This type of person may be an example of how one may behave if they had no concern for the feelings of others. For example, the personality that has emerged above as likely to have low NDS, having strong confidence in social settings and attaining what they desire by ignoring others' concerns, is similar to the behaviors that may be exhibited by the psychopath. I do not believe that the above descriptions of individuals with low NDS are technically psychopathic, but there is certainly room for psychopathic behaviors in the low end of the NDS spectrum.

The general conclusions I take away from this section include that the type of personality most likely depicted at the low end of the NDS spectrum is fairly negatively affected by their NDS deficits. They likely attempt to socialize with new groups but fail to visibly conform, and do so in ways that can make them seem confident and charismatic although they can also withdraw when their attempts to fit in with the group result in failure, shame, and confusion. They probably don't understand these failures and blame others for them, seeing the world as a hostile and unpredictable place, a feeling which is later used to justify their aggression. They perceive hostility in the world because they do not understand what they have done to elicit negative responses from others. This lack of perception prevents them from improving in ways that would gain them new friends of diverse kinds and improve others' perceptions of them.

The normality of in-group behavior, where adherence to clear rules is rewarded, may cause those low in NDS to become willing, rigid conformists who use the in-group to not only be rewarded for their behavior, but to also support and justify their negative attitudes towards those who do not support or agree with them. The in-group provides a static environment they can rely on, which requires no fluidity or the social chameleon capabilities of the nonverbally skilled. It is safe and reliable, with no "unreasonable" threat from hostile unknown persons or ideas. When such threat occurs, the in-group provides a safety net they can withdraw into and justify themselves with. Anxiety and shyness can contribute to this withdrawal, but can also provide the stimulus for self-improvement if they attend to it. As discussed above, those low in NDS are poor at problem solving and tend to attribute blame to others, so it is unlikely they will learn from their situation.

There is some evidence to support a genetic explanation for some of these traits, but there is also some evidence that children can be conditioned to behave with either empathy or aggression. The high aggression of children 1-3 years old suggests that humans either lose aggression as they grow, or that they are taught to behave better. Either option places heavy responsibility on the child's caregivers and early environment, which can create a lifelong cycle of negative, or positive, feedback. Those with low NDS could receive negative feedback from any number of unfortunate predispositions, given the host of related personality problems described thus far which interfere with healthy coping mechanisms. It is possible that a downward spiral originates during childhood. The impact of childhood environment is the topic of the next section.

Childhood Factors

The variables collected above that are positively correlated to NDS tend to correspond to more beneficial personality traits and healthier outcomes. Children with increased NDS are more popular and less likely to be bullied by classmates, and their parents tend to provide more productive and healthy environments, exhibit moderate strictness, and agree on childrearing practices (Table 4.1). The remaining childhood variables corresponding to increased NDS are similarly in agreement with the overall positive traits shown in their adult counterparts.

The only childhood environmental correlate that seems somewhat puzzling is family expressiveness, which is negatively correlated to NDS, meaning that children from more expressive families tend to have decreased NDS. One explanation for this correlation might be that situations requiring greater attentiveness lead to increased skill (Hall et al., 2009), explaining how a family low in expressiveness could increase childhood learning of NDS through the child's increased focus on emotional cues.

The research discussed in prior sections, suggesting that infants acquire ability and interest in helping others to avoid harm within the first year of life, also suggests that learning to feel concern for others may either be quickly learned or the child innately possesses the drive to assist others. Later conditioning in early childhood may re-align these behaviors in accordance with child-rearing practices. The creation of guilt and shame in the child for harming others may build on the child's predisposition to care for others' feelings, just as the lack of holding a child accountable for wrongdoing may result in the deterioration of any pre-existing or innate concern they may have felt for others.

The parent-child bond is therefore filled with this potential to "make or break" the child's potential, according to this argument.

An analysis of child-rearing practices by Krevans and Gibbs (1996) showed that only high use of inductive discipline, the explaining of wrongdoing to create feelings of remorse in the child, created the connection between guilt and empathy. Guilt caused by imposition of parental authority, rather than remorse towards the victim of one's actions, did not motivate prosocial behaviors, because it is understanding and feelings of responsibility towards others that is part of the effect of inductive discipline, not guilt for being caught or guilt for making a parent angry. More importantly, the authors found that expressions of disappointment from the parents increased the effect of inductive discipline on prosocial behaviors and also increased child empathy. Expressions of disappointment are considered signs of parental affection by the authors because these expressions of disappointment were negatively correlated to the tendency to withdraw love from the child, assert power over the child, and be less nurturing. The more nurturing parent, and the one who raises the more caring child, is more likely to show disappointment to their child and cause the child to feel guilty and responsible for their bad behavior (Krevans & Gibbs, 1996). This is somewhat counter-intuitive because a parent high in empathy may conceivably attempt to prevent their child from feeling any negative feelings during childhood, inadvertently creating a child lacking in empathy. Likewise, highly controlling parents who wish to raise a child high in self-esteem may similarly prevent negative feelings from developing in the child, fostering an unfeeling narcissist with only the illusion of self-esteem and no true feelings of self-worth. The child with parents of an even temperament and moderate strictness, low in expressivity,

and willing to guilt their children with disappointment, may raise the more empathetic, prosocial, and caring child. The tendency for nonverbally skilled children to have parents that agree on child-rearing practices (Table 4.1) also makes sense from this perspective because it eliminates the possibility for a child to run to the other parent in order to avoid parental disappointment or feelings of guilt. Consistent behaviors of the parents would result in more consistent effects of child-rearing practices.

Children's play behavior also appears to have strong effects on these related abilities and behaviors. Prosocial play in children can increase verbal intelligence, associative thinking, and the ability to define words and form concepts (Landazabal, 2005). Somewhat complimentary findings showed that social exclusion has negative effects on logical reasoning, but only in children with either low self-esteem, low popularity, or poor NDS (Tobia, Riva, & Caprin, 2017). Since NDS is positively correlated to popularity in children and high self-esteem, it seems likely that a child with higher NDS would not be as affected by social exclusion. Prosocial behaviors with other children appear to create positive feedback on general social abilities.

An important connection to draw from this research is that child-rearing practices likely determine the child's later behaviors "on the playground" so-to-speak. This means that the expressive style, disciplining techniques, and behaviors of the parents may have already determined how the child will react to negative situations in groups of other children. Likewise, how the parent responds to the child's "playground" behavior can determine further behaviors. The right kind of discipline increases prosocial behaviors, and prosocial behaviors when playing with other children can increase intelligence of

various kinds. It therefore becomes extremely important how and when a parent tends to intervene, especially when the child has behaved badly or is learning right from wrong.

I would argue that most of the personality traits and behaviors that have been discussed so far in this project can be tied back to this early environment. The side-effects of early conditioning appear to create feedback on other childhood behaviors and personality traits that strongly determine later life outcomes with minimal deviation from expected outcomes. High or low NDS may likewise exhibit feedback within this system, as a more skilled decoder would learn faster from their errors and more quickly perceive where they can assist others, thereby acquiring more friends and better relationships; while a less skilled decoder who does not navigate the social environment as well would benefit by quickly acquiring and conforming to the rules in order to achieve rewards and avoid punishments. What appears unfortunate is that child-rearing practices may be determining which path the child takes, perhaps in some peripheral way encouraging or discouraging the development of NDS and the related prosocial behaviors that result in so many positive life outcomes.

Experience and Performance

Many factors positively correlated to NDS suggest that exposure to others and the world can improve one's ability to understand others. Such an explanation for NDS relies heavily on simple learning models, but there is sufficient evidence to consider this explanation during this discussion. The types of correlates that suggest the benefits of exposure include American Sign Language (ASL) proficiency, having traveled in foreign countries, being married with toddlers (vs no toddlers), having musical training, increased age, and being culturally adjusted. Some variables also include behaviors that increase

interactions and proximity with others in the environment such as healthy and prosocial personality traits, involvement with sports or dance, and involvement with extracurricular activities.

ASL proficiency might be expected to increase NDS because it includes many facial expressions in its vocabulary; the findings were therefore as expected, that ASL proficiency had some positive effect on NDS (Goldstein & Feldman, 1996). However, this study was conducted on hearing individuals and there may not be a corresponding increase for those who are deaf. Deaf or hard-of-hearing children may actually have more vision problems than hearing children (Guy, Nicholson, Pannu, & Holden, 2003) and are no more likely to be visual learners (Marschark et al., 2017), contrary to common assumptions. Additionally, autism, defined by deficits in social and nonverbal skills (American Psychiatric Association, 2013; WHO, 1992) is over 14 times more likely in the hearing impaired, compared to those with normal hearing (Do et al., 2017). The Goldstein and Feldman (1996) study that discovered the ASL correlation to NDS used facial expressions that mirror some of the basic vocabulary used in ASL, so it is no wonder that the findings support a tendency for one to be more familiar with their learned vocabulary. I would predict that other types of NDS, such as situational context comprehension, would not show a similar correlation to ASL proficiency.

The effects of age, travel in foreign countries, and having toddler-aged children may have a similar effect of learning from exposure as that seen in ASL and facial expressions. Most of the personality correlates described in this project do not change drastically over the course of one's life, so I would argue that the effects of learned experience on NDS are of a different (and more limited) kind than the majority of

variables discussed here. For example, traveling in foreign countries may expose one to new kinds of behaviors and situations to learn to decode, but it is unlikely that a predisposition to prejudice and intolerance would drastically change due to a foreign travel experience. It is more likely that the extent to which foreign travel, age, or having toddlers affects NDS is determined by one's pre-existing personality traits of openness to experience, tolerance, prosociality, etc. For example, I would expect that an intolerant and closed-minded person with low NDS might be more likely to misinterpret the behaviors of strangers in a foreign culture and develop negative perceptions of them, while a more tolerant and open-minded person with high NDS may tend to increase their understanding of others from the same experience.

The effect of age also reflects a general improvement of skill through experience. Ages 14-85 showed steady increases in emotional empathy over time, although cognitive abilities decline in later life and negatively affect measures of more cognitive and social abilities with age (Khanjani et al., 2015). This means that the elderly have increased empathy compared to younger individuals although their perceptual abilities (e.g., sight or hearing), and therefore measurable NDS, may decline. The ability to accurately decode nonverbal behavior requires both perception and cognition so it is understandable that this skill may slip with cognitive decline. What is interesting in this case is that emotional empathy remains positively correlated in the elderly.

The positive NDS correlate to experience with different skills like music, dance, and sports may rely on a similar mechanism of exposure to expressive behaviors affecting NDS learning. However, team activities like sports teams and dance ensembles may attract or encourage certain personality types. Likewise, success at team endeavors

can be greatly affected by individual member traits. Task conflict (game-related disagreement) has been shown to improve team performance if team members are high in openness and emotional stability, and negatively affect team performance when team members are low in these traits (Bradley, Klotz, Postlethwaite, & Brown, 2013). Cohesion in the team is also found to be correlated to emotional stability, extraversion, agreeableness, and conscientiousness (van Vianen & Dreu, 2001). Personality traits may have been determined prior to involvement with sports, so it may be the case that sports attract a certain personality that naturally assists in team performance. These traits may predispose one to improve their NDS through interactions with others, making team sports a productive learning environment, but only for those with these positive traits, since individuals without them have more negative performance results in teams (Bradley et al., 2013). It is most likely that sports participation attracts those with high NDS or only increases NDS in those predisposed to be perceptive and social.

Dance performers exhibit a more varied collection of personalities based on style of dance and dance is correspondingly considered a more creative activity than sports. More creative forms of dance that require improvisation, like modern or contemporary dance, tend to have dancers who are more open to experience and less conscientious than more traditional ballet dancers (Fink & Woschnjak, 2011). Given the tendency for creative people to have a collection of independent and open-minded traits (Feist, 1998), it seems more likely that certain personality types are drawn to particular forms of dance rather than dance participation determining their personality. Additionally, a tendency for modern dancers to score higher on traits of psychoticism, in comparison to other dancers (Fink & Woschnjak, 2011), may drive other personality types towards more traditional

forms of dance. Their choice of dancing style may then allow a dancer to associate with other like-minded individuals and express themselves in ways that interest them.

Similar personality variation has been observed in musicians, depending on style or context (Woody, 1999) and instrument choice (Cribb & Gregory, 1999). The observed increase in NDS that accompanies musical training might be a result of the same mechanism causing the increased intelligence of musicians (Kemp, 1996). There is some evidence that traits most often found in musicians are stable from childhood into adult professional life (Kemp, 1981), so increased intelligence and NDS may be a side-effect of learning creative skills during childhood.

The level of intelligence in children considered "gifted" is typically an IQ of at least 115 or 130, depending on the scale used, and tends to correspond to inquisitive minds that challenge the status quo and can overwhelm adults (Semrud-Clikeman, 2007). However, the personality traits, academic skills, and temperament found in those with high IQ are not different from the general population (Robinson, 2002). The gifted are more likely to experience anxiety and isolation (Davis & Rimm, 1998) but this is most likely a result of temporary situations, and not a part of their personality profile.

The possibility that general intelligence is influencing the acquisition of NDS is unlikely because giftedness (IQ) in childhood does not predict adult success or achievements (Freeman, 2006). NDS, on the other hand, is strongly correlated to successful performance in a variety of adult skills, as discussed above. Additionally, self-esteem, motivation, and opportunity have been found to be more predictive of success than general intelligence (Freeman, 2005; Shavinina & Ferrari, 2004). Giftedness in childhood may actually be detrimental to the acquisition of other skills, since most highly

intelligent children exhibit giftedness in only one area and have difficulties learning other skills (Leal, Kearney, & Kearney, 1995). In one study, none of the child prodigies followed into adulthood maintained their superiority in ability level (Feldman, 1986), suggesting that superiority in IQ or learned skills in childhood is temporary. The signs of giftedness are indeed capable of fluctuation and fading altogether during childhood alone (Semrud-Clikeman, 2007). Regular skills acquisition and intelligence in a person of average intelligence appear to catch up to the child prodigy's abilities over time. The traits associated with child genius are actually unhelpful to NDS and later life success so it is unlikely that general intelligence is causally connected to this system.

The implications of this research are that parents would do well to avoid attempting to create a child genius, since this may only create a temporary intellectual advantage while potentially causing permanent damage to social and nonverbal abilities—skills more likely to cause long-term success and adult achievement than IQ or early proficiency. The NDS correlates collected above support the importance of NDS to adult success; leaders are more effective when they have more NDS, doctors have more satisfied patients, workers are evaluated more positively by their co-workers and are rated more effective workers by superiors, students are rated higher in academic achievement by their teachers, clinicians and teachers are rated higher by superiors, with clinicians more effective at diagnosing depression and anxiety, and the nonverbally skilled perform better in business, dance, and sports.

The conclusions I would draw from this section include that many experiential variables correlated to NDS only augment pre-existing abilities if there is already some predisposition towards increased skill. This is because personality traits corresponding to

increased abilities in a number of areas tend to develop relatively early in life and remain fixed during adulthood. Positive NDS correlations with performance in various skills are likely a result of having high NDS and the associated traits which contribute to success in different ways. Those with open and creative personalities that engages well with others, coupled with high NDS, are likely to perform well or fit in wherever they go. The individual low in NDS is less likely to learn from their mistakes and less likely to perform as well. I suspect that positive personality traits put one in a position to further improve oneself, and negative personality traits (as correspond to low NDS) likely lead to hostile reactions to an experience that could have been educational, encouraging further negative perceptions. This augmentation effect related to NDS is likely responsible for some of the other performance-related variables found correlated to NDS (e.g., work effectiveness).

Polar Ideals

Throughout this discussion, the research has suggested there are distinct personality types that exist at either end of the NDS spectrum (e.g., tolerant vs intolerant), with the more average personality existing somewhere in between these two extremes. To conclude this analysis, I would like to specifically synthesize the accumulated research into the traits and patterns of behavior that might be typical of individuals who might be found at these extreme ends of the spectrum. This involves the creation of two polar ideal types; one at the high end of NDS (e.g., tolerant) and one at the low end of NDS (e.g., intolerant). The major traits and behaviors I propose to be associated with these two personality types are summarized in Table 4.2.

As expected from the above discussion, the traits exhibited during childhood appear to be highly predictive of what is found in adult behaviors, according to this collection of traits. Those with high NDS are mentally healthy, helpful, and caring, with internal motivations; while those low in NDS possess less favorable traits and tendencies, and are overly concerned with and motivated by appearances, rules, and rewards. In the chapter to follow, these proposed sets of polar behaviors may be employed to simplify the discussion of theoretical hypotheses and interactions although it is likely that most people are somewhere between these two polar ideals, with a collection of traits from each of the columns in Table 4.2.

It is also important to remember that this spectrum does not include individuals with cognitive or physical deficits resulting from genetic or other issues. It would be incorrect to infer from this personality profile that, for example, an autistic or blind individual who performs poorly on tests for NDS is necessarily in possession of any traits listed in the right-hand column of Table 4.2.

Table 4.2 Hypothetical Personalities at the Polar Ends of the Nonverbal Decoding Skill (NDS) Spectrum

High NDS	Low NDS
Childhood	
Parents moderately strict with the child	Parents too harsh or too lax with the child
Parents consistent in child-rearing	Parents inconsistent in child-rearing
Parents show disappointment in the child	Parents do not show disappointment
Parents show love and nurturing	Parents withhold love and affection
Raised to feel guilt for harm to others	Raised without feeling bad for others
Learns right from wrong by consequences	Learns right from wrong by rote
Behaves well to feel self-respect	Behaves well for rewards or appearance
Internal sense of self-esteem	Self-esteem tied to others' perceptions

Exhibits prosocial play and empathy	Does not play well with others
Popular as children	Difficulty acquiring friends
Retains intellectual abilities if isolated from play	Negative intellectual impact if isolated from play
Continues to learn when alone	Requires assistance or input to learn
Good at forming and associating concepts	Difficulty putting new ideas together
Adulthood	
Feels others' feelings unintentionally	Finds others' feelings confusing
Responsive to others' needs	Cannot perceive others' needs
Responds to challenge with compassion	Responds to challenge with aggression
Helps others for internal reasons	Helps others for rewards or appearance
Has genuine concern for others	Shows concern when expected to
Effective at a variety of jobs	Limited range of work effectiveness
Becomes proficient in new things easily	Has difficulty acquiring new skills
Learns with limited time or experience	Needs more time or experience to learn
Good at independent problem solving	Difficulty seeing solutions without help
Turns negative reflections into motivation	Turns negative reflections into excuses
Feels responsible, learns from mistakes	Blames mistakes on outside forces
Can predict consequences of their actions	Cannot see past their choices
Feels personal control over their life	Feels their life is controlled by others
Sees how things logically connect	Sees things as confusing or unpredictable
Honest work for achievements	Gains by cheating and manipulating
Forgives others' wrongdoing	Uses anger and blame for victim status
Works for personal gratification	Works for expected rewards
Performs well in teams	Does not understand team contribution
Has high-performing cohesive teams	Has low-performing non-cohesive teams
Possesses traits of effective leaders	Possesses traits of authoritarian leaders
Leads by compassion and understanding	Leads by authority, power, and aggression
Organized and deliberate	Disorganized and reactive
Calm when dealing with stress	Hurried when dealing with stress
Careful or thoughtful with decisions	Over-confident or impulsive decisions
Accurate or critical of their ability	Over-rates their ability

Solves problems by helping others	Solves problems by giving orders
Creative interests and skills	More rule-based interests and skills
Curious and imaginative	Difficulty thinking “outside the box”
Identity remains independent	Identity defined by group membership
Questions or challenges authority	Blindly supports in-group authorities
Questions the rightness of rules or laws	Blindly follows rules or laws
Blames themselves when breaking rules	Blames others for catching them
Has a “moral compass”	Has no internal motive to do right
Does not need to conform to the group	Is driven by the comfort of group norms
Is comfortable in any group	Feels shy and anxious around new people
Blends in anywhere	Has rigid personality and behaviors
Diverse associations with varied traits	Similar friends with stable set of traits
Modifies inappropriate behaviors	Stands out, blames others when rejected
Persuades with sincerity	Persuades with manipulation
Opposes dogmatic thinking	Supports dogmatic thinking
Does not support religious control or rules	Comfort with religious control or rules
More masculine with age	More feminine with age
Liberal views about women’s roles	Traditional views about women’s roles
Religious value systems	Concerned with appearing to have values
Tolerance from genuine concern	Intolerant, may make shows of tolerance
Seeks to understand rather than demonize	In-group out-group thinking
Openness to new people and ideas	Closed and narrow thinking
Uncertain of assumptions	Conviction of rightness
Feels equal to others	Feels entitled and superior to others
Perceives commonality in others	Perceives difference and threat in others
Emotional need to be with others	Emotional need to be seen by others
Blames failed relationships on both parties	Blames failed relationships on the other
Desires realistic high-quality relationships	Obsessed with ideas of being in love
More casual, less invested relationships	More committed and serious relationships
Does not redefine themselves for partners	Identifies strongly with their relationships
Positive internal coping mechanisms	Negative external coping (e.g., alcohol)
Emotionally controlled and stable	Emotionally reactive and volatile

Takes care of their mind and body	Neglects doctor's appointments and health

What I take away from this discussion of variables correlated to NDS is that a majority of these variables (e.g., the Big Five personality traits) are considered to be a result of childhood environment, predisposition, or early interactions. Many traits and behaviors described above manifest within the first years of life and are highly predictive of later outcomes. It is therefore necessary to examine what is known to cause these early manifesting traits in greater detail. This requires a closer examination of childhood developmental factors; specifically, family interactions, peer socialization, and the educational environment. In the following chapter, major influences acting upon this system of variables are enumerated.

The hypothetical personality types proposed to exist at either end of the NDS spectrum (Table 4.2) will assist in determining how various childhood factors may be feeding into NDS ability. For example, if a particular parental behavior is known to increase tolerance in children, that behavior could then be examined for how it is affecting other behaviors at the high end of the spectrum. The goal of the investigation into early environment, presented in the next chapter, was to determine the causal factors causing these polar patterns of behavior to emerge and to identify the primary variables that would be included in the model for how one acquires NDS. Because the discussion above repeatedly directed attention towards predisposition or early learning, the focus of the model was similarly directed towards early developmental stages. The factors and resulting model discussed below explain how the personality profiles in Table 4.2 result from early differences in parenting practices and peer interactions.

CHAPTER FIVE: THEORY

In this chapter I will discuss the developmental stages and influential factors that give rise to NDS and its correlated variables. This discussion culminates in a theoretical model of influences. The information provided in previous chapters suggests that causal factors for this system of variables are most likely tied to early development. Aside from the few predictor variables that directly correspond to childhood environmental differences, most of the variables discussed thus far appear to be less-directly associated with NDS. It is almost easier at this point to use the correlated variables to construct an *effects* model for NDS rather than to use them as *causal* factors. One possible model of effects, based on the collected research, is presented in Figure 5.1. This is only one of many interpretations that might be made of NDS effects, since many of these variables are known to influence each other as well. The fact that the majority of these variables can so easily be argued to be effects of NDS, narrows the focus of attention for potential causes to any remaining variables.

The following sections describe causal influences in the development of NDS. The discussion proceeds through a series of developmental steps or stages, describing which factors are acting to create which variables of interest. These causal factors are used to explain the remaining variables which make up the majority of personality and behavioral traits that are correlated to NDS. At the conclusion of this procedure, the steps are compiled into a model that summarizes influential factors acting upon NDS.

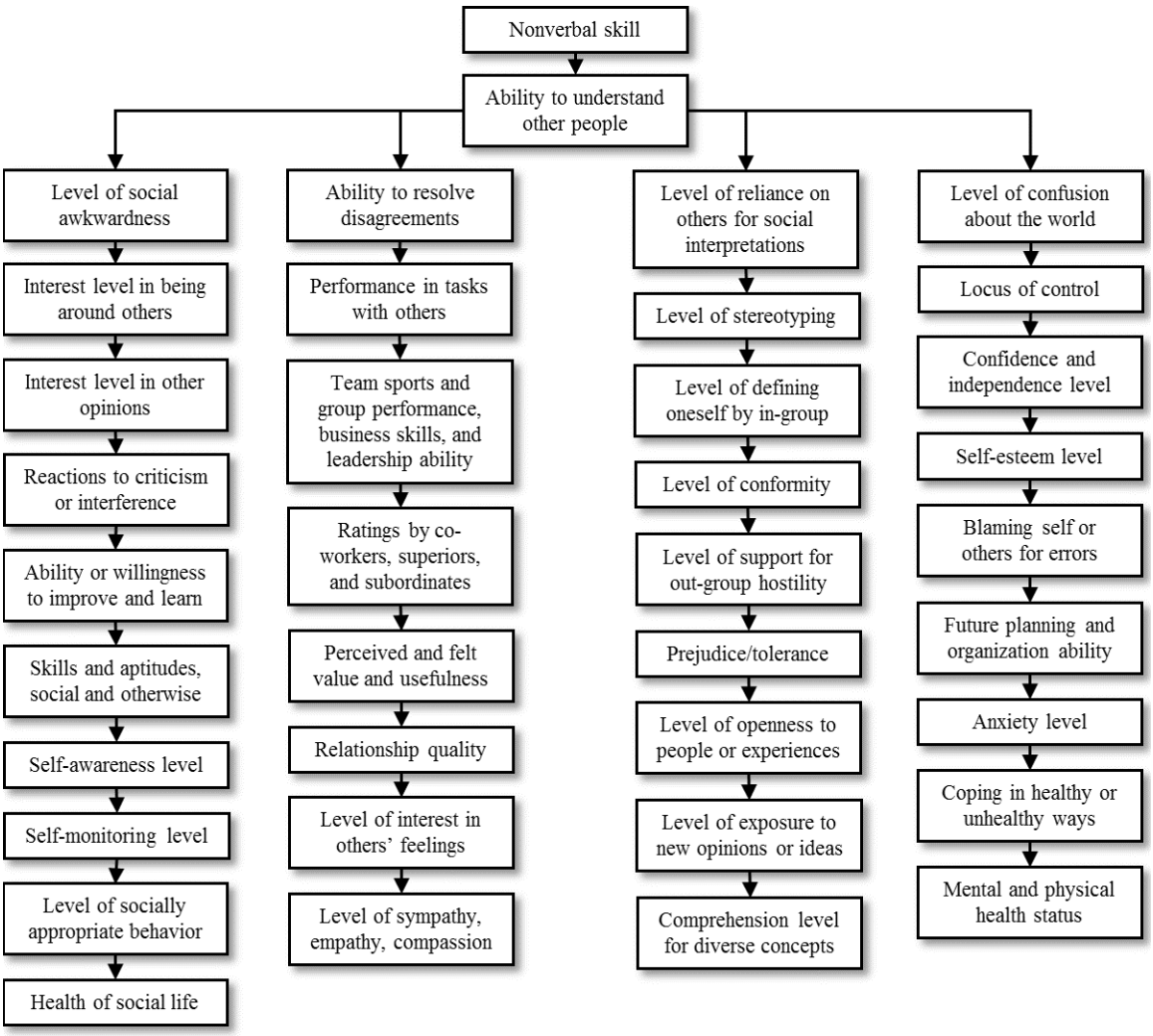

Figure 5.1 Potential Effects Diagram for Nonverbal Decoding Skill

Due to the many effects one may hypothesize for NDS (e.g., Figure 5.1), the model developed below includes some discussion of feedback within the system of variables. For example, high or low NDS can exacerbate certain positive or negative pre-existing traits due to the corresponding increase or decrease in understanding others. This means that the possible effects described in Figure 5.1 could be feeding back into the system, driving some individuals further towards the high or low ends of the NDS spectrum. How this feedback may be operating is discussed in more detail later in this chapter.

Major Theoretical Claims for NDS Acquisition

This discussion addresses the acquisition of NDS as it may be influenced throughout several life stages. The major points of interest are subdivided by categories: infancy, childhood, adolescence, and adulthood. Major claims are numbered, followed by descriptions and evidence. The causes of NDS described throughout this discussion will also be used to explain the development of the related variables of interest.

As mentioned previously, research studies discussed throughout this project do not focus on the NDS "spectrum" of ability, so the NDS acquisition model below (Figure 5.2) is constructed mainly in reference to those individuals with regular functioning biological systems. At the extreme low end of the NDS spectrum it is not as easy to assess autistic or pre-verbal children as it is to measure an average speaking adult or an infant with functioning sensory organs who might be more average. That being said, researchers tend to emphasize the "healthiest" conditions for a certain trait to develop, often through an exploration of influences known to be detrimental. This means that the research focuses on "best" and "worst" case scenarios, or high and low NDS. There is also little discussion of what causes "average" ability and outcomes. This discussion therefore proceeds by exploring the best and worst outcomes in terms of causal influences, given the nature of available research. Causal descriptions of the entire spectrum of NDS ability are made when possible. The following discussion proceeds through the developmental life stages of influences upon the model, beginning with infancy. The model is summarized and evaluated afterwards.

Infant Conditioning

This section contains a set of influences on NDS that occur during infancy. Summary: Infants are hard-wired to learn quickly and absorb information from their environment. They seek out information to process at their own pace unless intruded upon by controlled environments, over-stimulation, or other parenting habits. The resulting variation in the environment (usually from parental interaction) leads to differing patterns of behavior in infants. The infant acquires identifiable personality traits through this process within the first two years of life, including a predisposition to attend to, interact with, and decode the messages of their caregivers, or a predisposition to disregard and disengage from caregivers, responding with hostility to unwanted interactions. This early environment creates conditions for the later development of self-esteem, self-assurance, locus of control, independence, and a variety of other traits which start to manifest in infancy. It also predisposes the infant to attend to and decode nonverbal communication or to ignore it—the difference of which may determine later life outcomes and level of NDS. These processes are detailed in the first three steps of the model presented here.

1. A Healthy and Regular Birth

Infants are hard-wired to learn, even before birth. Short-term memory and habituation to a conditioning stimulus from outside the womb have been documented in the fetus as early as 22-23 weeks of gestation (Leader, Stevens, & Lumbers, 1988). This may be possible due to the high-activity neural “noise” in the fetal brain, which some believe is required for neuronal wiring to develop (Lagercrantz, 2016). These early neural connections are the hard-wired behavioral responses documented in both animals and

humans. For example, a fight or flight response is exhibited in the fetus when it loses oxygen or goes into shock, increasing adrenaline and redirecting blood flow to the heart and brain (Lagercrantz & Slotkin, 1986). These physiological responses can also be affected by early environmental disturbances like maternal smoking, which results in abnormal physiology and behavioral tics in the fetus (Reissland, Francis, Kumarendran, & Mason, 2015) that may affect responsiveness in the newborn (Cohen et al., 2005). Responsiveness to external stimuli is necessary to the learning process, meaning that the infant's predisposition to learn and attend to nonverbal stimuli may have already been compromised prior to birth, based on the fetal environment.

In addition to difficulties resulting from genetic issues, birth weight has also signaled long-term consequences for learning and abilities. As reviewed by Strully (2009), children born with comparatively low birth weights, assuming they are otherwise healthy, require more time to recognize people and objects, score lower on later IQ tests, are more likely to drop out or be held back in school, and make roughly 8% less income. Birth weight can be easily affected by maternal health, which re-enforces the importance of the fetal environment in later achievement. Most importantly, with low birth weight there is a general delay in recognition and understanding of objects in the infant's environment; a delay which has consequences throughout life.

At birth, the infant's brain becomes highly reactive. Infants naturally receive a surge of physiological and brain-activating signals during regular childbirth, thought to be a response to head compression during birth, and which assists them in surviving the trauma (Lagercrantz, 2016). However, this trauma may be necessary for normal development, since children born by Cesarean section have altered DNA activation

(Schlinzig, Johansson, Gunnar, Ekström, & Norman, 2009) and increased prevalence of autism (Cho & Norman, 2013). Autism is defined by social and nonverbal deficiencies (see discussion above), making the conditions of birth particularly relevant to this project. Additionally, under-weight infants may have undergone less compression-related trauma during the birthing process, leading to similar side-effects as seen in children born by Cesarean section. Altered brain chemistry due to a less-traumatic birth may decrease attention to the environment and negatively impact the later ability to understand nonverbal information.

Perhaps the rude awakening of birth is the first motivation to attend to environmental cues. Physiological changes that support early neural activation may have evolved to support this attentiveness. Attempts to prevent the child from experiencing trauma at the time of birth may therefore have some negative unforeseen consequences for cognitive development and NDS. Long-term consequences of interference at this stage may include decreased attentiveness and engagement with caregivers during the early months of life, resulting in delayed acquisition of regular communication abilities.

2. Presence of Observable Behaviors

The presence of others helps in the development of cognition. The cognitive processing in the infant brain is initially unstructured and noisy. Early neural connections can fire spontaneously without input (Maffei & Galli-Resta, 1990) until sensory experience determines which neurons will live and remain connected (Greenough, Black, & Wallace, 1987). These early connections (synapses) and disconnections (called "pruning") occur over time in a series of steps resulting from continued experience (Changeux, 1985). Synapses first appear in the brain during 6-8 weeks gestation, with

major growth in connectivity continuing throughout the first year of life (Bourgeois, 1997). These synaptic connections are stimulated by experience and are therefore reduced by any deprivation of parental interaction or other experience (Bourgeois, 2010). These early connections are the brain's first attempt to "wire" itself to process information.

Infant learning is another process impacted by the presence of others. Among infants born preterm, those who had been kept in isolation wards or incubators were more likely to have language delays and symptoms of autism, compared to those who had been kept in areas where they could hear human voices and observe other sensory information (Pineda et al., 2014). Within the first few months of life, infants develop the ability to remember past events (Herschkowitz, Kagan, & Zilles, 1997), faces, and objects (Marshall & Melzoff, 2014). That infants form memories at this age suggests that the development of behaviors and personality traits can begin to be influenced. The influence may be as simple as maternal touching, which is suggested by animal studies to have a beneficial effect on later stress responses, learning abilities, and curiosity (Liu, Diorio, Day, Francis, & Meany, 2000).

Infants also remember and begin to mimic (copy or mirror) the observed behaviors of others within the first months of life. By six months, infants have the ability to retain and mimic behaviors observed 24 hours earlier (Collie & Hayne, 1999). By nine months, nearly half of infants can remember sequences of events after a five-week delay (Carver & Bauer, 1999). Additionally, those infants who were allowed to mimic the behaviors they observed showed better recognition of those behaviors a month later (Lukowski et al., 2005). The effect of mimicry on long-term memory was also verified at 15 months (Bauer, Hertsgaard, & Wewerka, 1995), supporting the role of mimicry in

learning. This also means that infants who have limited experiences or who are prevented from mimicking, may exhibit learning delays.

By roughly the end of the first year, infants form expectations based on observation. One-year-olds show confusion or frustration when objects with which they are familiar do not behave as expected (Stahl & Feigenson, 2015). Infants at this stage also display the ability to determine if a caregiver has positive or negative interest in an object by looking at the caregiver's face, and the infant will respond to the object accordingly (Wellman, Phillips, Dunphy-Lelii, & LaLonde, 2004), seeking out objects that the caregiver has a positive interest in (Phillips, Wellman, & Spelke, 2002). This indicates that the infant has an understanding of gaze by roughly one year. The development of this understanding in the first year is related to the child's ability to understand social cues at 3-4 years (Wellman et al., 2004). That is, if there is a delay in the understanding of social cues within the first year of life, there are delays in later childhood.

Most importantly, expectations cannot be formed without exposure to behaviors and consistent memories of those behaviors. A basic understanding of social cues in the first year appears to be a form of pattern recognition that develops through observation, mimicry, and memory recall. This means that within the first two years of life, there may be observable differences in nonverbal comprehension based on the availability of observable behaviors and the freedom granted to the infant to mimic and explore. It is conceivable that some caregivers may condition their infants to inhibit mimicking behaviors, to fear novelty, or to otherwise be distrustful of the environment and strangers. These conditioned responses would decrease interaction with both people and the

environment, which may explain the related deficiencies of those with low NDS in understanding the causal interactions of both people and objects.

3. Supported Exploration of Novelty

Parental support of novelty will determine later outcomes. Infants quickly develop a tendency to respond with interest or distress to new information. Four-month-old infants have been categorized in several studies as being either high-reactive or low-reactive, more or less inhibited, and more or less anxious or wary. As reviewed by Fox and Reeb-Sutherland (2010), one way to describe the inhibited child is that they have heightened vigilance to novelty, causing them to react with more negativity and distress to information or change. These heightened threat responses can affect emotional regulation and have been connected to social withdrawal and anxiety problems later in life (Pine, 2007; Rothbart & Posner, 2006). This explains why high-reactivity, behavioral inhibition, and anxiety begin to exhibit as related traits in infancy.

These dispositions are seen as early as four months and can be used to predict later tendencies. Those who respond with high distress to novelty at four months show more response to deviant sounds at nine months (Marshall, Reeb, & Fox, 2009) and the high reactivity and negative responsiveness of four-month-olds can significantly predict behavioral inhibition in later childhood (Kagan & Snidman, 1991). This type of child continues to be inhibited, distrusting of novelty, and to withdraw from strangers (Degnan & Fox, 2007). The trend continues to be exhibited through seven years old (Fox, Henderson, Rubin, Calkins, & Schmidt, 2001)—although, in the upcoming discussion of later childhood it will become evident that these trends often continue into adulthood.

The tendency to embrace or avoid new information has been tied to specific behaviors of caregivers. As reviewed by Fox and Reeb-Sutherland (2010), intrusive, over-controlling, and over-solicitous care in parenting increases behavioral inhibition in infants. As early as 17 months, the child begins to have personality traits like anger and hostility in response to levels of parental intrusiveness—defined as irritation, rough handling, and control or lead-taking in play activities and tasks (Szabó et al., 2008). Mothers who avoid strict controls and directives have infants who are more responsive and manageable (Lindsey & Caldera, 2005). The same effect is observed when fathers exhibit similar parenting; children have fewer behavioral problems and better overall cognition when there is less interference in infant activity (Schaefer & Edgerton, 1981). Schaefer and Edgerton claim that when parents are more encouraging of their children being self-directed rather than conforming to orders, it increases intelligence because it improves the child's imagination, curiosity, and independent thinking.

It is also important that parents agree on this style of parenting, since children score higher on cognitive tests if both parents are less intrusive (Shears & Robinson, 2005). This benefit of parental agreement manifests as less defiance in infants at 18 months (Lindsey & Caldera, 2005) and later positive outcomes such as improved prosociality, social competency, and self-control (Deal, Halverson, & Wampler, 1989; Vaughn, Block, & Block, 1988). Children of divorce can exhibit similar benefits if parents remain on good terms, agree on parenting behaviors, have good self-esteem, and work together to organize schedules (as reviewed in Whiteside, 1998). These trends support the assumption that consistent, non-intrusive parenting is the most helpful for the early development of cognitive and emotional skills.

Parental warmth and affection is considered connected to low intrusiveness and improved behaviors in the child. Increased sensitivity to the child when the child is actually in need of assistance (as opposed to intrusive interference), decreases nervousness and later withdrawal behaviors when children enter school (Early et al., 2002). This type of minimally intrusive parenting, sometimes called *authoritative* or *inductive* parenting, leads to more well-adjusted children (Whiteside, 1998). This responsive and supportive style of parenting is contrasted with *authoritarian* parenting, which corresponds to more controlling, strict, rule-based expectations of the child and results in decreased helping and sharing behaviors being exhibited by the child in later life (Carlo, Mestre, Samper, Tur, & Armenta, 2010). Early inhibition and reactivity to intrusive parenting and the subsequent adjustment problems seen in school can be counteracted in infants with as little as 10 hours per week in a day care setting (Fox et al., 2001) or by having affectionate siblings (Modry-Mandell, Gamble, & Taylor, 2007), showing the potential for socialization to counteract the negative effects of intrusive parenting.

The infant needs to feel that it is in a safe space. This includes safe exploration of new information or objects and also the knowledge that the caregiver will be there when necessary. This allows the infant to securely explore and acquire an understanding of the objects and people in its environment by learning at its own pace—arguably the only pace at which it is capable of learning. In the ideal parenting situation, over-stimulation by control, directives, or intrusive play that shuts down cognitive processing is avoided, allowing the child to begin laying the foundation for self-motivation, confidence, independence, and self-esteem. Through self-directed free play and interaction, the infant

begins forming an understanding of social cues earlier than would be possible with more intrusive parenting styles. The authoritative parenting style also includes certain behavioral directives during later childhood that will be elaborated on in later sections.

Summary: Implications of Infant Conditioning

The infant that has already disengaged from the caregiver at infancy is likely to be socially delayed in comparison to the infant that has learned to attend and decipher the messages of its caregivers. The responsive or "compliant" infant is likely to not only be more quickly acquiring the neural pathways that assist it in acquiring verbal and nonverbal language, but will also likely begin acquiring an understanding of other humans in the environment—including social models of behavior, appropriate responses, temper management, and how its own behaviors affect those around it. The child which is not attending to caregivers at this point is unlikely to look to them or desire their presence for anything other than basic needs. The child will express greater hostility to the presence of caregivers and disengage or withdraw from interactions in their presence. Additionally, when these infants are reprimanded, they probably fail to understand what they are being reprimanded for and develop negative feelings towards caregivers. The more attentive infant raised with greater independence and freedom is therefore not only ahead in cognitive, emotional, and communicative abilities, but is also benefiting from a healthier personality which has positive effects throughout life.

The next stage the individual enters into is childhood, when the influences that are beneficial to NDS development begin to change from influences that affect primarily cognitive skills to those that affect social skills.

Childhood Learning

This section contains a set of influences on NDS that occur during childhood. Summary: There is evidence that infant dispositions can be altered throughout childhood to some extent. The consequences of parental control or intrusiveness in infancy continue throughout life, but these consequences can be repaired or mitigated through adequate peer socialization and authoritative disciplining. Ideal parenting in childhood mirrors ideal caregiver behaviors in infancy, including the freedom to explore and assistance from caregivers when needed. There are also enormous benefits from the preaching of moral and proper behaviors, which also become enforced through peer interactions. The child benefits from learning right from wrong, and being trusted to operate independently to implement and explore correct behaviors. Children deprived of these unsupervised opportunities develop rule-based conformity to authority and expectations, and are more limited in coping strategies, confidence, and social skills. These processes are described in the next four steps of the model described here.

4. Effects of Infant Inhibition Continue

The consequences of childrearing practices in infancy continue in later social interactions. Self-regulation of attention, one of the abilities affected by infant child-rearing practices, is thought to be necessary for the development of emotional and cognitive responses that impact later social competencies (Wilson, 1999). Behavioral inhibition and withdrawal in response to unfamiliar information or situations also manifests later in childhood as shyness (Kagan, Reznick, Clarke, Snidman, & Garcia-Coll, 1984), elevated heart rate in new situations (Snidman, Kagan, Riordan, & Shannon, 1995), decreased social skills and empathy-related behaviors (Bohlin, Bengtsgard, &

Anderson, 2000), and a distress or fear that prevents the child from playing with others as they would like to (Rubin, 1993). Social inhibition makes it difficult for the child to learn from these experiences because they lack the emotional regulation abilities that help to solve social problems and develop coping strategies (Bronson, 2000). The decreased engagement of the inhibited infant eventually becomes poor social skills and frustration in the growing child.

Peers respond to these inappropriate social behaviors with dislike and rejection, which only increases the loneliness of the inhibited child (Hymel, Bowker, & Woody, 1993). Inhibited children fail to recognize wants and desires, and they inaccurately interpret the emotional reactions of others (Henker & Whalen, 1999). The subsequent social rejection by peer groups likely increases negative feelings towards social interaction. As a result, these children may act out, throw tantrums, whine, or act aggressively, making them even less desirable playmates (Diener & Kim, 2003; Eisenberg & Fabes, 1992). This is likely the reason that inhibited children solicit more attention from their teachers as early as preschool, where they begin to avoid socializing, show dependence on their teacher, and exhibit poorer academic performance than their more independent peers (Coplan & Prakash, 2003). This is the first indication that enforced socialization is needed.

The childhood behaviors caused by infant-caregiver interactions are not always permanent. The effects of early caregiving can be altered by a shift in parenting practices during preschool years, causing a corresponding change in the child's social behavior (Booth-LaForce & Oxford, 2008). Some studies suggest that forcing children to engage in activities they may not like can force them to learn coping skills and therefore lower

their inhibition levels in later years (Park, Belsky, Putnam, & Crnic, 1997). This suggests that training or conditioning can be effective in correcting traits during childhood. Some researchers have argued that the behaviors exhibited by withdrawn infants and children is similar in neural and physical activity to animal fear conditioning (Kagan, 1994; Kagan, Reznick, & Snidman, 1988), impacting attentional processes when children perceive threat (Pérez-Edgar & Fox, 2005). Through enforced engagement with others and creating new spaces for the child to safely explore new experiences without the intrusion of an authoritarian parent, improvement should be expected. As young as three years old, children begin to show differential treatment towards others, based on relationship status (i.e., friends vs siblings; Volling, Youngblade, & Belsky, 1997) and will begin to show sympathy and offer assistance selectively to friends (Rose & Asher, 1999). A fear-conditioned child at this stage may attempt to refrain from play, but in the absence of the controlling parent and the threat they pose, children may be able to acquire new behaviors that can be used to navigate new developing relationships with peers.

It is important that proper behaviors are developed during childhood because childhood self-disciplining behaviors can predict high school reasoning, organization, expressiveness, temper, and coping behaviors (Shoda, Mischel, & Peake, 1990). These abilities assist in understanding how to interact with and interpret the actions of others—a social skill set that affects later success. If un-remedied during childhood, it is likely that the negative consequences of infant inhibition will become more detrimental as children continue to be excluded and rejected from peer groups which would have provided them the experience to better understand themselves and others.

5. Peer Socialization

Peer interaction assists in both the development of appropriate social behaviors and the understanding of the behaviors of others. The effects of poor infant environments can also be rectified with improved social environments in later childhood. The negative behavioral side-effects of drastic social deprivation in children have been successfully remedied by providing them with supportive environments to engage in social interaction, but these therapeutic environments lose effectiveness the longer a child is deprived (O'Connor et al., 2000; Rutter & the English and Romanian Adoptees Study Team, 1998). This means that earlier interventions are probably best.

Interacting with and being in the presence of others can aid in the acquisition of many behaviors and competencies. For example, children copy and learn observed behaviors like helping and sharing, communication, aggression, and psychopathic behaviors, simply from observation (Rushton, 1980). Pretend play among children can increase emotional regulation and understanding (Lindsey & Colwell, 2003). Even television shows like Mister Rogers's Neighborhood significantly increase positive behaviors like charitable giving and getting along with others (Coates, Pusser, & Goodman, 1976). Children not only model these good behaviors, but can understand intentionality and acquire moral judgments through this process (Bandura & McDonald, 1963). However, helping behavior can become preferentially directed toward one's in-group (Reykowski, 1982), which suggests that prosocial behavior may be a way of bonding or forming cooperative relationships with others. Those with high NDS are less likely to privilege their in-group with their helping behavior (see earlier discussion), suggesting that prosocial behaviors may develop differently for them than those with

average or low levels of NDS. Perhaps those with high NDS are exposed to more types of play groups or social circles as children, which would also further benefit their nonverbal development.

Increased capacity for moral judgments and moral behaviors tend to accompany the helping and sharing behaviors of the prosocial child. Charitable donations from children ages 7-13 could be predicted from their assessed ability to make moral judgments (Emler & Rushton, 1974), and peer ratings of prosociality also predicted moral judgment (Harris, Müssen, & Rutherford, 1976). However, helping and sharing behaviors during grade school are reportedly directed at those who they like and want as friends (Damon, 1977; Youniss & Volpe, 1978). This manipulative use of prosocial behavior should be less likely in those with high NDS, who are more likely to behave prosocially for the genuine benefit of others, including strangers.

Prosocial behavioral rules are often reinforced through social disapproval for children who do not behave charitably (Rushton & Teachman, 1978). However, social disapproval would only reasonably have an effect on those who are concerned about the opinions of others. Children who do not succeed in peer conversations tend to interrupt, disagree, or talk about themselves more than other children (Putallaz & Wasserman, 1990). They also tend to overestimate their social skills and underestimate their aggression (Kupersmidt, Coie, & Dodge, 1990), behaving more aggressively when they don’t succeed (Dodge & Frame, 1982). This may make it more difficult for them to learn from instances of social rejection, especially because rejected children also overestimate how much they are accepted (Patterson, Kupersmidt, & Griesler, 1990). They are also more reliant on the opinions and authority of their caregivers, which devalues the

importance of peer perceptions. The lack of accurate perception of their peers suggests that the inhibited child may already be displaying poor NDS. The rejection that results from their inappropriate behavior likely increases their negative outlook.

Parent-enforced interactions with others become important for later success. Among children with high IQ, those who were kept in regular classrooms below their ability level were more popular and accepted, with more athletic interests than those put into accelerated programs (Sayler & Brookshire, 2004). Increased friendships and social skills are also seen in children whose parents encouraged extracurricular activities with peers (Kerns, Cole, & Andrews, 1998). Time spent with parents who may have caused negative behaviors to develop also decreases as the child ages, enters school, and associates with others (McHale, Dariotis, & Kauh, 2003). Parents also tend to become less supportive of inappropriate social behaviors from children as they age (Dix, 1991) which helps to discourage misbehavior. Parenting decisions during childhood can help the child to engage with others and remedy poor social skills.

The normal and healthy level of social abilities one would expect or want for a child therefore tend to develop as a result of peer- and parent-enforced socialization. Needless to say, this socialization would also be required for higher levels of NDS. Piaget (1932) observed cooperative behaviors tend to develop around age seven. Sharing behaviors also increase with age from 33% of 4-6-year-olds willing to share with friends to 77% of 7-10-year-olds, and 100% of 11-16-year-olds (Ugurel-Semin, 1952). Perspective taking also develops in preschool interactions and corresponds to increased social skills (Cassidy, Werner, Rourke, Zubernis, & Balarman, 2003). Conflict increases between friends, which solidifies friendships and increases problem-solving ability

(Hartup, Laursen, Stewart, & Eastenson, 1988), reducing the aggressive responses to conflict that are typically seen in those with poor social skills. Taking turns, listening to others, nonverbal comprehension, popularity, and peer acceptance all increase through social interaction before adolescence (Black & Hazen, 1990; Zsolani, 2002).

Many undesirable behaviors learned during infancy can be remedied during childhood through socialization. Engagement with others, inclusion in regular childhood activities, public schooling, playground interactions, having groups of friends, and other interactions all help to teach the child how to control their emotions, understand others, and have healthy relationships. High NDS requires an understanding of behavior that can only be acquired through interactions with others.

6. Only Interfere to Correct Errors

The parenting practices that lead to the most prosocial and emotionally healthy children require the child's freedom to act and parental interference only when needed to correct moral errors. As the child ages, parents increase their tendency to explain the consequences of actions to children (Mounts, 2000). The explanations parents give to children for avoiding mistakes are expected to cause them a healthy form of anxiety, likely due to a history of some form of punishment, resulting in reduced expression of undesired behaviors (Walters & Grusec, 1977). Prior preaching of right and wrong behaviors has also been shown to be more effective at improving later helping behaviors than emotional or intellectual reasoning (Grusec, Saas-Kortsaak, & Simutis, 1978). The mothers who engaged in the most dramatic (i.e., highly expressive and emotional) explanations of consequences also tended to be the most nurturing mothers and their children were more likely to exhibit helping and sharing behaviors with other children

(Zahn-Waxler, Radke-Yarrow, & King, 1979). The authors suspected these increased positive behaviors were a way for the child to avoid future feelings of guilt and anxiety from having upset their caregiver. The right kind of parental interference therefore directs the child's attention to their own and others' behaviors and emotions.

Parenting behaviors have been classified in various ways that correspond to differing childhood outcomes. The most damaging parenting style in regards to the development of NDS and the related positive personality traits is authoritarian; that is, a collection of rigid, punitive, and restrictive controlling behaviors which cause withdrawal, aggression, and peer rejection in children (Chen & Rubin, 1994; Maccoby & Martin, 1983). Withdrawn and anxious children also tend to have parents who are either overprotective (McShane & Hastings, 2009), less encouraging of autonomy (Dumas, LaFrenière, & Serketich, 1995), or overly solicitous and intrusive (Rubin, Burgess, & Hastings, 2002). Micromanagement and excess affection when the child has no distress undermines the child's autonomy and denies them the opportunity to develop emotional management skills, teaching the child that it cannot handle tasks without assistance as young as two years old (Rubin, Hastings, Stewart, Henderson, & Chen, 1997). The parenting behaviors that cause the child to withdraw from social interaction are therefore likely to influence a variety of personality traits correlated to NDS, such as self-esteem, locus of control, openness to experience, and a sense of responsibility.

These parents are likely attempting to help the child but are doing so in emotionally unhealthy ways. Mothers of withdrawn children are more assertive in their orders (Mills & Rubin, 1998), less feeling in their social problem solving discussions with their child (McDowell, Parke, & Wang, 2003), or overcritical and derisive (Rubin et

al., 2002). These behaviors damage the child's self-worth and ability to trust others (Barber & Harmon, 2002). This is contrasted with the overly-affectionate intrusive parenting discussed above which also leads to negative childhood outcomes. These different behaviors may have the same outcomes because they train the child to focus on the parent and the parent's wishes, shutting down interests in alternative or independent thinking, relationships, and activities.

There are two interconnected parenting behaviors or practices that lead to the best outcomes. The first is allowing the child to self-direct, interact with others, and make mistakes so that they can develop problem-solving skills, independence, and confidence without relying on the presence of caregivers. The other important behavior is the imparting of moral and social rules when the child behaves badly. For example, the child does not necessarily understand what hurts the feelings of others, especially if the child has become inhibited and withdrawn during infancy. Once the child learns through social interactions how people interact and treat each other, they also need to be held accountable for mistakes, informed when they have done wrong, and told what the "right" behavior is. A child who is not corrected and who is allowed to act as though there is no wrong behavior would likely fail to develop empathy or to understand why others respond negatively to them, assuming that dislike is the flaw of the other party. In many ways, NDS and personality traits co-develop, as over-reliance on parental presence increases dependency and social skills deficits simultaneously while the more independent child is left, for the most part, to solve the problem of social interactions on their own.

7. Cultivate Internal Rewards

As the punitive punishment and rule-based control style of parenting decreases autonomy and responsibility in children, the encouragement of free exploration and self-directed learning in the absence of parents supports the development of self-confidence and internal motivation for good behavior. Reykowski (1982) suggested that external displays of helping and supportive behaviors (prosociality) are motivated by two very different goals. The first motivation for prosocial behavior is an extrinsic reward for personal gain or to avoid loss or punishment. The second motivation is an intrinsic reward that improves self-esteem by adhering to social norms. Intrinsic rewards (e.g., knowing that one has done the "right" thing) have higher success rates at motivating kindness and sharing behaviors in children than external rewards (e.g., candy bars), which produce lower levels of motivation (Kochanska, 1980). Internal motivations are subdivided by Martin Hoffman (1970) into either rigid rule-adherence from conformity or true concern for the feelings of others. The following of rules for the sake of appearing to do so (conformity), I would argue to be similar to extrinsic rewards, since the motive is to either improve or maintain others' perceptions of oneself. Seeking to appear caring in order to fit in should be considered an extrinsic motivation. It is also more typical of those with low NDS.

A child who is high on intrinsic motivation can be demotivated by offering them extrinsic rewards for good behavior. The offering of extrinsic rewards like money or toys tends to demotivate children in general (Condry, 1977; Lepper, 1981), by decreasing their interest (Lepper, 1981) and causing them to devalue the activity being rewarded (Deci, 1975). The child who tends to be more motivated by extrinsic rewards may have received

more controlling and rule-based parenting, which lowers their internal motivation and makes them less likely to follow behavioral rules or behave selflessly if there is no one watching who can hold them accountable for it later (Dienstbier, Hillman, Lehnoff, Hillman, & Valkenaar, 1975). This is supported by studies that showed increased giving in children who had been told by adults that they were giving because they enjoyed doing so (Grusec et al., 1978). It would therefore be beneficial to offer intrinsic and supportive comments to the extrinsically predisposed child and to avoid rewarding the child who is already intrinsically motivated. In either case, improved behaviors can be elicited by refraining from offering material or other extrinsic rewards to the child.

The tendency for intrinsic motivation to increase prosocial behavior explains the correlation of positive social behavior to nonverbal abilities because those who are better able to perceive need in others would likely have greater intrinsic motivation to help them. Those who are poor at nonverbal decoding, on the other hand, would be less capable of perceiving need and therefore more reliant on the rules of helping or not helping in order to determine when they should and should not do so. Following the rules of proper behavior should therefore become important to the poor nonverbal decoder because it is their best source for behavioral mandates. They should therefore be more focused on appearing to follow the rules while the good nonverbal decoder will decide to help based on others' needs.

Summary: Implications of Childhood Learning

Behaviors remain moldable during childhood. Much of an infant's disposition towards any negative behaviors of avoidance, inhibition, and withdrawal can be counteracted during childhood with the right parenting practices. Children can be

encouraged to attend to social behaviors and emotions through consistent caregiver support of independent peer socialization and the enforcement of violated behavioral norms, when and if such violations occur. The independent and open-minded personality develops alongside NDS, along with social problem solving and the ability to understand internal states. Exposure to peer groups can compensate for disciplinary failures in parenting, making the socialization process in childhood especially important. Those who are deprived of these interactions become poor at NDS, while developing dependency on authority, external motivations, and conformity to rule-based directives that interfere with the ability to self-monitor and improve their behaviors later in life.

Adolescent Augmentation

This section contains a set of influences on NDS that occur during adolescence. Summary: Behaviors and personalities developed during childhood become more fixed in adolescence. Predispositions begin to more strongly determine later life outcomes as neural pathways become less plastic and social groups begin to differentiate. Individuals begin to seek out and form groups independent of parental oversight and subsequently may choose to expose themselves to behaviors that are more narrow and align with their existing preferences. As personality traits become more fixed, exposure to new experiences can drive childhood predispositions into further permanence by encouraging familiar behaviors and reactions which conform to one's newly developing peer groups. Decisions made at this stage are largely determined by the competencies developed in childhood, but have the added effect of long-term consequences in adult life. These processes are described in the next three steps of the model discussed here.

8. Drastic Loss of Plasticity

The brain changes drastically during adolescence. The formation of neural connections that exploded in the first year of life and assisted with the learning process, continued throughout childhood. However, in adolescence the formation of new connections is drastically reduced, making learning more difficult (Bourgeois, 1997). Similarly, patterns of behavior that are in place during this time would be more difficult to unlearn. The traits and behaviors acquired during childhood will therefore become more permanent during adolescence in additional to determining how one reacts to others.

Positive predispositions towards socialization and feeling concern for others will likely encourage the high nonverbal decoder to experience new activities, make new friends, and consider new ideas about the world. Those with low NDS, who are predisposed to withdraw, feel threat, and be socially inhibited, will blame others for their position in life and fail to interact in ways that teach them how to improve their conditions. The loss of neural plasticity that occurs in adolescence makes these patterns of behavior more difficult to change later on.

9. Increased Independence

Parental interference fades during this time as individuals become more independent and begin to make their own judgments of others, asserting themselves in day-to-day decisions. Parents begin to back away from correcting negative behaviors and aggression as children age (Dix & Lochman, 1990; Pakaslahti, Spoof, Asplund-Peltola, & Keltikangas-Jarvinen, 1998). Combined with the tendency for some adolescents to inappropriately judge others based on their own internal state (Dodge & Tomlin, 1987) in

order to validate their feelings (Forgas, 1995), this can cause increased social errors and negative perceptions of intent in the poor nonverbal decoder. Additionally, the withdrawn youth who is more likely to experience hostile emotions in response to rejection may be prevented from solving their own problems by the cognitive restriction effect that anger has upon the brain (Bodenhausen, Sheppard, & Kramer, 1994). With less presence from a corrective moral authority enforcing discipline, explaining moral problems, or reprimanding poor behavior at this stage, incorrect perceptions may become easily reinforced through internal rationalizations or appeals to like-minded peers. Someone pre-disposed to inaccurately read others will therefore be likely to continue to do so. Those who are better at NDS will be more likely to form healthy social identities, bond with others, and form meaningful relationships—all of which will assist in further improving their social skills and NDS.

Choices in social interactions bring to light the personality traits that have been evolving during childhood. Self-esteem and positive coping strategies emerge in those who have had positive relationships with their parents during childhood (Patterson, Pryor, & Field, 1995). These individuals are therefore able to engage in healthy friendships with others. Those who remained inhibited and withdrawn throughout childhood with aggression and anxiety problems have predictable difficulties with social situations during adolescence (McGee & Williams, 1991), making it more difficult to attain friends. The related NDS level that corresponds to these two different sets of behaviors only encourages one's predisposition. That is, if one is outgoing, increased NDS will assist in developing even better relationships, and if one is withdrawn, poor NDS will assist in further isolating and confusing them. Increased independence for a withdrawn individual

may therefore be a cause of anxiety and loneliness, making the improvement of negative traits that developed during childhood especially difficult.

10. Exposure to New Influences

New peer groups begin to influence the development of more elevated forms of thinking. The establishment of new relationships may provide the opportunity for adolescents to think more carefully about their identity and self-esteem through interactions with others (Samter, 2003). Those adolescents who can develop a better understanding of themselves and others have reduced emotional and behavioral problems (Lenhart & Rabiner, 1995), contributing to the narrative that social skills can improve personality problems. Some researchers argue that empathy does not truly begin to show its full potential until adolescence (Buhrmester & Furman, 1986), when it is arguably most put to the test. The independently formed associations adolescents have with peer groups may provide the forum for these abilities to more fully develop, as one begins to consider their identity and future.

Positive social interaction also begins to manifest in various pursuits and competencies. More socially adept adolescents have more advanced problem solving skills (Lenhart & Rabiner, 1995) and greater academic achievement and reasoning skills (Pellegrini, 1985). The academic and intellectual performance evident in those with high NDS will allow them to manifest their creative interests (see discussion above) in a variety of ways. They may join a variety of social groups, moving easily among them at will. They may join academic or sports teams, engage in artistic hobbies or pursuits, or develop alternative agendas, guided by their independence and openness to new ideas. Those with low NDS, on the other hand, tend to be shy, which makes it difficult to

approach people (Bell, 1985). This narrows their interests and associations, making it easier for them to choose to follow the expected rules of behavior with which they are most comfortable. An implication I might draw from this is that one who exhibits the traits of someone with low NDS might be therapeutically remediated through forced socialization. This may assist in the improvement of behaviors, but whether this would improve NDS after adolescence begins is a more difficult question.

Summary: Implications for Entering Adulthood

As the adolescent enters adulthood, the variables that correlate to NDS become more clearly *effects* of NDS, which have become more or less fixed during childhood development. Most of the correlated variables included in this project have already appeared in one form or another as products or byproducts of caregiver and peer interactions. The role of social interaction is therefore a primary force in the development of the social skill set. This should be obvious by definition because NDS is a skill, and in order to learn a skill, one must either practice with correction from an authority for incorrect implementation, memorize its rules with conscious intention, or passively acquire it through excess exposure and observation. Luckily, most of these learning styles occur incidentally throughout youth, which is possibly why individuals at either end of the positive or negative spectrum of NDS are rare. Influences on the development of NDS are likely to have already taken their toll prior to adulthood, for better or for worse.

Adult Consequences

This section contains a set of consequences from previously acquired levels of NDS that affect adulthood. Summary: Adult dispositions, personality traits, and competencies are slower to change and improve than during childhood. The behaviors

which result from early predispositions echo what has been observed throughout childhood with adult consequences for success, achievement, relationships, and other social and emotional outcomes. Those who have remained withdrawn into adulthood develop insecurities and phobias while the open and outgoing person is more moral and independent. These behaviors become side-effects of one's ability to understand and communicate with others, which has become relatively fixed. Effort and the experience of age can slowly improve any deficiencies, but there are likely limits to this improvement. This process is described in greater detail in this last step of the model.

11. Independent Achievement

Those who have been encouraged throughout life to self-direct and explore novelty are now independent and self-assured. Independence assists in personal achievements and is associated with moral reasoning, along with tolerance and responsibility (Megargee, 1972). Self-directed or independent individuals were also shown to be calm, clear-thinking, mature, imaginative, and original, with wide interests; they were more likely to be rated reliable, insightful, stable, confident, and self-controlled. Those who did not achieve independently in this study were rated as bossy, egotistical, excitable, foolish, and immature. These individuals tended to be hard-hearted, resentful, cautious, suggestible, have narrow interests, and to be stubborn and pessimistic (Megargee, 1972). The behaviors throughout early life that have corresponded to independent engagement with others and increased communication abilities continue to show a connection during adulthood. The collections of both positive and negative traits continue to re-enforce the conditions that cause the individual to exhibit those traits. This makes it particularly difficult during adulthood to alter these behaviors.

The withdrawn and dependent individual continues to avoid contact, developing social phobias and stereotypes of others that increase isolation. Adults more prone to anxiety have greater difficulty determining when aversive stimuli are present or not, resulting in over-generalization of threatening circumstances (Lissek et al., 2005). This heightened attention to threat may make social interactions more difficult throughout adult life. The socially phobic adult specifically reports having had over-controlling and less-affectionate parents during childhood (Arrindell, Emmelkamp, Monsma, & Brilman, 1983), supporting the carryover from childhood parenting into the behaviors of adulthood. This parenting style encouraged dependence, obedience to rules, and conformity, while preventing children from developing social problem solving skills and emotional control. As a result, these children develop into adults who cannot achieve what they believe they deserve, thinking that following the rules and appearing to deserve what they desire will garner them achievements. Nor can they figure out why they often fail with this approach, attributing blame to others for not rewarding their attempts to succeed. They will therefore remain locked in isolation from social circles that would improve their social skills and continue to lack the self-awareness and self-blame that would encourage them to improve their efforts.

Implications for Later Life

Internal motivations for actions and the ability to skillfully navigate the social world makes almost anything possible for the nonverbally skilled. Like a skeleton key, it may open any door. It provides for increased competencies and the ability to get along in any group. The tendency to have increased empathy ensures that this skill will not be

abused, having developed alongside a moral education and socialized through healthy and positive peer interactions during childhood.

The individual with low NDS, on the other hand, is suffering from a social disability. They fail to be socialized by increased peer interactions and are less likely to acquire the norms of both moral and rational behavior. This leads to further rejection and greater hostility. They will seek out groups that support their strict adherence to rules of moral order and will there find other like-minded individuals who provide the conforming environment they feel safest in. They are more loyal to their in-group and identify more strongly with its members. This set of behaviors was encouraged throughout childhood as the child was trained to fear novelty, be dependent on its caregiver for social and moral order, and surrender control of its life to another. This individual was likely deprived of both the exposure to social interaction and the separation from its caregiver that would be necessary to attend to and be forced to solve the puzzle of nonverbal cues.

The vast majority of individuals lie between these two extremes, being neither a "wizard" of nonverbal decoding at the high end of the scale, nor suffering from psychopathology or autism at the low end of the scale. It is most likely that, whatever accidents occur during childhood, lived experience in the world provides enough counterbalance to create a regular population of mostly regular people with average nonverbal abilities who can basically understand each other to some minimum degree.

Model for the Acquisition of Nonverbal Decoding Skills

The major claims above are summarized below in Figure 5.2. Two major themes have emerged throughout this causal discussion: social skill and morality. There are

specific social and moral traits that correlate to NDS, but the real question at the heart of this model is “What is the connection between nonverbal ability and empathy?” This connection appears to exist because social and moral skills both develop as a byproduct of the same parenting decisions. That is, less intrusive and more authoritative parenting increases both social and moral ability, whereas more intrusive and authoritarian parenting decreases both social and moral ability. The connection between empathy and NDS is therefore explained by parenting practices; parents who allow independent, self-directed exploration and provide corrective input or discipline for mistakes, provide the conditions for the development of genuine concern for others and the social problem solving skills of the high nonverbal decoder. Those parents who prevent free exploration, controlling or intruding upon the child’s attempts to learn or socialize while teaching the child to follow directives and fear authority, provide the conditions for the development of extrinsic motivation for actions and an inability to understand social rules and the behavioral cues of others. A more simplified understanding of causation for moral and nonverbal skill development might therefore be considered in terms of parenting styles which cause a collection of varying outcomes depending on various levels of control.

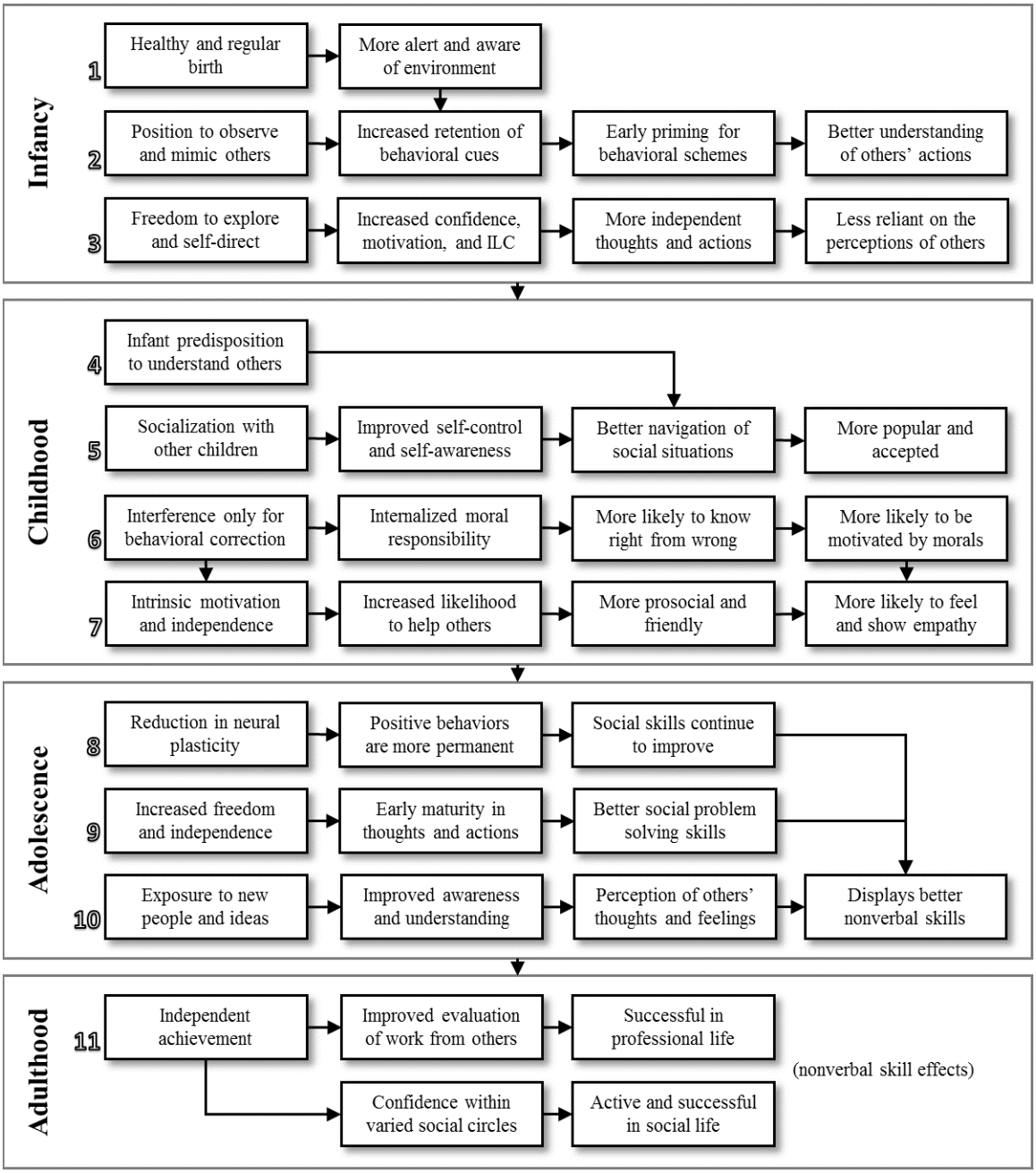

Figure 5.2 Model for the Acquisition of Nonverbal Decoding Skill

Increased NDS is shown in the model to correspond to improved quality of life, both psychologically and professionally. Childhood environmental factors are used to explain both NDS and the majority of the variables that have been correlated to NDS. The correlations observed between NDS and the predictor variables (e.g., empathy) are

therefore an artefact of their mutual origins. Traits like independence, creative problem solving, and moral reasoning correspond to reduced parental interference. Overly-intrusive parenting, on the other hand, results in increased dependency, poor problem-solving skills, and less concern for others' feelings. The correlated personality traits and tendencies associated with NDS can be explained by parental control and intrusiveness. These circumstances are summarized in Figure 5.3.

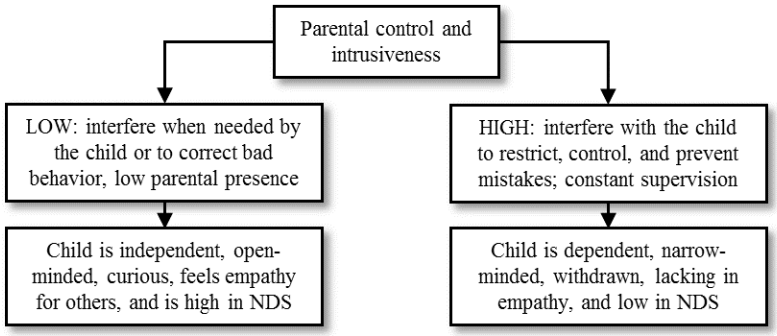

Figure 5.3 Summary of Caregiver Effects on Child Behavior and Nonverbal Decoding Skill (NDS)

The research suggests that many variables correlated to NDS are direct byproducts of caregiver decision-making and interactions. The remaining variables included in this project are side-effects of these developing traits. For example, support for authoritarian systems arises from a reliance on rules, structure, and the safety provided by the in-group; these are behaviors typical of more dependent and narrow-minded individuals with low levels of NDS. The variables discussed throughout this project can all be similarly connected back to a few simple choices made in child-rearing practices.

Some Minor Hypotheses

Throughout this project a number of observations have been made, some of which suggest unexpected consequences of both the parent's and child's behaviors and choices.

In this section I propose several hypotheses for how additional behaviors are implied to affect life outcomes or how they might be affecting the system of variables discussed above. These are theoretical suggestions for further interpretations of the research.

A Box-Building Hypothesis

The effect of parental controls over a child's development and potential is severe. The negative outcomes that result from intrusive or controlling parenting appear to result from the removal of input that would have otherwise allowed the child to develop a more positive collection of traits. For this reason, I imagine this negative form of parenting as a sort of box-building behavior, in which the child is forced to live within a psychological box constructed by their parents. This box is used by the parent to filter out unwanted influences and, in their mind, is protecting the child. The actual consequences are, of course, decreased likelihood of success and achievement in both social life and professional or academic abilities.

I propose that any manner of box-building is negative. The best outcomes correspond to the parent who trusts their child to explore the world, providing feedback and reprimands in a consistent manner; most importantly, supplemented by the ability for the child to check the parent's authority against the moral structures of their social groups so they may develop an internal understanding of right and wrong. This means that homeschooling, private schooling, isolated environments and communities, restricted access to particular social groups, precisely scheduled lives, assistance provided to the child when they don't require it, or presence of caregivers during otherwise harmless activities are all more negative for the child's development than the alternatives.

The alternative situations require the child to problem solve, become independent, explore and understand things for themselves, and organically acquire information which they can request clarification on when necessary. The child who grows up in the psychological box is less required to face challenges, intellectually or emotionally, and therefore has more difficulty coping with challenges of all kinds, unable to solve or possibly to even recognize problems without assistance in later life. Thinking "outside the box" may not be possible for these individuals in later life. It is also likely that the child who is raised in this psychological box will lack the awareness to perceive that there has been any negative outcome from their childhood environment, since they have poorer awareness of themselves and others. Needless to say, a more critical evaluation of restrictive environments would be supported by this hypothesis.

A Negative Space Hypothesis

Similar to the box-building hypothesis, the negative space hypothesis is an explanation of effects of the controlling parent. Rather than psychologically blocking out influences that may have improved the child's development over time, I suggest here an alternative result of parental control. Namely, that the child was already achieving social and emotional competence which would have resulted in positive outcomes throughout life, but the strict control of an intrusive parent creates a space that negates this competency, dragging the child back down to a lower competency level with permanent negative consequences.

I propose that it is possible for a controlled environment, as that provided by controlling or intrusive parents, to stunt an otherwise well-developing child and permanently negate their potential. In this scenario, the infant may be ahead of the curve,

but the restrictions placed upon the child during childhood cause the child to redirect its attention to the rules and oversight of the parent, losing any predisposition to be insightful, independent, internalize understandings, or think creatively. The negative space undoes prior positive experience, replacing it with more negative personality traits and lower competencies as the child becomes dependent on the opinions and directives of the parent.

A Broken Leash Hypothesis

Children are dependent on the parents for moral and social authority, but at some point the child needs to assert its independence. The child who has been raised to be more independent and self-motivated has, in the best-case scenario, also been given moral teaching through reprimands, corrections, and explanation. This is a form of rule learning, but the child is free to explore and implement these rules in its independent social activities absent the caregiver. Socialization with peer groups will bring to light certain discrepancies between the parent's moral order and the norms of peers.

I propose that at some point, the child internalizes for themselves the notions of right and wrong, potentially breaking the leash, so to speak, of the parent's moral order. The child may at that time attempt to argue with the parents about *why* something is wrong and demand explanations. They may argue against the moral imperatives of the parent and seek a philosophical discussion for which the parent is unprepared. Anecdotally speaking, I have rarely seen parents respond well to this challenge. But the fact that the child has asserted an internal sense of morality to the parent with confidence is evidence that the parent has engaged in the positive behaviors that instill moral values and independence in the child. I believe the breaking of the moral leash of the parent is a

natural consequence of the most beneficial child environment. As the child ages, it will begin to solve moral dilemmas on its own, and may come to different conclusions than peers or parents. Confidence and independence, with internal motivation at this stage will determine if the child asserts its moral self or bows to the pressure of conformity to peers and authority.

A Math-Like Problem

Nonverbal skills are not acquired by enforced instruction and controlled environments. That type of learning is strict and dependent on constant authority to solve new problems. I would like to compare the acquisition of NDS to the learning of math. Typically, in the learning of mathematics, a rule is introduced which generalizes to a series of problems and the child is then given a series of problems to solve independently. When errors are later identified, they are corrected in no uncertain terms, often with a red pen and decreased score. If necessary, the child is given an explanation of their mistakes. This is similar to the authoritative parenting style that corresponds to improved competency and independence in children's social skills.

The authoritarian parenting style, on the other hand, is so controlling that it would be equated to a different type of mathematical instruction. The math teacher in this case oversees the child's attempt to solve new problems, dictating every stroke of the pen without allowing the child enough time to figure out the problem on its own. Directives for how to solve the problem are given to the child as they are led through the specific details of solving every problem with supervision. This child will see problem solving as proceeding through a series of absolute, restrictive steps that are just as the authority figure has shown them. Errors will be strictly corrected without allowing the child the

chance to understand why they have made an error. This would most likely create a submissive and withdrawn student who would be less interested in doing their math problems. Correspondingly, there is little reason to believe the child of an authoritarian parent would be interested in engaging with new social or academic activities due to apprehension of parental oversight. The decreased motivation typical of these children may be caused by their attempt to avoid parental interference and the dissatisfaction they receive from being controlled.

The availability of moral rules, freedom to independently deploy them with others and solve social problems, and the consistent correction of mistakes helps the child to become more confident, self-assured, and internally motivated. The independence that results from increased competency also has positive feedback on the learning of additional skill sets that may rely on this self-motivated confidence to grasp initial concepts.

An "Always Right" Pedagogy

There may be permanent negative consequences to a childhood teaching strategy that does not make corrections, declare "right" and "wrong" answers, or mark down students for making mistakes. Corrections correspond to greater internal comprehension of concepts, confidence, and competency. Avoidance of terminology like "wrong," "bad," and "incorrect," and avoiding behaviors perceived to be negative and damaging to the child's self-worth, actually increases the damage to self-worth that caregivers are attempting to avoid. It is important to recognize that correcting mistakes is not abusive or bullying. One set of behaviors (corrective) is necessary to the learning process. The other set of behaviors (abusive) can damage the learning process. Red ink on incorrect math

problems and use of words like “wrong” are not abuse; rather, they correspond to the type of authoritative parenting behaviors that increase child confidence and problem-solving skills. For this reason, I suggest that parental interference with educational practices is a layer of negative control and intrusion that damages children’s later success.

Failure to assert the child’s poor performance when it occurs is unhelpful for the child’s intellectual development. Asserting the “value” of every child’s efforts, whether their work is right or wrong, is similar to the intrusive overly-supportive interference provided by the all-present caregiver. This inappropriate level of intrusive affection corresponds to the same negative outcomes as strict, controlling, and harsh behavior. The best outcomes occur when interference is only provided when mistakes have been made. Having nurturing and supportive teachers with minimal intrusion, assigned homework and negative marks for errors (with explanation, if necessary), are therefore the most beneficial circumstances to improve the child’s competencies. The *child is always right* style of teaching, or, what one may call the *everyone gets a trophy* strategy could be considered a form of neglect from this perspective.

Implications for Related Theories

There are several implications of this model for prior theories used to explain NDS. The basic learning model and the social learning model discussed in Chapter Two can both be illustrated in the current model in various ways. Basic learning mechanisms exist during infancy and beyond as the child is developing its cognitive understanding of the world and the objects in it. The steps of memory acquisition are one way of interpreting the infant’s progress at this stage, including how later memories and behaviors of acquired. Similarly, the social learning model is one way of describing the

infant and young child's acquisition of behavioral rules before they develop the cognitive structures to reason about and question them. These learning models are a way of interpreting the relationships presented in the model, but I do not believe they provide any greater understanding for the causes of NDS.

The co-development model of language and gesture is also useful for interpreting this model. There are certainly elements of this NDS model that are suggestive of co-developing skills. However, my model suggests the co-development of moral and social ability, which is a slightly different hypothesis. The co-development of language and gesture occurs earlier in development. My model may impact this theory by suggesting that parenting styles cause a set of outcomes that result in *apparent* co-development of language and gesture because the parenting styles that affect learning likely affect the development of both verbal and nonverbal language simultaneously. That is, a parent who engages in behaviors that cause fear conditioning or withdrawal in their child will cause cognitive and learning delays through the infant's reduced engagement with the environment. This consequence of intrusive parenting may continue into childhood where a collection of decreased competencies may begin to manifest. This NDS model is therefore one way of explaining the mechanism behind the theory that skills co-develop.

Further implications of the model might be made in regards to the acquisition to additional skill sets which rely on creative thinking and problem solving, such as musical or mathematical ability. The independent and creative spirit that develops as a result of the parenting behaviors suggested in this model should also provide the foundation for competencies in a vast array of academic or creative pursuits. The child high in NDS should become proficient in whatever they attempt, due to internal motivation,

confidence, ILC, self-awareness, and problem solving skills. They can self-correct, learn independently, and remain focused. Skill sets for this individual may only be limited by their exposure to various media and concepts as a child. This means that there may be some optimal set of childhood conditions under which competencies in seemingly unrelated skills can co-develop with verbal and nonverbal abilities. In this sense, the co-development perspective of skills acquisition provides a new implication for the NDS model.

Mirror neurons, evolution, and genetics are somewhat lacking in additional insight for this model. The mirror neuron hypothesis and genetic explanation both provide a way of understanding how people might be functionally *able* (i.e., structurally) to acquire or exhibit NDS, but they still fail to explain *how* NDS develops over the course of one's life. Evolution provides a different means of understanding this construct altogether, in a way that does not necessarily explain the socialization process that was under scrutiny here.

The evolutionary explanation I might suggest after completing this project, is that evolution has selected for the entire spectrum of NDS, with exhibited abilities dependent on the environment. What I mean by this is that it is beneficial for the entire range of the NDS spectrum to exist in a population; that both the highly conformist, dogmatic, loyal individuals, and the more caring, careful thinking, and understanding individuals are simultaneously selected to exist in a population in order to provide the diversity that increases community survival. Both extremes of these behaviors have qualities that can help the community in different ways, either by increasing solidarity and support for the in-group, or by contributing creative ideas and alternative solutions. The exploration of

NDS traits and behaviors provided by this project therefore also provides a genetic explanation for the spectrum of NDS.

The model of influences presented earlier from Zeidner et al. (2009; Figure 2.1) is similar in some respects to the model developed here. Similar clusters of information were identified as important to Zeidner et al.'s model, such as child-parent interactions, socialization processes, and rule-based learning. However, the model developed here is different in a couple of important ways. First, rule-based learning has limited usefulness in the development of NDS competency unless those rules are tested and examined by the child without supervision. That is, rules are only so useful in so far as the child learns how and when to change or ignore them through socialization processes. A second way this model deviates from Zeidner et al., is that genetics or temperament are de-emphasized here, with greater weight on early caregiver interactions in the child's developing temperament. Parental responsiveness and interaction with the child should be interpreted in this account to over-ride much of what is otherwise considered "pre-determined" by genetics (excluding genetic disorders). Decisions made during early caregiver interactions with the infant, according to this model, can determine whether genetic temperament has lasting effects on behaviors and competencies. Zeidner et al.'s model assumes less room to socially train early behaviors and learning than is argued here. The model developed by this project also provides a more thorough description of *how* factors of influence are exhibiting the observed effects.

The model proposed in Figure 5.2, and summarize in Figure 5.3, could be used to re-interpret the results of many studies discussed throughout this project. For example, research on dogmatism can be re-examined by considering dogmatic behaviors as a

byproduct of overly-controlled, rule-based learning of ideas during childhood, combined with limited peer socialization and increased dependence on parental opinions. Attempts to identify causal factors in studies of dogmatism may therefore benefit by considering child-rearing practices in their research and whether early environmental factors differ significantly between study groups. This would suggest an alternative explanation for differences in dogmatic behavior rather than to focus solely on current individual circumstances like religious or political affiliation. This model suggests that early environments differ significantly; if exhibited dogmatism differs by political party, then it could be hypothesized that differing childhood environments played a role. The inference would be that parenting styles are associated with political party affiliation.

The interpretation of research from the perspective of caregiver intrusiveness could also be enlightening in research reviews. For example, Hall et al.'s (2009) meta-analysis on variables correlated to NDS concluded that "early family climate" and "learning experiences" are influential, but these conclusions were only *suggested* because "various causal paths can be imagined for all of these relations" (p. 165). The model presented in this project would re-interpret the findings of Hall et al.'s study by explaining how the learning experiences that feed into NDS are also a product of childrearing practices that limit or encourage childhood proficiency and independence. Early family climate would be dissected more precisely into various behaviors that lead to the variables of interest. Responsibility for early family climate would be placed on caregivers, who make the majority of decisions, and are therefore primarily responsible for the child's exposure to various social and academic experiences. However, Hall et al. made no effort to explain why the causal variables of family climate and learned

experience were suggested. Causal explanations are typically not a focus of meta-analytical studies, which means that the perspective offered in this project would offer a potential explanation for the results of their analysis. The explanation provided in this project is also helpful in the sense that it provides a unifying theory to the observed correlations rather than to assume that an over-abundance of possible causes implies no clear mechanism is at work.

CONCLUSION

The development of NDS is tightly connected to a variety of interrelated traits. Moral understanding, problem-solving skills, and self-motivation are just a few of the beneficial competencies that accompany increased NDS. The collection of beneficial behaviors and abilities typical of those at the high end of the NDS spectrum result from specific parenting styles that can permanently affect the child's potential. Improvement during later life becomes more difficult, so the disposition one acquires during childhood is particularly important.

The level of NDS one develops may also determine their future environments, including work and social groups. The high nonverbal decoder is adept at fitting in to new environments and may be found blending in virtually anywhere, perhaps seeking out other open-minded individuals; but the low nonverbal decoder prefers homogenous groups with stricter social rules that are easy to follow. They may be more likely to involve themselves with dogmatic ideologies in order to receive the form of support they are most familiar and comfortable with. They may be associated with more extreme religious groups or involved with aggressive contemporary social agendas. In light of these tendencies and preferences, job selection processes seeking certain types of employees based on self-report measures of motivation and abilities might therefore benefit by asking more nuanced questions about childhood environment and parental interactions. Childhood factors may turn out to be more predictive of effectiveness in the workplace than one's CV.

Researchers in this area also tend to focus on an individual's present circumstances, behaviors, or traits, rather than how these variables have developed in concert with each other. Variables such as "relationship quality" are assumed to be directly associated with NDS in some causal way by researchers, rather than to suppose that the correlation is an artefact of prior conditions giving rise to both NDS and the correlated variables. The researcher focus is interesting, because to examine the variables as a source of difference, is to suppose that there is pre-existing and meaningful difference between different types of people such that they exhibit different sets of behaviors. In my model, I have specifically excluded pre-existing difference (genetic or otherwise) as a source of later variation between individuals and sought to identify factors that have similar effects across individuals.

The understanding of NDS acquisition explored in this project includes a variety of social and emotional factors within the environments of home, school, work, and play. The most influential factors throughout this analysis have been the use of parental control, intrusion, and oversight. In most cases, the individual is exposed to enough diverse experiences during childhood to balance the effects of any negative forces in their lives. This model has focused on more extreme cases at the high and low end of the NDS spectrum in order to illustrate what can be done correctly and incorrectly in order to produce the best (or worst) outcomes. Most of these positive and negative forces are at play to some degree throughout a normal child's life, resulting in a mix of various traits that allow the individual to navigate the social world to some degree by the time they are adults.

It should be concerning when cultural trends suggest a shift towards behaviors that encourage more negative traits and behaviors. Over-protective parenting, intrusion into classroom instruction, refusing to reprimand or correct child behaviors and refusing to allow others to do so, and preventing the child from freely interacting with others or to form friendships—these are all detrimental to later success and the ability to form healthy relationships.

The implications for this model are therefore wide-reaching, implying that increased moral and social development occur through specific parenting and educational practices combined with exposure to peer interactions. Unsupervised social groups provide environments to learn social rules and test out behaviors while developing problem-solving skills. Psychiatrists, instructors, caregivers, and parents should all consider this perspective of human ability informative in their decisions for best practices. Additionally, researchers in various fields related to human behavior and abilities may be better informed by exploring the consequences of parenting styles on their own variables of interest.

One avenue of future research is therefore to test this model and the claims that have been made throughout this project. However, much of the research in this field has been conducted on college freshmen, and it is unlikely that the college freshman population contains the level of heterogeneity I propose to exist on this spectrum. Prior research has likely failed to uncover a number of insights due to this narrow population focus. It will therefore be important that future researchers explore other demographics and understudied populations in order to test further assumptions. It may be easiest to predict certain environments where a poor nonverbal decoder may feel more comfortable,

as already mentioned. However, since it is difficult to predict where the highly skilled nonverbal decoders may reside, locating them for future research may be unfeasible.

I suggest to future researchers that childhood environmental factors, specifically variation in parental intrusiveness and childrearing practices, be considered as possible causes affecting their system of variables. This may turn out to be important in a variety of fields investigating childhood competencies and development, parenting practices or family interactions, healthy environments for emotional and moral growth, best practices for childcare settings, and other interpersonal fields of research. In many cases, minor alterations in parenting behaviors may have extreme positive or negative, long-lasting effects on adult outcomes. This source of influence, and the collection of consequences that result, should be considered when evaluating best-case scenarios for early environments, treatment options for those exhibiting the collection of traits found at the low end of the NDS spectrum, and when developing theories of human behavior. There continues to be many unanswered questions on the topic of human interaction. This model has proposed an additional perspective and theoretical focus for future research.

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