

Philosophical and Theoretical Foundations of Developmental Language Disorder

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Abstract

This manuscript provides a comprehensive framework for the scientific study and clinical management of developmental communication disorders and in particular developmental language disorder. This framework is grounded in both the philosophy of cognitive science and psychology and in the philosophy of medicine. It acknowledges that notions of function and dysfunction are central to understanding developmental communication disorders. I will argue that functionalism and in particular mechanistic functionalism provides a strong basis for understanding individual differences in language performance in the form of interpretation and generation of messages. I further argue that there are no forms of variation in the functioning of this message mechanism that are inherently defective or disordered as would be expected within naturalistic account of health and ill-health within the philosophy of medicine. Instead, I argue that notions of health and ill-health have been shown to be grounded in cultural values. As such, in order to understand developmental language disorder, we must understand how language provides important functional utilities to individuals within their societies. In this regard, understanding developmental communication disorders requires and appreciation and articulation of both natural and social sciences.

Philosophical and Theoretical Foundations of Developmental Language Disorder

Early in my career, I was told that the biggest challenge to contemporary scientific scholarship is that researchers find that they need to “learn more and more about less and less.” As a result, we find ourselves becoming increasingly focused on very narrow and specialized problems and in so doing have a hard time seeing the broader context of the work. This paper is an attempt to reverse this process by attempting to zoom out and attempt to examine what it is that we mean when we say a child has a developmental language disorder (DLD) and what it is that we need to know if we are to understand what DLD is. In this manuscript, I will focus on the philosophical foundations to the study of DLD. Those who study a of DLD rarely seek insight from philosophy and philosophers rarely if ever consider human communication disorders as topics of interest. Traditionally, philosophy has been concerned with the basic issues of what the natural world is comprised of (metaphysics), how we know about the world (epistemology), how we should behave and relate with one another (ethics) and how to evaluate and determine truth (logic). These issues often underly much of what we do in basic and applied science and as such provides a framework for analyzing, formalizing, and possibly clarifying some of the basic concepts that form the ideas that we work with on a day-to-day basis¹.

This will require that we explore several basic concepts within the areas of philosophies of science and in particular philosophy of mind and medicine. Specifically, given that language is something that is a part of the human mind and a social tool, we need to examine how we

¹ The initial ideas in this paper, particularly those concerned with the philosophy of medicine were first presented in 1983 at the Fourth Wisconsin Symposium on Research in Child Language Disorders (J. Bruce Tomblin, 1983). Subsequently, I published papers expanding on these ideas (J Bruce Tomblin & Christiansen, 2009; J. Bruce Tomblin, 1991, 2006). This paper represents an updating and expansion of these prior papers.

structure a coherent scientific account of how we might best think of biological and psychological mechanisms, capacities, and functions of language. Furthermore, because in one way or another DLD claims to be a “disorder” of this system and thus claims to be a form of ill-health, I will examine what it means to be healthy or in a state of ill-health and in particular how we should conceive of language within the construct of health. In order to adequately consider this issue of language health, I will explore the ways in which language is becoming an increasingly important aspect of human function and thus is an emerging factor in our well-being. My goal in this paper is to provide an explicit statement of these notions and a documentation of these ideas. As such, this paper is much longer than I would like; however, I have chosen to error on the side of comprehensiveness and as such will not assume that the reader has much background in these topics. As such this paper functions as a tutorial and also argument for an approach to research in DLD and human communication disorders in general.

Recent Emergence of DLD as a Health Condition.

Over the course of human history there has been a steady flow of new things entering into the general knowledge base. These may be things that have been discovered such as oxygen, the Bernoulli effect, and the Higgs Bosons or these may be inventions such as baseball, compound interest and the internet. During the past 60 years a new thing, developmental language disorder (DLD), has come to be. Unlike the Higgs Boson or baseball, DLD is not widely known or talked about even today and within the discipline of Communication Sciences and Disorders (AKA Speech-Language Pathology and Audiology) it is a relatively new idea. Under various names (delayed speech, childhood aphasia) this condition emerged in the 1960s (Berry, 1969; Menyuk, 1964). At that time concern was being voiced about children who were struggling with the development of listening and expression of language. These kinds of challenges were often seen

in children who had moderate to severe hearing loss or intellectual disability, but this condition also could occur despite having adequate hearing and intellect. In the 1980s, this condition came to be called specific language impairment (SLI). These children were described as having slow development of spoken language that was unexpected and unexplained. The term “specific” in SLI suggested that these children were normal in all respects except for their language ability. Subsequent research showed that these children showed deficits in a range of nonverbal abilities (J. Bruce Tomblin, 2009). A recent influential paper, (Bishop, Snowling, Thompson, Greenhalgh, & consortium, 2017) reported the results of a large survey of experts concerning the terminology and criteria for classifying forms of developmental communication challenges in children. Suggested that the term Specific Language Impairment should be replaced with the term Developmental Language Impairment (DLI) and that this be viewed as being a subvariant of Language Disorder (LD) which could occur with or without associated medical or psychological conditions. In this paper, I will focus on DLI, however, most of the issues I consider apply to LD and in fact communication disorders in general.

DLI was not a new developmental disorder as there were some reports of such a thing dating back to the 1800s. In the 1960s in the U.S. and U.K., there were few texts and even fewer university courses concerned with DLI and as well little clinical services provided. At the time of this paper, numerous texts and scholarly publications can be found addressing DLI, along with wide spread university course work and provision of clinical services including its inclusion in the Diagnostic and Statistical Manual-5 (Association, 2015) and the International Classification of Diseases (Organization, 2019). Thus, DLI has become an established health condition of childhood. This raises an interesting question. Why is it that DLI only recently came to be a health condition?

If we were to ask the “person on the street” to list the attributes of a healthy person, it is unlikely that language ability would be among them. Hjelmslev stated, "It is in the nature of language to be overlooked – to be a means and not an end" (quoted by: Hasan, 2015, p. 14). The ordinary person has little awareness of language in their daily lives (Markandan, 2021). Thus, the idea that language function is a contributor to health or ill health is somewhat foreign. Even now, DLD only seems to be a recognized health condition in the more economically developed countries in particular English-speaking countries. Even within the U.S. and U.K., DLD is not something that is well known and often is not identified until the child enters school. Importantly, neither the parents nor the child with DLD is often aware of the condition unless there are co-morbid conditions that result in a wide range of developmental problems. This also underscores the fact that its treatment is centered in the educational system rather than in the health system. Thus, DLD is a marginal example of a health condition.

I contend that DLD can be construed as an emerging health condition that reflects the increasing importance of language functions in serving the well-being of members of our societies. In this respect, I will argue that health is a construct grounded in social values that are concerned with the functional capacities of members of a society. These capacities arise from complex interactions of environmental and biological systems that both evolve over time and thus exemplify niche construction and biocultural evolution (Laland, Odling-Smee, & Feldman, 2000). The study of language has had a long history of viewing it as a cultural artifact or a product of biology. Thus, for us to have the tools for thinking about the biological and cultural foundations of both language and health. This will allow me to outline a

framework of DLD that incorporates these foundations. To do so, we must start with the notion of biological and psychological function.

Biological and Psychological Functions and Mechanisms

For several decades, there has been an active debate in the philosophy of science and medicine concerning what constitutes an understanding of biological and psychological conditions (health) and when and why a condition may be concerned with health and thus ill health. We assume that these health and ill-health states arise from the products of biological and psychological systems. In the past several decades there has been an ongoing debate, mainly in the philosophy of science, about how to describe and explain these systems. During the first half of the twentieth century, psychology attempted to emulate physics in the form of behaviorism (Skinner, 1965; Watson, 1928) where laws were used to explain relationships between stimuli and responses. Thus, psychology was concerned with relationships between stimuli and responses and the laws were intended to map stimuli to responses. Intervening mental states or functions were viewed as unnecessary for adequate accounts of psychology.

From Behaviorism to Functionalism

During the 1950s, molecular biology began to develop an understanding of cellular function based on DNA and computers became capable of performing complex operations. In each case, organisms and machines achieved sophisticated functions as the result of complex more basic functions. In 1959, Chomsky (1959) challenged behaviorism as being inadequate to explain language, and the following year, Putnam (1960) laid out an alternative to behaviorism called functionalism. Functionalism explicitly allowed for mediating mental entities between

stimuli and responses to be used in psychological explanations. Putnam argued that behaviorism was inadequate to understand psychological states and that mental functions provided a solution. Much of his thinking was influenced by the similarity of functions provided by computers and those of humans. For Putnam, mental states are functional roles within a system, where a mental system could be viewed as a computational system and as such a Turing Machine. In humans, this is done with neurons, and in computers, it is done with electronic parts. In this respect, his approach to functionalism has been called computational functionalism. Furthermore, the fact that computers and humans can do similar computational things, he argued that it was not necessary to explain functions based on how they were performed. The important thing was what the function accomplished since the function might be produced in different ways. This was called multiple realizability. Thus, his view of functionalism rejected what was called Identity Theory (Smart, 1959) which claims that states and processes of the mind are identical to states and processes of the brain thus, how something is done in the brain is equivalent to what it does. In some functional accounts what something does has been referred to as its role whereas how it is done is the realizer. The role is often understood to be a mental state such as pain and the realizer is the brain states that are causally associated with pain. It is important to note that Putnam did not deny that there were realizers underlying roles, but he believed that you could explain psychological phenomena without the need to employ underlying mechanisms; whereas in Identity Theory which focused on "how", psychological phenomena didn't add anything to the explanation and thus weren't necessary.

Variations of Classical Functionalism

After Putnam introduced functionalism, a variety of versions or flavors of it emerged. Many of these were in response to the question of how to determine what the function of a system is, that is what is it that the system is supposed to do? This is viewed as the system's proper function and contrasts with artifactual functions that don't reflect the purpose of the system and don't need to be addressed in an explanation. If the system has been created by a designer, we can say the proper function is what the system was designed to do which is viewed as its purpose. This has been termed a teleological explanation and within this explanation, if the system fails to achieve this purpose, it can be viewed as being dysfunctional. However, in natural systems, it is not clear whether there is a design and purpose and therefore it is difficult to establish a proper purpose and likewise when it is in a state of dysfunction. You will see that this debate bears on much of the thinking about health and ill health that will be discussed later. A classic example is the proper function of the heart is to pump blood, but hearts also produce a pumping sound and so we might view the pumping sound as an artifactual function.

There have been different approaches in functionalist accounts that seek to explain proper function and dysfunction. Boorse (1976) has argued that the correct or proper function of a system is determined by how the function of interest contributes to the survival of the organism in the current environment which he refers to as fitness. This explanation emphasizes the purpose of the system oriented to the future and thus is viewed as forward-looking. The main problem with this account is that it explains a current function in terms of a future utility and thus requires causation to go backward. Alternatively, the explanation may focus on how the function came about through Darwinian selection (Neander, 2017; Wright, 1976), and thus functional traits tend to be retained and nonfunctional ones tend to disappear. This latter type of function is backward-looking and has been called a Wright function. Boorse (1976) argued that this comes

down to saying that a function exists because it mattered in evolution since if it didn't matter it wouldn't be there which he views as circular. Note however that, this does not provide a way to differentiate between a proper function and an artifact. Since hearts produce a sound, we would have to conclude that the sound production has a purpose which seems unlikely.

In the accounts above, the focus was on explaining a proper function on teleological grounds (forward or backward). An alternative approach seeks to explain a function by what the component parts of the system do (the function of the parts) in order to yield a functional product (function of the whole). Cummins stated that “to ascribe a function to something is to ascribe a capacity to it which is singled by its role in the capacity of some containing system” (R. Cummins, 1975, p. 765). Thus, Cummins argued that the function of a system is explained by the causes of the function. In effect, he sees no need to distinguish between proper and artifactual functions when explaining how a system works. There are operations of the heart that pump blood and there are operations that create sound. This account has been referred to as a Cummins function in contrast to a Wright function.

An important feature of a Cummins function is that basic functions can contribute to the capacity of a higher-level system. Returning to the classic example of the heart we can say that the heart pumps blood (low-level functional capacity) to accomplish circulation (a containing system with higher-level functional capacity). So, the function of the heart is to pump blood. A key feature of this kind of explanation is that functions are both the thing to be explained (explanandum) and the thing that explains (explanans). Bechtel (1988) characterizes this as being similar to nesting dolls "as we unpack each one we proceed to a more micro level (p. 123). Cummins's approach has been called a Homuncular functional explanation and in psychology,

these have been quite common and are often seen in box and arrow models of cognitive processes where an overall function such as memory is explained by a set of subfunctions. For instance, Baddeley (1992) has proposed that there is a memory function that serves the purpose of performing active work (working memory). One of the subfunctions of working memory is a phonological loop that maintains speech representations. The phonological loop contains a storage system that has the function of holding information temporarily and a rehearsal system that has the function of refreshing the information in the storage system. The overall function of working memory can be described in terms of its capacity which are explained by the capacity of each of the subcomponents. This kind of functional explanation has dominated the kinds of explanations for DLD where the cause of the language disorder is explained by capacity limitations in temporal processing (Tallal & et al., 1992), working memory (Montgomery, 2002), executive function (Pauls & Archibald, 2016), statistical learning (Evans, Saffran, & Robe-Torres, 2009), etc.

Toward Mechanistic Functionalism

All these different functionalist accounts (computational, homuncular, forward-looking or backward-looking, and Cummins function) will be called Classical Functional accounts. The Classic Functional accounts focus on what a system does. It doesn't seek to address how it does it or if it does such as Cummins, it uses functions to explain functions. As an alternative to these functional explanations, some philosophers of science (Bechtel & Richardson, 1992; Craver, 2001; Glennan, 1996) turned to mechanistic explanations that are grounded in physical and biological mechanisms to explain mental functions. As such this mechanistic approach reflects a form of naturalism – a term that will come up later in our consideration of Health and Ill-health.

This approach accepts at least a weak version of Identity Theory (Bechtel calls this Heuristic Identity Theory: HIT) that there are strong causal relationships between psychological states and processes and brain states and processes. Establishing these links is the goal of a mechanistic explanation. Mechanistic explanations have been prominent in the physical and biological sciences for a long time dating at least back to Greek atomists wherein fundamental basic entities such as atoms inform more complex entities up to life forms. Bechtel (2007) has proposed:

“A mechanism is a structure performing a function in virtue of its component parts, component operations, and their organization. The orchestrated function of the mechanism is responsible for one or more phenomena....
Operations can be organized simply by temporal sequence, but biological mechanisms tend to exhibit more complex forms of organization. Mechanisms may involve multiple levels of organization.” (Bechtel & Abrahamsen, 2005, pp. 223-224)

Based on this definition we need to identify underlying subsystems (parts) that do things in a particular way (organized operations) that result in what Bechtel describes as "phenomena." Note that the mechanism can be responsible for more than one phenomenon and thus he follows Cummins in disregarding the notion of a proper function for a mechanism. I should note that Bechtel uses the term phenomena whereas others seem to treat the terms: function, behavior, and phenomena, as largely equivalent. For instance, Azevedo Leite (2018) stated “a biological mechanism functions, or performs a function, it is a biological functional mechanism” (p. 31) and it is this definition that I will follow. Craver (2001) noted that the organizational properties of a mechanism are essential in that they specify the way the parts interact such as through cooperation, competition, and other forms of engagement. He stated that one understands a mechanism by discovering its component entities and activities and by learning how their activities are spatially and temporally organized" (p. 60).

Figure 1 provides a graphic depiction of this account. In contrast to a functional explanation, the mechanical explanation introduces new entities that are grounded in physical/biological entities (parts) and operations into the cause of the function. Thus, the mechanism has both causal processes (realizers) and functional properties (roles). It is important to note at this point that some of these mechanical parts are internal to the organism, but these parts can be open to environmental input (Piccinini, 2020). In this respect, the inputs to a mechanism are physical parts that are likely to come from a lower level and environmental inputs. The outputs of the mechanism are its function and although these can be basic internal physiological and ultimately mental events, they can also be behavioral. This means that the organism can both behaviorally alter its environment, but also respond to this environment. This feature of mechanistic functionalism allows it to be consistent with what is called the extended evolutionary synthesis that emphasizes the bidirectional relationship of biological and

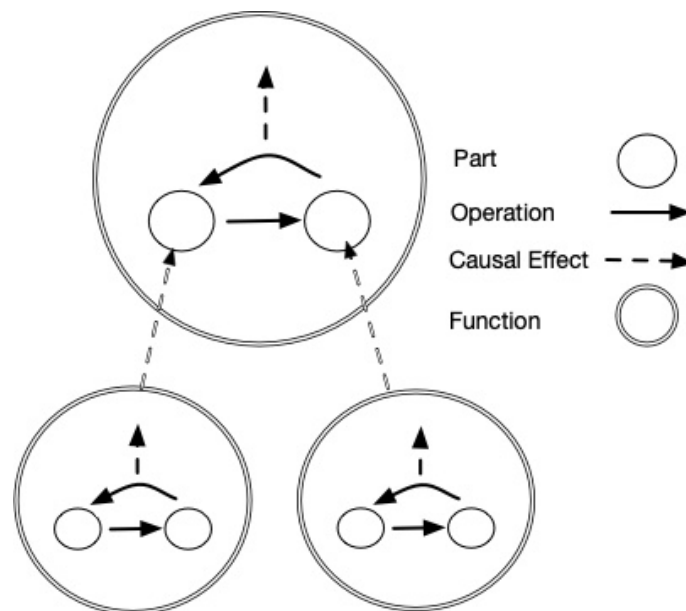


Figure 1. Characterization of a mechanistic explanation where a function is the result of parts and their operations which then become parts at a higher level.

environmental processes where the organism shapes the environment and biologically adapts to it (Clark, Deffner, Laland, Odling-Smee, & Endler, 2020). This reciprocal process is described as niche construction and as we will see later becomes important in thinking about cultural factors and health because niche construction can include learned cognitive and behavioral resources.

As was shown in the classical functional account, the elements of a mechanism are organized hierarchically such that mechanisms at a lower level can become parts of higher-level functions. This notion that higher-level functions are understood by looking at the more basic parts becomes an issue with a mechanistic account that includes basic biological mechanisms that form more complex higher-level mechanisms. If all we need to know is how basic parts (chemicals and energy use) assemble into more complex systems i.e., the whole is simply the sum of the parts, then we only need to understand the parts and we need to go down to the lowest possible level. This has been termed reductionism which implies that we don't need higher-level constructs such as mental functions and thus psychology can be reduced to neuroanatomy and physiology as proposed by Bickle (2006). Bechtel has argued against strong reductionism because psychological phenomena or what I am calling functions are emergent. Emergent phenomena contain properties that depend upon the underlying parts but arise from complex interactions among the parts. Thus, the whole is more than the sum of the parts. Furthermore, emergent phenomena can then participate in complex interactions with other emergent structures at the same level which gives rise to even more complex higher-level emergent functions. Azevedo Liete (2018) referred to this as causal pluralism which rejects reductionism. Emergence allows for causal effects across levels of complexity and allows for new mechanisms

such as language to arise from more basic brain systems, but at the same time represent a phenomenon that requires its own theory.

We can see that what a mechanistic account aims to do is to seek an explanation of a particular function by drawing on all the relevant types of scientific evidence that bear on the cause of the function (Stinson & Sullivan, 2017). Stinson and Sullivan have outlined the general features of a mechanistic investigation of a phenomenon. They note the first step is the characterization of the function and decomposition of the subfunctions that underly it. In this respect, it is like classic functionalism. The mechanistic information is then drawn in by using known or plausible mechanistic processes provided by relevant scientific knowledge at the time. These authors emphasize that mechanistic explanations evolve gradually over time. "Mechanistic explanations start as sketches ... that have gaps in their productive continuity Sketches re-revised, filled in, and fit into their surrounding contexts, until they eventually gain the status of adequately complete mechanistic explanations, or are rejected as false starts" (p. 382). They note that this evolutionary process involves working from both top-down and bottom-up and via the use of multiple scientific methods to arrive at the current best account. Thus, mechanistic explanations are aspirational and rarely fully complete. This is analogous to piecing a puzzle together where certain parts of the puzzle (edges and corners) are more tractable than other parts. By solving the tractable parts, along with a top-down theory of what the picture is, we can then converge on a solution. The tractable parts in cognitive science are often found in basic neuroscience, but the big picture comes from having hypothesized about important functions of the mind such as language.

A Mechanistic Functional Model of Language

Currently, a mechanistic model of the language system is only beginning to emerge. The functional mechanistic account of the auditory system was aided by the fact that its parts comprise distinct peripheral and central neural structures whereas language is accomplished through complex integrated networks in the cerebrum (cortex, hippocampus, basal ganglia). Given that we aim to develop a model of DLD, we need to construct a heuristic model of a language mechanism. This model is depicted in Figure 2. We can see that this model frames much of what psycholinguistics is about. There are many details of this model that have been left out and there are many alternative operations and parts for this model. A variant of this model that contains more detail regarding mechanisms underlying language can be found in a recent paper (McMurray, Apfelbaum, Colby, & Tomblin, In Press). The current model has a greater emphasis on the higher-level functional products of language.

I begin, by proposing that the language mechanism can be functionally characterized as a message generation system. This system has inputs from both the visual and auditory systems and also an intentional system that motivates and specifies the purpose or goal of the message. The outputs of the message system comprise (1) a gesture system involving speech, writing, or signing, and (2) mental systems for thought. The parts and operations of the language system are included here to serve as placeholders. In this model, both comprehension and production share the same processes of message construction, but these differ concerning whether the inputs come from mental states (production) or sensory input (comprehension). These processes of comprehension and production are often treated as separate aspects of language processing, however, several studies have shown that these processes are highly correlated and seem to reflect a single latent language trait (Anthony, Davis, Williams, & Anthony, 2014; Bornstein & Putnick, 2012; Consortium, 2015; J. Bruce Tomblin & Zhang, 2006). It remains to be determined

whether this low dimensionality in psychometric language tests extends to the underlying mechanisms or is due to some kind of common final path. I should note that this model is primarily concerned with language use rather than language learning; however, there is increasing evidence that language learning occurs via language processing and thus, this model can incorporate both learning and processing.

An important feature of this model is that variation in the operations performed among the parts will result in systematic differences in message formation and as well variation in language function. In this regard, we can assume that the mechanistic and functional variation is continuous across the ability range. Thus, the same mechanistic principles that yield variation that differentiates high performers from average performers also underlie the variation that differentiates the poor performer from the average performer. This at least serves as a starting hypothesis. It is possible that functional variation in certain subgroups can originate in different ways as a result of the operational characteristics of certain mechanisms.

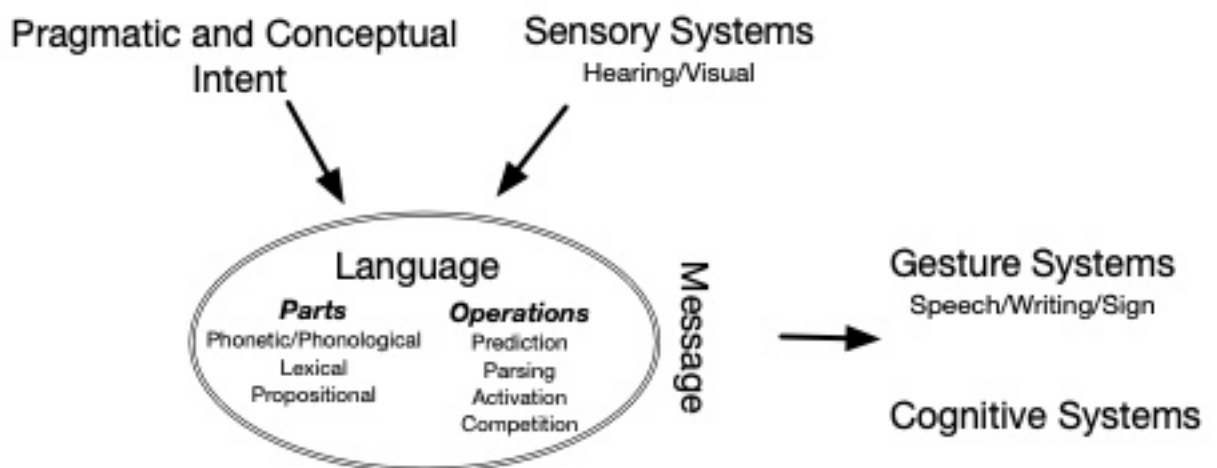


Figure 2 Heuristic Mechanistic Model of Language

Bechtel has noted that a principal method for the study of mechanistic processes has been through experimental manipulation of either the input to the mechanism or by altering the operations of one or more of the parts of the mechanism and then measuring a change in the

functional output. Although Bechtel does not include correlational methods, we can also measure the correlation between the operation of a mechanistic part and a functional product. This can be seen in research methods that examine the correlation of brain structure with measures of brain function. Cronbach (1957) and later Underwood (1975) and Scarr (1992) noted that much of psychological theory construction treats individual differences as nuisance variance even though this variance is systematic. These authors argued that individual differences need to be included as a part of the process of theory construction and testing. Considering this, we need to acknowledge mechanistic operations can often vary, and this variation will be reflected in an associated variation in the function level. In this regard, we can see that in homuncular functionalism, capacity is often seen as varying but with no explanation as to how this comes about, a mechanistic explanation can address this. Furthermore, this variation in mechanistic operation and functional level is likely to differ among individuals and differ within individuals over time and development. We can see that this property of mechanistic and functional variation and importantly covariation have important implications for the conceptualization of health and ill health.

Although it is premature to conclude that mechanistic functionalism has now become of the accepted philosophical foundations of biological and psychological sciences, it has taken a dominant position. In so doing, I believe that it also provides a way of thinking about health and ill health in ways that may help clarify our understanding of the important philosophical issues concerned with these. Importantly, it specifies a causal relationship between mechanisms and functions. Following Bateson and Laland (2013) we can think of the functions of a mechanism as comprising the utility of the mechanism for the organism. In the case of humans, economists view utility as reflecting value or desirability. Although many of the biological and

psychological functions that operate in humans are not open to conscious awareness, many are, and I will claim to have this economic sense of utility or value. As we will see in the following section, thinking about states of health requires thinking about mechanisms, functions, and human values or their utility.

Mechanisms, Function, and Values in Health and Ill-Health

At this point, we have established that our understanding of how biological and psychological systems work involves mechanistic operations and functional outputs or utilities. When we restrict our consideration to humans and perhaps other animals, we confront the idea that these mechanisms and functions have something to do with the idea of health and ill health where some level or kind of mechanical operation or function is viewed as health and other levels or kinds are viewed as ill health. Two issues are at the center of the literature on ill health: (1) when can a mechanism or function be thought of as a state of health and (2) within this when and why is a level of function be viewed as some form of ill health? We can see that these issues have implications for our thinking about DLD. Specifically, do the functions of language fall within the scope of health and if so why and on what grounds do we decide that language function constitutes ill health?

For more than 60 years, there has been an active ongoing debate about how to conceive of health and ill health, largely within the philosophical literature. Within this literature numerous terms have been used to refer to ill health; however, "disease" and "illness" are the most common, and much of the debate regarding the nature of health is concerned with this. A different set of terms namely impairment, disability, and handicap can be found in the field of Disability Studies. Later, we can examine these terms and their conceptualization concerning the

notions of illness and disease. I should also stress that here we are interested in the conceptualization and explanation of health states regardless of the terms used.

The terms disease and illness are often used to contrast two perspectives on ill health, one from the perspective of the health provider and is concerned with a description or explanation of the state of ill health and the other is from the perspective of the patient and is concerned with the experience (symptoms) of the state of ill health (Hofmann, 2002). This debate over these perspectives was triggered by an article in the *American Psychologist* by Szasz (1960) titled *The Myth of Mental Illness*. In this article, he argued that unlike diseases of the body that have objective features that can be determined by the provider, diseases of the mind are grounded solely on value judgments placed on the behaviors and reports of the patient. This can be seen in the following:

“The notion of mental symptom is therefore inextricably tied to the social (including ethical) context in which it is made in much the same way as the notion of bodily symptom is tied to an anatomical and genetic context. The notion of mental symptom is therefore inextricably tied to the social (including ethical) context in which it is made in much the same way as the notion of bodily symptom is tied to an anatomical and genetic context”(Szasz, 1960)

This view challenged the idea that mental illnesses can be viewed as illnesses that are to be addressed via medical actions. Instead, Szasz, argued that the actions (often psychotherapy) should be recognized as efforts aimed at achieving emotional and behavioral conformity in the patient. That is mental illness was not a true health condition, but rather a culturally based rejection of certain types of behavioral differences. Fifty years after this publication, he admitted that his views were not accepted in medicine, but he continued to argue that treatment of mental illness was often a practice of "state-sanctioned coercion"(Szasz, 2011, p. 182). Although Szasz was only addressing mental illness, his thinking provoked a broader consideration of the role of

social values in health beyond mental illness in the subsequent for the past 60 years that asked whether health and ill health could be viewed as states of nature (naturalism) or the creation of human culture (normativism) or possibly some of both.

Normativism and Illness

Within the debates about the nature of health and ill health, there is a consensus that illness is a normative concept. Normativism was a perspective expressed by Szasz. In its general form, it claims that health and ill health are culturally grounded in social or cultural norms or values. These norms are shared beliefs within a community about what ought to be or should be (Palao, 2021). Normativism holds that health and ill health are creations of humans that refer to states or functional levels in individuals that are evaluated in positive or negative ways based on cultural norms or values. Szasz's position suggests that he believed that what he called organic disease and health should not be thought of as normative concepts. These organic conditions were grounded in objective biological understanding – organic disease. He argued that mental illness was not grounded in the body but rather in the mind. Thus, mental illness was a culturally based concept it should not be considered an illness.

In response to Szasz, Margolis (1969, 1976) argued that cultural values also played a role in somatic as well as psychiatric and psychological conditions. In this account, cultural values are directly applied by the patient to the experience of illness. Human societies create cultural niches (Laland et al., 2000) that contain “shared information (ideas, beliefs, values) that is learned, expressed in cultural activities, and socially transmitted between individuals in the form of cultural inheritance” (p. 137). Cultural values comprise its ideas about what individual functions are viewed as good/bad, right/wrong, fair/unfair, and just/unjust. Values concerning health and illness are found in all cultures although there is considerable variation in how these

are constituted these values concerning illness can change within a community over time. These values are often implicit; however, their application to a person's functioning often results in explicit judgments and actions. At this point, we can see that illness represents a judgment about the functional status of oneself or another individual. In this regard, it is clear that illness is a cultural evaluation of a function about its current utility. This view of the cultural foundations of illness was also reflected in Engelhardt's writing where he stated that illness "is a set of observables identified by the ill person or his or her associates a pathologically distressful, displeasing, painful, or dysfunctional" (Engelhardt, 1976, p. 257). It is difficult to find anyone who disputes the general sense of this statement concerning the notion of illness and its grounding in cultural/social values (See for instance: Goosens, 1980; Kingma, 2014; Nordenfelt, 1993, 2007; Wakefield, 1992). In many of these papers, the cultural values applied to illness concern the failure of a valued function to perform as expected or as

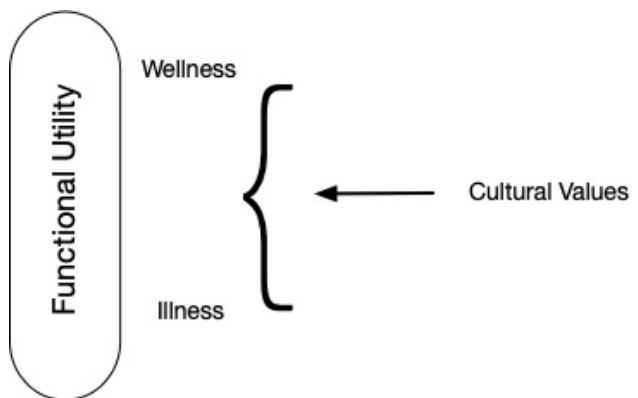


Figure 3. A normative model of Illness

desired. Wakefield (1992) referred to this as harmful levels of function and Nordenfeldt concluded that illness 'is any internal psycho-physical state or process that interferes with the ability to achieve one's vital goals' (Nordenfelt, 1987, p. 108).

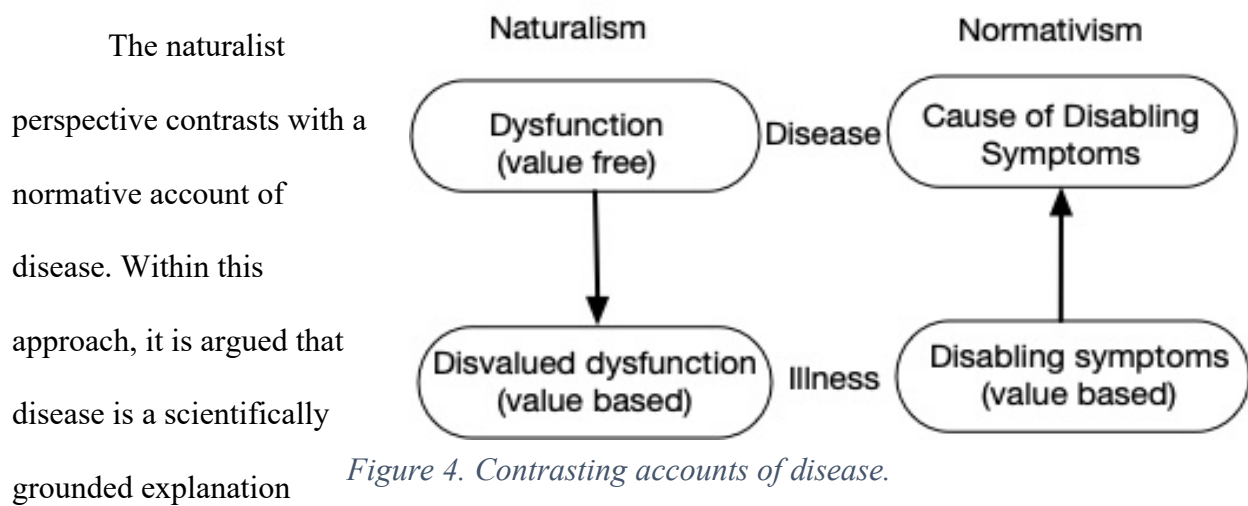
We can conclude that there is a consensus that the construct of illness is concerned with disvalued function. It is important to note that Bateson and Laland have advocated for an extended evolutionary synthesis (Laland et al., 2000) wherein biological evolution and cultural evolution (niche construction) interact over history and thus the current utility of a function can be culturally influenced. In their account, they do not address the question of how functions are

culturally evaluated and thus their account doesn't address health; however, it would seem that within this account, cultural evaluation of functions would be expected. Furthermore, it is generally agreed that illness is a culturally informed statement regarding the sufficiency of the function to serve the purposes of the function. We can see this depicted in Figure 2 where illness contrasts with states of wellness as different culturally evaluated states of a functional utility. Relating this to DLD we can see that although we don't use the term "illness", we may consider DLD as a condition wherein the important (culturally valued) functions of language place the child at risk for harm.

Naturalism vs Neutralism in Disease

In contrast with the broad consensus regarding the place of cultural norms in illness, there is considerable disagreement about the notion of disease and how it relates to illness. Recall that disease is an account of the state of ill health from the perspective of the health provider. There does appear to be agreement that disease is concerned with the causal operations that give rise to a function and thus in contrast to illness that is concerned with disvalued function, disease is concerned with mechanisms that are associated with the disvalued function. This distinction maps quite well to the mechanistic functionalist model that is shown in Figure 1. In this case, disease is concerned with the organization and operations of the component parts that give rise to the function. The basic issue is whether it is possible for an account of disease to be free of cultural influences. That is, are diseases natural kinds that can be discovered by scientific methods? This is a position that has been termed naturalism or neutralism because disease can be viewed as a state of nature. At its core, a neutralist account assumes that a disease can be understood as a universal feature of an animate entity (human, animal). In this respect, a disease is an inherent trait of the sick person. A fundamental aspect of naturalism is the notion that a

disease is a situation in which the system does not accomplish its proper function. Thus, naturalists cannot avoid the issue of proper function that I discussed earlier. As we will see, naturalists need to establish that the proper function of a system is not dependent on cultural values and thus are universal for all members of a species. These naturalistic accounts rely on either forward or backward teleological accounts.



for culturally evaluated illnesses, and thus disease accounts are grounded in culture-free science but are defined and validated by their ability to explain value-based states of illness. We can contrast the naturalist approach with the normative account by the fact that for naturalists, illnesses are nested within diseases, whereas within normativim, diseases are nested within illnesses. Bueter (2019) pointed this out by stating that in one case illness had priority and the other disease had priority as depicted in Figure 3. Note that in Figure 3 the directional arrow shows that the naturalist account starts with a value-free dysfunction from which value-based illnesses are selected. In contrast, the normative account starts with the functional states that are disvalued and these serve to motivate the explanation that is the disease. This account has been termed a reverse view of disease and illness by Fulford (1989) and thus we will call the naturalist

account a forward view. There has been an ongoing debate between various naturalist and normative accounts of disease and so I will attempt to summarize these.

Naturalism and Disease. The most prominent naturalist account of disease was provided by Boorse (1977, 1997, 2014) in the form of his Biostatistical Theory (BTH) of Health. This theory seems to have prompted much of the debate over the nature of disease. We can understand Boorse by first recognizing that he generally holds a classic functionalist position regarding biological and psychological explanations. In this respect, biological and psychological systems are comprised of functions and subfunctions that are properties of nature and thus value free. Health within any system exists when the functional components are operating properly. Recall, Boorse defined proper function in terms of the normal fitness of the organism to the individual's current survival and reproduction (a forward-looking teleology). As I noted earlier, there have been concerns with this since it involves backward causation. Thus, the system must anticipate the consequences of the current function. Furthermore, many diseases do not threaten survival and reproduction, they simply make life harder. Boorse recognized that functioning can vary so this presents a problem as to how to define the proper level of function that represents a healthy state that can fulfill the purpose of the function. His solution was that the central tendency (average) of the function in an appropriate reference group that controls for expected variations in function (age, sex etc.) provides this information. This raises the issue of where to draw the line between normal function and dysfunction. Boorse stated that this cut-off point "can only be conventionally chosen, as in any application of statistical normality to a continuous distribution. The precise line between health and disease is usually academic since most diseases involve functional deficits that are unusual by any reasonable standard" (1977, 559). Thus, he seems to accept that functions can vary, but seems to believe that there will be an obvious

discontinuity that can be found without recourse to cultural values. Schwartz (2007) referred to this as a frequency approach to the determination of dysfunction and noted that this did not provide a sufficient means of establishing where to draw the line.

At this point, I need to point out that Boorse' BST fits well with common research approaches used to understand the nature of developmental language disorders. Much of this research has assumed that embedded in the language features of children with DLD we will find a property such as auditory processing (Corriveau, Pasquini, & Goswami, 2007; Tallal, Stark, & Mellits, 1985), learning and memory systems (Archibald & Gathercole, 2006; Ullman & Pierpont, 2005), grammatical features (Leonard, 1972; Rice & Wexler, 1996; Van der Lely, 1998) that distinguishes it from the typical or normal states of language development. Thus, with sufficient empirical research, we can determine what language mechanisms are malfunctioning. As such, underlying this work is often the assumption that a properly functioning system in language development is disrupted and there are two distinct states of language development disordered vs normal. By contrasting the language functions of those with DLD with those who are normal we can discover what is dysfunctional. Furthermore, our clinical approach to defining DLD has been to place a cut-off line somewhere toward the lower tail of a frequency distribution of language function as shown in my own work (J. B. Tomblin, Records, & Zhang, 1996).

Boorse's BST provoked several scholars, mainly philosophers, to criticize the validity of his account (Ereshefsky, 2009; Kingma, 2007; Reznick, 2022; Wakefield, 1992). Even Boorse acknowledged that most of the papers in response to BST disputed it and 20 years later he (Boorse, 1997) provided a lengthy response to these many criticisms. Boorse summarized the

criticisms of BST as it being: vague, covertly normative, and based on bad biology and medicine. The covert normative issue shows up in his easy acceptance that levels of function in one direction away from the mean (high intelligence) are good and the other are bad. Regarding bad biology, Ereshefsky noted that most of these problems with BST come from the fact that health and disease are referenced to a notion of species design which is determined by the statistics of the species' phenotype. However, Ereshefsky notes that biology defines species on the grounds of shared ancestry rather than similar phenotypes. In response to this criticism in several places of Boorse's rebuttal, he stressed that this account was about a theoretical or idealized view of health and thus it was not intended to explain the actual practice of health care and therefore not all things that are in practice treated as disease. He also emphasized that diseases will vary in "grades of health". These grades allow for value-free, objective health states that are **theoretically** normal vs pathological, but this seems to be a small subset of all forms of ill health. Beyond this are a set of value-laden health states that are the objects of health care that also receive a diagnosis, therapy, claims of illness, etc. Thus, he agrees that cultural values have a clear place within health care, but these value-laden states may not actually represent "true disease".

Other naturalist accounts of health have attempted to construct accounts that avoided some of the problems of the BST. Several of these accounts redefined functional fitness to use a backward-looking (Wright function) view of proper function. That is that the proper function of a system reflects those properties of an organism that have been selected by evolution and failure of a proper function constitutes disease (Griffiths, 1993; Wakefield, 1992). As I noted earlier, a common concern with these accounts is that we can't know how a

function evolved and this doesn't allow for a differentiation of proper functions, from artifactual functions.

At this point, despite considerable effort to define health and ill health as conditions that are free from human values either via the BST or modification of it. However, this position remains in considerable dispute (Doust, Walker, & Rogers, 2017). This has led Thorell (2021) to conclude that naturalism only concerns a theoretical idea of value-free biological states of health, but is not concerned with addressing practical questions that arise in clinical practice.

Normativism and Disease. As I noted earlier, the principal alternative to the naturalist account of disease has been the normative account. This view was first expressed by Margolis (1969) where illness consists of the patient's overt distress and disability while disease is defined by its tendency to cause illness. Thus, as shown in Figure 2, value-based illness serves to motivate an explanation that consists of notions of disease. Engelhardt (1976) voiced his agreement with this account. Illness refers to a set of "observables identified by the ill person or his or her associates as pathologically distressful, displeasing, painful, or dysfunctional" and disease refers to "those pathophysiological or psychopathological generalizations used to correlate the elements of disease state to allow (1) an explanation of its course and character, (2) prediction or prognosis concerning its outcome, and (3) therapy through manipulating variables important to the course of the illness." (Engelhardt Jr, 1976, p. 257). Engelhardt noted that disease explanations contain value-free scientific knowledge; however, these explanations are still influenced by the cultural values that define illness.

After Margolis and Engelhardt presented the case for a normative view of disease several other authors presented somewhat similar arguments. Two of these, Wakefield and Nordenfelt were particularly influential. Nordenfelt (1987, 1993, 2007) presented an account of disease that is very similar to that of Engelhardt. Nordenfelt started by focusing on what constitutes health which he claimed is a person's ability to achieve one's vital goals which he refers to as a concept "welfare notion of health". "A is healthy if, and only if, A is able, given standard circumstances in his environment, to fulfill those goals which are necessary and jointly sufficient for his minimal happiness." (Nordenfelt 1987, p. 79). So, health for Nordenfelt is a subjective state of at least a minimal sense of well-being. This state of health underlies both illness and disease. Illness for Nordenfelt is similar to most normative accounts in that it contrasts with a state of health. He further defines disease similar to Engelhardt in that it is a "type of physical or mental process which, when instanced in a person ... would with high probability cause illness." (Nordenfelt 1987, p. 108). It is important to note that he introduces the idea of probability in this definition. This introduces the notion that disease does not always require an illness state which allows for asymptomatic diseases that carry the risk of illness. For instance, high blood pressure often is not known to the patient until it is measured by the physician and yet it is treated as a disease. Thus, a disease state is justified because it is associated with the risk or probability of becoming ill and thus some diseases may exist without a current state of illness. This feature is important to our thinking about DLD as often the clinical efforts are provided in early childhood intervention programs before there is any evidence of substantial harm, but the justification is that it will reduce the risk of later harm.

Wakefield (1992, 2007, 2015) also concluded that disease requires a normative state of illness which he referred to as resulting in harm. However, he added, that disease also required

that the function serving the illness condition be dysfunctional, thus disease consists of harmful dysfunction. Importantly in his account “dysfunction” is a scientific factual term, referring to the failure of biologically designed functioning where the biological designs are evolutionarily selected and thus he employs teleonomic processes to determine proper biological design. In contrast, Engelhart and Nordenfeldt seem to focus more on understanding the scientific grounds for what currently is causing the disvalued state which can be seen as a question of how the function currently operates. Thus, for Wakefield a (mental) disease condition needs to be both: (1) a failure of biologically designed functioning and (2) judged to be negative by sociocultural standards. (Adapted from Wakefield, 2007, p. 149). The reason for including a naturalist component was to constrain the use of value-based criteria in determining mental disorders and thus avoid the abuse of psychiatric diagnosis in being applied to social situations such as homosexuality or political speech. In this respect he espouses both a normative and naturalist position regarding disease, however, in so doing, he inherits the challenges against establishing a value-free view of dysfunction.

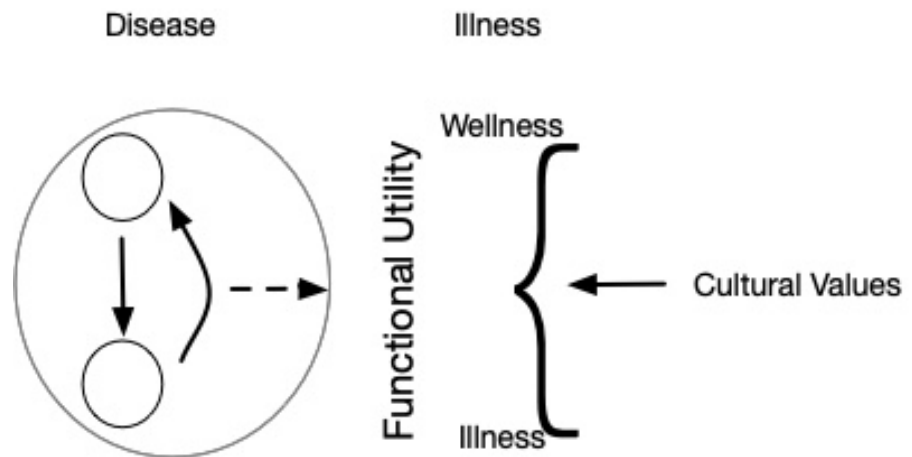
Construction of a Mechanistic Functional Normative (MFN) Account of Disease

The debate between normativism and naturalism regarding disease continues. However, what might be viewed as a weak normative perspective seems to emerge as a good candidate for understanding both disease and illness. To do so, I will attempt to draw on the debates over mechanistic vs functional accounts and bring this to bear on the disease and illness contrast. Recently Amoretti and Lalumera summarized the current normative position held by Nordenfeldt, Fulford, Megone, Reznick, Cooper, and Wakefield as “the concept of disease [is] holistic and evaluative: on the one hand, it regards the whole person, not single parts of an

organism; on the other hand, disease is judged a bad thing to have, something that we (individuals or society) negatively evaluate and dislike it being constitutively linked to some disability, action failure, harm, suffering, unluckiness, or undesirability. Typically, traditional normativists deny that disease can be analyzed (solely) in terms of dysfunction and underlie the necessity of including evaluative terms as its explicit conceptual components.” (Amoretti & Lalumera, 2022, p. 48). This summary points out a key feature of most of the normative positions (except for Wakefield). This is, that disease does not require any sense of inherent functional failure for it to exist, but rather it only requires that there be variation in function. Both Margolis and Engelhardt noted that there are natural processes that govern the occurrence of a function, and the operation of these processes can vary across individuals and as well within individuals over time. This is a very important point. It picks up on the notion that within mechanistic accounts variation in the mechanism’s operations will yield variations in the functional product and all this variation may arise from the same basic operational organization and processes. This variation is required in most accounts of evolution whether it occurs quickly (saltation/ punctuated equilibrium) or more gradually. Without variation, we couldn’t have evolution and all accounts of evolution assume that all variations have equal potential utility. This means that a normative account of disease can allow for a value-free account of variations in natural biological and psychological functions.

Often this variation in the biological and psychological sciences has been ignored and treated as uninformative and often as error variance (c.f., Cronbach, 1957; Scarr, 1992); however there is clear evidence that as Margolis and Engelhardt noted, variation in the mechanism's operation and associated function is an inherent and expected aspect of all biological and psychological functions Recall earlier concerning asymptomatic disease, I noted

that a diseases state is associated with the probability of illness. Thus, what constitutes disease is that there is a region of variation that is associated with



illness. In other words, a *Figure 5. A normative mechanistic model of illness and disease.* level of function that is not inherently defective or dysfunctional takes on the role of disease when it is associated with illness as shown in Figure 4. All the mechanism needs to do is generate variation in function. Then disease processes are those that give rise to functional levels that carry an elevated likelihood of judgments of illness. Likelihood is used in the Bayesian sense of a level of confidence in a theory or hypothesis. Thus, a disease is a theory or hypothesis about the cause of a disvalued state of illness; however, the causal mechanistic account is not restricted to determining just the functional levels considered to be disease, but rather explains the full range of functional variation.

We can exemplify this account by explaining language disorder that is associated with congenital hearing loss. Recall, that a theory of disease is considered to be a health provider's response to the patient's complaint of an illness. Let's assume an infant is found to have difficulty hearing low-amplitude sounds. We can return to Table 1 where several possible component mechanisms are involved in hearing. One mechanistic explanation might be that the child has an infection in the middle ear that results in the stiffening of the tympanic membrane and thus attenuation of the conduction of acoustic energy to the inner ear.

Alternatively, the child could have a mutation of the *STRC gene which alters the Stereocilia* protein in the hair cells in the cochlea such that the cells are less sensitive to the mechanical displacement of the Basilar membrane and thus limiting the child's access to auditory experience including exposure to spoken language. In either case, we have strong evidence that these conditions can cause poorer language learning outcomes if not managed clinically and as such threatens the child's well-being. This account provides a rather complete disease account of congenital hearing loss. The mechanistic aspect of this account explains the nature of the disease and provides important information regarding clinical management. Also, we view this as an illness because auditory acuity provides several important functions for human infants that are widely valued in human cultures, one of which is the access to spoken messages of the caregiver which is essential for oral language development. Thus, in these cultures, congenital hearing loss is an illness that in this case is explained by a mechanism. It is noteworthy that the hearing loss in this account would not apply to a child who is born into a family that identifies with the Deaf culture, although an infection in the middle ear could cause pain which would be an illness in the Deaf community. This culture, largely comprised of families of Deaf individuals, do not believe that hearing is a valued function and that limitations in auditory function are illnesses or disease. (Ladd, 2005; Lane, 1995).

DLD as a Type of Disease Underlying Socially Valued Language Functions

At this point, I will propose an account of how we can think about language health and ill health, and in particular DLD. I noted earlier that the notion of language disorder seems to be a new concept and that rarely are children or their parents' aware of language difficulties, but instead are told about this by teachers and clinicians. This would imply that language

itself is not a function that is available for direct social evaluation. This does not mean that linguistic communities ignore language variation. Membership in a community is closely tied to the language conventions of that community and numerous norms concern appropriate language and dialectical variations serve as indicators of social status. However, the many ways language contributes to the health and well-being of individuals in our contemporary society do not seem to be known or appreciated. As such it is difficult to argue that poor language *per se* can be viewed as a form of illness. Although language dysfunction does not seem to serve as an illness, it may still contribute to health and ill-health. Within the mechanistic account, functions can serve as parts of higher-level functions that may be socially valued and thus, we can ask what are the higher-level functions that language serves, and are these open to social evaluation? Language then can be viewed as an underlying mechanism that contributes to these functions and thus can operate in the role of disease when the functions are disvalued. I should emphasize that the use of the term “disease” here refers to its meaning within the normative mechanistic functionalist model.

Figure 5, provides a sketch of this model by building on the previous models of language and health. I will refer to this as a mechanistic-functional normative (MFN) model. It is important at the outset to acknowledge that this is a highly simplified account. In this model, I view the functional product of language as a message and that messages can then have functions. The functions we are interested in are those that

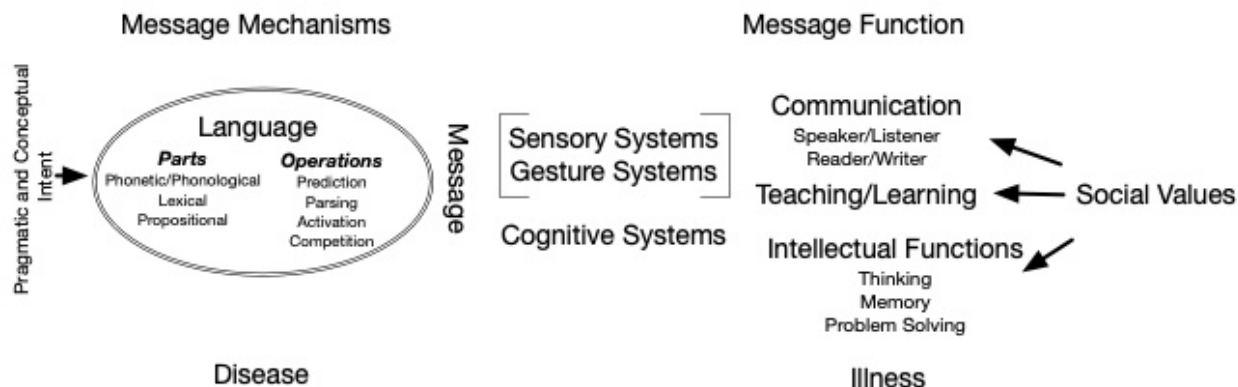


Figure 6. Normative Mechanistic Model of Language Health and Ill-health

receive social evaluation and thus may result in the normative assignment of illness. I propose that these are at least, (1) interpersonal communication where the participants assume speaker/listener roles, (2) a teaching/learning function where the participants assume teacher/learner roles and (3) intellectual functions where language is turned inward to effect functions of thought, memory and problem-solving. It could be argued that teaching and learning are forms of communication, but in this case, it may be useful to distinguish these to allow different social evaluations. The model highlights the importance of the establishment of knowledge about the ways messages provide important functional utility within the human ecological niche. There is a well-established field of psycholinguistics that addresses the study of language mechanisms, but there is not a coherent discipline concerned with this the study of message functions. Sociolinguistics could be a candidate, but it has been more focused on how language contributes to cultural identity rather than utility within a culture. As we will see philosophy has addressed this somewhat, but not empirically. Much of the purpose of this paper is to argue that the nascent field of communication sciences and disorders must see this as part of its mission. At this point, it is necessary to examine what we know about these proposed message functions and the ways they may be socially valued.

What are the functions of language messages that are socially valued?

Basic Communication. I will define basic communication as the use of messages mediated by the gesture and sensory systems to accomplish changing an interlocutor's behavior, mind, and/or affective state. It is explicitly teleological in that it is intentionally performed by an agent with a goal in mind on a patient who is believed to be able to recover the intended message because of a shared language (message system). This characterization of communication draws on the field of the pragmatics of language that has been influenced by the work of Austin (1975), Searle (1989), and Grice (1969) and is quite similar to Kolodny and Edelman's (2018) statement that "language constitutes a toolkit that effectively supports an individual in influencing the state and the behaviour of others" (p. 3). Austin proposed that communication can be described in terms of Speech Acts where a speaker has (1) an intent to influence an audience via an utterance (illocution), (2) an act of utterance expression (locution), and (3) the recovery of the intent by the audience (perlocution). Within our model (Figure 2), we allow for these intents to provide input to the language system during illocution and receive outputs from the language system during perlocution. Since Austin's original work, several authors have constructed taxonomies of subtypes of speech acts (Dore, 1974; Greenfield & Smith, 1976; M. A. K. Halliday, 1973). Somewhat later, Ninio, Snow, Pan and Rollins (1994) developed an Inventory of Communication Interaction -Abridged (INCA-A) that has been incorporated into the widely used Tools for Analyzing Talk (MacWhinney, 2000). This system provides for 12 categories of speech acts (see Table 2) along with codes concerned with types of conversational exchanges (Negotiations, Discussions, Markings, Performances, and Metacommunication). The speech acts can be viewed as utterance-level intents that serve the broader conversational purpose. This system was constructed to allow the study of social communication across a wide developmental

range. It has been widely used in examining the communication features of clinical groups such as children with Autism Spectrum Disorder, DLD, and children with hearing loss. Also, Snow and colleagues (Snow, Pan, Imbens-Bailey, & Herman, 1996) showed that by 32 months of age, typically developing toddlers had already developed the use of many of these acts. Although researchers have not extended this type of work to typically developing children at older age levels, it is quite likely that by the age of six, most children can accomplish most if not all of these communication acts and that by this age they have a solid base of language skills that can support the performance of these acts in many common communication settings. This is not to say that six-year-olds are fully mature language users, but by this age, they have the core skills that allow them to engage in face-to-face interpersonal exchanges. Furthermore, an examination of these acts suggests that they comprise a substantial portion of what individuals employ throughout life. Cummins (J. Cummins, 1989, 2008) has referred to this as Basic Interpersonal Communication (BIC) which was viewed as a context-embedded and cognitively undemanding language.

Table 1. Speech Acts Categories (after Ninio et al., 1994)

Speech Act Category	Subtypes
Directives and responses	Requests, warn, call attention, refuse, accept,
Speech elicitations and responses	Elicit imitation, elicit rote-learned text, a complete statement of other's text.
Commitments and responses	State intent to act, ask for permission, promise, prohibit
Declarations and responses	Create a statement regarding the factual, fictional, or degree of belief in a declaration, agree or disagree with a declaration.
Markings and responses	Thank, greet, apologize congratulate, express emotional state (distress, surprise, happiness).
Statements and responses	State or make a declarative statement, agree or disagree with a statement made by an interlocutor, express a wish
Questions and responses	Wh questions, yes/no questions, answers, refusals,
Performances	Perform a game, read or recite text.
Evaluations	Praise, approval/disapproval
Demands for clarification	Signal communication failure, request for a repetition
Text editing	Correct prior utterance

The development of these basic language skills occurs during early childhood within oral language exchanges with caregivers embedded in the here-and-now context. This process is typically done with little awareness on the part of the child or the caregiver and by around the age of six, most children can understand and produce messages that serve many of the communication functions they will need through life. This developmental period in language development has been the main focus of research in child language development. Throughout this period individual differences in the pattern and rate of language growth are well known (Bates et al., 1988; Kidd, Donnelly, & Christiansen, 2018; Lieven, Pine, & Barnes, 1992). Recently Norbury (2019) reviewed much of this literature and pointed out that these individual differences are developmentally unstable during the preschool years and then at around age six (school entry) appear to stabilize. Thus, a child's relative standing among age peers about basic language ability seems to be largely established at end of the preschool period of development (Bornstein, Hahn, & Putnick, 2016; Courtenay Frazier Norbury et al., 2017; J. B. Tomblin, Nippold, Fey, & Zhang, 2014).

This raises the question as to whether these individual differences result in social evaluations that constitute judgments of concern by caregivers. Several years ago, my colleagues and I conducted a large-scale study (N=1,929) to obtain population-level data on DLD in kindergarteners where DLD was defined as language ability below the 14th percentile. Within this study, they found that among the 288 children, only 18% had received clinical services for speech and/or language (Zhang & Tomblin, 2000) and most of this identification was associated with their speech sound production abilities rather than their oral language

ability. Several years ago, we examined the way adults perceived and evaluated four to six-year-old children's communication performance (Burroughs & Tomblin, 1990). We found that their judgments could be characterized as being concerned with the child's degree of social engagement (dynamism), cognitive maturity, and social appeal. We then examined what features in the child's communication were associated with these judgments. We found that the child's speech sound accuracy and degree of conversational participation were associated with each of these factors. Variables concerned with the child's oral language were not strongly associated with these evaluations.

These findings suggest that at least among children of this age, individual differences in oral language do not play a strong role in how a child is evaluated. These findings seem to suggest that the BIC-level language abilities of late preschool-age children are usually sufficient to allow these children to meet the demands of simple social exchanges. Not all children in contemporary Western countries achieve these core or BIC levels at any point in development. Individuals with language abilities that fall below these levels, nowadays in the Western world are very likely to be viewed as having some form of severe developmental disability – primarily intellectual disability or autism spectrum disorder. Intellectual disability has a long history of negative judgment as evidenced by English terms such as fool, dolt, simpleton, idiot, imbecile, and feeble-minded. Thus, substantial limitations in core language abilities are likely to have contributed to an illness state for quite some time and are likely to be identified before the child entering school. Individual differences in these core functions can lead to concerns that can be viewed as language illness; however, for most children with DLD, the illness state is not apparent during the preschool years. Below, I will argue that this changes as children enter a more demanding language environment.

Academic Communication. One type of communication activity contrasts with basic communication by the fact that one interlocutor has knowledge that is not shared with the other interlocutor and the goal of communication is to transmit this knowledge. This may be viewed as instruction. I will refer to this as academic communication which implies that it occurs in a school setting. This type of communication can occur in a variety of settings and is not developmentally restricted to the school years. Halliday (1993) describes this as learning through language. I am treating this as a separate form of communication from basic communication for two reasons. First, the nature of academic language is cognitively more demanding (J. Cummins, 2008; Schlepppegrell, 2012; Snow & Uccelli, 2009). Snow and Uccelli summarized several features of Academic Language as being: Detached/distanced, authoritative, concise/dense, embedded, lexically diverse, grammatically complex, conceptually abstract, and rational. In this respect, individuals with language abilities that may be sufficient to support basic communication functions may not perform as well within communication settings that involve academic language. The second reason, for distinguishing basic communication from academic communication is that these may be culturally valued to different degrees or in different ways. Furthermore, the use of language for face-to-face communication is believed to have been a universal feature of human cultures since early humans. In contrast, language in the service of modern educational objectives is a recent development, largely found in developed countries and importantly it begins with learning to use language in written form.

This educational function of language was summarized by Halliday (1993) in his language-based theory of learning. He noted that within Eurasian communities

“A new form of expression has evolved, that we call writing, and following on from this a new, institutionalized form of learning that we call education.

Children now learn language not only in home and neighbourhood but also in school; and with new modes of language development come new forms of knowledge, educational knowledge as distinct from what we call common sense.” (p.93).

Halliday's summary reminds us that until the late 15th century, a stable language-communication niche consisting of basic oral communication was disrupted by the technological advances in printing employing movable type as well as advances in inexpensive paper. Before this, books were expensive and in very limited supply. Even as late as the middle ages, "people relied for day-to-day information solely on what they themselves experienced in the world immediately around them" (Burke, 1995, p. p. 121) and spoken language was the primary means of conveying this information. Thus, it is likely that this oral language-based biocultural niche remained stable in human communities for several hundred thousand years. When books were available, most were written in Latin (Lyons, 2011). Thus, literacy was restricted to a small elite.

Mechanized movable type led to a substantial drop in the cost of books and an expansion of literacy to a much larger part of society (McDaniel, 2015). Eisenstein (2005) has argued that during the two to three centuries following the introduction of mass printing, a culture of print emerged that transformed the Western world. The print medium provided a form of communication that contrasted with the primary oral traditions that were conducted in face-to-face communication exchanges. Messages in print are by their nature about the not here and not now. In contrast with oral communication where the message is often about objects and events in the immediate surround that is often familiar, reference in print is often about things and events that have not been experienced and not known. Also, in contrast with the face-to-face relationship of the speaker and listener in spoken communication, the reader

became distanced from the author, and often the reading act was private, as the silent reading came to predominate. Furthermore, written language allowed for the message to be slowly formulated, reviewed, revised, and retrieved. This allowed the structure and content of language to take on greater complexity. In this respect, a new form of literate language developed. The language niche was dramatically changed in nature and the change spread across communities over time.

This new print culture provided the ordinary person with the means of access to events and ideas from far away via newspapers, magazines, and books. At the same time, the Western world was experiencing the Renaissance that generated vast new knowledge in the humanities and science. It is likely that the print culture both contributed to this and was advanced by it. By the 17th century, printed language became a critical part of government and commerce and the ability to read and write became increasingly a part of many occupations and a command of literate language became central to economic and community participation and well-being.

This expansion of the print culture triggered the development of one important industry – the school. In contrast with spoken language that is acquired implicitly, reading requires that the person explicitly learn to read and write to access this information. Contemporary schools in the Western world have become the vehicle for the provision of many if not most of the skills needed for successful function and thus for well-being in contemporary society and this process begins with learning to read and write. During the early grades literacy enculturation involves learning to read and write and so learning to read in Western European schools involves solving the problem of decoding print (Chall, 1983).

During this time, the nature of the language being read (words and sentences) is very constrained and assumed to be familiar to the child. Initially, decoding is slow and laborious. With continued experience, word recognition becomes increasingly automatic, and oral reading begins to have the fluency of spoken language (Roembke, Hazeltine, Reed, & McMurray, 2021). Children's success in this learning process is quite strongly related to the oral language skills that they have when entering school. (Catts, Fey, Zhang, & Tomblin, 1999; Nation & Snowling, 2004). Children learning to read within an alphabetic print system, benefit from consciously drawing on their knowledge of the sublexical (syllables, onsets, rhymes, phonemes) sound structure of words and mapping this to the visual orthographic forms. This requires that the child brings to consciousness information that otherwise is implicit and thus is a metalinguistic act that is not necessary for core language functions. Thus, learning to read is quite clearly dependent on oral language learning processes that operate in early childhood; however, this process is likely to be more demanding at least for some components of the learning system.

By around fourth grade, the typical child will have developed basic reading skills. At this point, it is often said that the child moves from “learning to read to reading to learn” (Chall, 1983). A useful way to view this is that the child moves from a focus on learning to read to learning by understanding language presented in a new way. Much of this is the by-product of the culture of print where language is decontextualized, often about things and events that are not known, and expressed in a more complex form with more abstract content. Thus, in contrast with core language functions, this kind of language entails a more advanced command of all aspects of language form and content and places a much greater demand on language processing skills. Importantly, during this time the child is not just performing

language, but also is continuing to learn and refine language, and much of this concerns the lexical and structural features that mainly show up in an academic context. A child who had sufficient skills to acquire basic core skills may be challenged by this environment. It is also the case that the child has less latitude in this environment to ways accomplish language acts in comparison with an informal communication exchange outside of school.

We have good evidence that children who may appear to have adequate language skills at school entry because they can meet the core language function demands begin to struggle with Academic Language. Recall that in our longitudinal study of DLD, we found that only 18% had been identified at school entry. Catts and colleagues (Catts, Fey, Tomblin, & Zhang, 2002) found that when these children with DLD were followed to fourth grade, 60% of these children were found to have persisting reading disorders, and the same percentage of them were enrolled in special education services. When they reached the 10th grade, 24% of these children who were found to have DLD in kindergarten had reading levels below 5th grade. Thus, although these children's language abilities had not attracted clinical attention as they entered school, clearly the majority of them found Academic Language and reading to be very challenging. Recently, Conti-Ramsden and colleagues (Conti-Ramsden, Durkin, Toseeb, Botting, & Pickles, 2018), reported education outcomes in the UK for young adults who had been earlier identified with DLD. More than half of these participants achieved level 1 or 2 on an 8-level National Qualifications Framework and 26% were at level 1, whereas all the controls were above level 1. These data provide strong evidence that language ability plays a critical role in becoming literate and in overall educational success. Furthermore, educational achievement as reflective of the ability to work within the print culture along with the cognitive and fund of knowledge provided by it is widely viewed as

key to economic and social accomplishment in adulthood. There is a growing acknowledgment of the importance of spoken and written communication skills for success in the modern workplace (Conrad, 2014; Rios, Ling, Pugh, Becker, & Bacall, 2020). Thus, we contend that the functions served by language can be highly valued in the Western world even if language itself is given little prominence. This leaves little doubt that children who perform poorly in learning to read and perform with the more advanced forms of literate language face present functional limitations that are highly disvalued. Thus, these can be viewed as forms of illness. Many causes have been offered. Some focus on the nature of instruction whereas others focus on the ability of the child to learn. We believe that language ability plays a key role in this and thus can be viewed as explaining this “academic illness”.

Intelligence. Beyond these communication and academic functions of language, language has become integral to human cognition. Language researchers such as Whorf, Sapier, and Vigotsky, argued that language served as a primary medium of conceptualization and thought (Lucy, 1992; Reines & Prinz, 2009) and these ideas have been restated in recent years within the context of cognitive niche construction (Clark, 2005; Sinha, 2015) where language modifies and enhances cognitive functions and creates an enhanced cognitive system. A common explanation for academic learning difficulties based on the learner has been that the intellectual abilities of these children lead them to perform poorly in school. Unlike, language, intelligence has a prominent place in folk psychology and is quite likely to be on many people's lists of desirable personal attributes and that this trait. Intelligence has been a construct that explains how well children learn a wide range of things and language, reading, and academic content are certainly included. However, within psychological science, there has been, considerable debate about whether intelligence should be viewed as a psychologically coherent

mental mechanism (McGrew, 2004). Much of the research on intelligence has been concerned with identifying the correlational structure of the various tasks used within intelligence tests. Jensen (1969) defined intelligence as being what intelligence tests test. In fact, intelligence tests initially were constructed not with a desire to model cognition, but to predict academic success. The result has been that tests are very good predictors of academic outcomes (Hunt, 2000). Nonetheless, predictive validity does not by itself guarantee that a construct has theoretical or explanatory utility. One important finding from research on the structure of intelligence tests is that measures of language are highly correlated with most measures. This was observed some time ago by (Oller Jr, 1981) who argued that rather than viewing language as a product of intelligence it might be better to view intelligence as being a product of language. Given the inadequacies of intelligence as a theory of learning and performance and the strength of current theories of language as a pervasive cognitive system, I support this proposal. It may be better to think of intelligence as a broad category of several functions that are all served by language. Specifically, the language functions concerned with learning, memory, problem-solving, and literacy all seem to be the kinds of things that come to mind when we think of intelligence and these functions have a utility that is socially valued.

Cultural Issues and Language Health

Individual differences in biological and psychological functions serve as an important central concept in the account presented here. In the preceding discussion, we have focused on those differences that, due to cultural perspectives, are relevant to positive and negative health states. The proposed model is explicitly normative and thus acknowledges that cultural values and practices play an important role in determining when and why functional variations come to be forms of ill health. By incorporating culture into the notion of health, several interesting

issues arise. One obvious issue comes from the fact that in many settings nowadays, individuals find themselves in multiple cultural contexts and thus multiple possible cultural values may exist. Furthermore, associated with these multiple cultural contexts are often variations in languages used which have important consequences on how we think about language disorder. Another issue has to do with the degree to which health states can be argued to be solely social constructs that are assigned to individuals in much the same way as gender and race/ethnicity can be argued to be assigned social roles. This issue has become the centerpiece of debate within the field of Disability Studies. Each of these issues will be examined below in relationship to the Mechanistic Functional Normativism model.

Cultural Pluralism and Multilingualism

In this framework, cultural values play a central role in defining the general notion of health. This is particularly salient for a notion of language health and thus language disorder due to the very close ties between language and culture. Cultures determine what is desirable and what is expected of members of a society and to a great degree sharing a language is a central feature of cultural membership. So long as all members of a community share the same culture and language it is possible for conditions of well-being and ill health to be applied somewhat uniformly. Even within this context, there are often adjustments for differences in function associated with age as well as possibly other factors such as gender and cast. Thus, even in homogeneous cultural environments, variation in function is relative to socially defined roles. The situation becomes more challenging when the community is comprised of members who identify with more than one culture and language and engage with individuals from other cultures and language communities. In such cases, individuals may have different facility with language across communities. These individuals may be

native or heritage speakers of a minority language along with varying proficiency in a majority language of a community. This multilingual variation may result in limited function in some settings and in fact, may have functional levels that are handicapping in these settings. In such cases, the individual faces similar challenges within this context as those confronting a person with DLD. However, we would not want to claim that this situation constitutes a language disorder as the explanation (illness type account) is quite different. If, within the individual's own cultural community, that is the culture and language the person identifies with, the person does not experience negative consequences due to language functioning, then the person does not present with a language disorder. Thus, I propose that the determination of language disorder is relative to the individual's identified culture and primary language.

Social versus Medical Models of Health, Impairment, and Disability

Up to this point, our consideration of health and ill health has been based on ongoing debates in the field of the philosophy of medicine. There is a separate literature that has emerged in governmental policies and law as well as within an emerging field of disability studies. Interestingly this literature makes very little reference to the work in the philosophy of medicine and likewise, this literature is not referenced in the debates on the philosophy of medicine. Much of this literature and policy is focused on long-term health conditions that involve limitations in mobility, sensation, and cognition and its roots can be found in the emergence of a broader human rights movement in the 1960s. that included the deinstitutionalization movement (Blatt, 1970) along with an antipsychiatry movement that was triggered by Szasz's publication of the *Myth of Mental Illness* (Szasz, 1960). Recall that Szasz accepted a naturalist account of diseases

for most medical conditions. He referred to this as a medical model of disease but, he rejected this model for mental diseases and instead argued that these conditions were the product of social and political processes aimed and controlling behaviors that were deemed socially unacceptable. This later position came to be viewed as a social model of mental illness (Kaufman, 1967). The social model of mental illness was quickly extended to individuals with physical or mental disabilities. Underlying much of this work was a view that individuals with disabilities represented a class of persons who were assigned a social status much like race and gender that limited their opportunities. Within the social model, the focus was on the domain that within the philosophy of medicine constitutes illness (and sickness), but rather than using these terms, the terms disability and handicap were employed with a particular emphasis on disability.

In 1980 the World Health Organization published the International Classification of Impairments, Disability, and Handicaps (ICIDH) which was intended to complement the existing International Classification of Diseases (ICD) where the disease was like that discussed in the philosophy of medicine. The purpose of both the ICD and the ICF was to provide a classification system of health states that could be used internationally to document health across the world. In this regard, these systems were not intended to be theoretical positions about the nature of health and ill health, although they are reflective of ongoing thinking at the time of their creation.

The ICIDH focused on the impact of a disease on an individual's function and capability to engage fully in his or her life (Rosenbaum & Stewart, 2004). In this classification “*Impairments* [were] concerned with abnormalities of body structure and appearance and with organ or system function resulting from any cause; in principle, impairments represent disturbances at the organ level.... *Disabilities* [were] reflecting the consequences of impairment

in terms of functional performance and activity by the individual; disabilities thus represent disturbances at the level of the person.... *Handicaps*, [were] concerned with the disadvantages experienced by the individual as a result of impairments and disabilities; handicaps thus reflect interaction with and adaptation to the individual's surroundings.” (Organization, 1980, p. p. 14). This account is quite similar to the naturalist account described earlier where the diseases in the ICD cause impairments which cause a limitation in the functional performance of the individual resulting in disability that in turn result in handicap. In this regard, the ICD largely expanded the notion of illness in the philosophy of medical literature which in most accounts was viewed as normative, even those that treated disease as a natural condition. Thus, the ICIDH was largely reflective of a strong naturalist medical model of health. The ICIDH made no explicit statement about cultural values or disvalue; however, the terms used carry clear negative meanings and there is a clear view that the functional impairments result in challenges to meeting environmental demands as seen in Figure 7

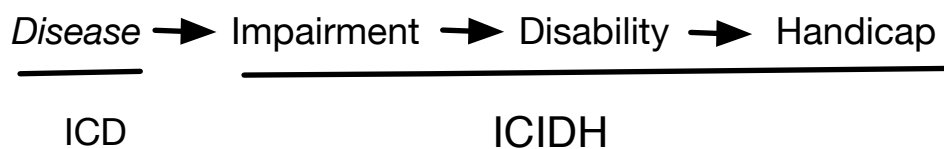


Figure 7 ICIDH Model of Disability. Note that disease is not explicitly part of the ICIDH model, but rather is the focus of the ICD system.

After the creation of the ICIDH system in the 1970s, it subsequently came under criticism due to its focus on the negative features of impairment and disability and its conceptualization of impairment as the sufficient cause of disability and handicap. Many of these concerns are likely to have been influenced by the broader societal discussions of human rights occurring at the time and the advancement of the Social Model of Disability during the 1970s and 80s. This model has

both informed and incorporated thinking within academic departments of Disability Studies and public efforts to promote Disability Rights. The social model viewed disability and handicap to be the result of actions and attitudes in the individual's physical, social, and cultural milieu. In this respect, disability and handicap are the outgrowth of oppressive social and political motives (Abberley, 1987). Oliver expressed this by stating that disability is “the disadvantage or restriction of activity caused by a contemporary social organization which takes no or little account of people who have physical impairments and thus excludes them from the mainstream of social activity (Oliver, 1996). Importantly, in most of these accounts, the construct of impairment was not challenged and thus it was largely accepted that impairments were grounded in the dysfunction of an individual's body and mental functions. Haeefe and Hodge (Haegele & Hodge, 2016, p. 197) summarized the Social model as viewing impairment “as an abnormality of the body, such as a restriction or malfunction of a limb”.

Although most accounts of impairment in the Social Theory of Disability treat notions of disease and impairment as terms that apply to biology and medicine some that adopt social constructionism have argued that these are also social constructs. Social construction theory proposes that our understanding of the world is not a valid representation of the objective world, but rather is an interpretation based largely on culturally based concepts that are strongly influenced by language and communication (Burr, 2015). We can see this concerning disease where Hughes and Patterson stated "If medicine is the sole master of the language of impairment and it acquires this sovereignty through its power to name bodily dysfunctions. " (1997, p. 333). Thus, those espousing a social constructivist account view all aspects of health including the biological and psychological mechanisms and processes that comprise an account of disease as stories or language-based discourse rather than objective facts. This type of thinking is reflective

of earlier theories of general semantics where language shaped and constrained perception and thoughts (Korzybski, 1990). Wendell Johnson used this theory as the basis of his diagenetic theory of stuttering, where children developed stuttering as a result of parents labeling normal dysfluencies as stuttering (Johnson, 1959). In a general sense, this social construction account of disease is similar to our MFN model in that they both acknowledge that culturally based concepts are the basis for carving up variations in mechanistic functions into categories of essentially good and bad levels. However, the MFN model assumes that mechanistic functions are not due to cultural discourse. For instance, even if parental labeling of children's disfluencies is associated with the onset of stuttering, this process must work through neurobiological systems that are not culturally grounded.

Revision of the ICIDH.

The emergence of the social theory of disability and perhaps social constructionism strongly influenced the revision of the ICIDH system in 2004 which was titled *International Classification of Functioning, Disability, and Health (ICF)* (Organization, 2001). A central feature of the ICF is that the components are no longer limited to negative health states but rather refer to domains of both positive and negative health states. Thus, the terms used for different domains no longer involved pejorative terms of disability and handicap. This revised system continued to be a complement to the ICD system which was concerned with disease. Thus, it continues to allow for disease to be an important although not sufficient causal condition for the health states. The ICF also incorporated the role of the physical, social, and personal contexts as influences on the health states.

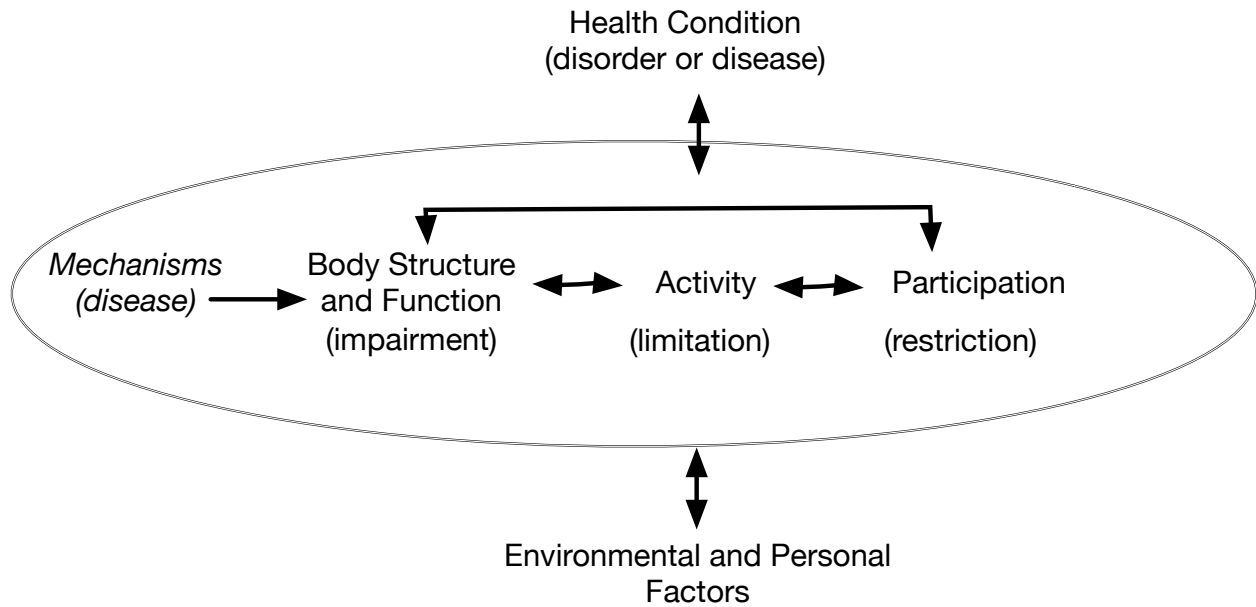


Figure 8 ICF model of disability.

Body Structure, Function, and Impairment. The ICF replaced Impairment with Body Structure and Function which can be viewed positively as integrity or negatively as impairment. Thus, the ICF acknowledges functioning can vary, although it maintains a dichotomous view of this which contrasts with the MFN model described earlier. The notions of body structure and function in this system follow a classic biological distinction between anatomy and physiology and impairments can involve either of these. The ICF continued to define impairments of structure and function as “an anomaly, defect, loss or other significant deviation in body structures...Impairments represent a deviation from certain generally accepted population standards in the biomedical status of the body and its functions” (Organization, 2001, p. 12). This language seems to reflect a naturalist position similar to the BST theory of Boorse where ill-health is based on a statistically abnormal state of nature. The ICF document also states that “impairments are not the same as the underlying pathology, but are the manifestations of that

pathology.” (p. 12). Furthermore, it states “Impairments are not contingent on etiology or how they are developed; for example, loss of vision or a limb may arise from a genetic abnormality or an injury” (p 13). Thus impairment is treated in the same way as in the ICIDH where impairment refers to functions that may be viewed as a final common functional outcome such as seeing, hearing, ambulation, etc. rather than the causal processes and mechanisms that give rise to these. In this respect, most of the causal systems that comprise the construct of disease in the MFN model including basic subfunctions that arise from mechanistic operations are excluded from this notion of body structure and function. Indeed, the ICF document explicitly states that impairment in this system is not the same as disease or even sickness. It notes for example that “the loss of a leg is an impairment of body structure, but not a disorder or a disease” (p. 13). The rationale for this statement was not provided; however, it is likely to reflect an interest in separating notions of impairment and disability from a medical framework.

Activities and activity limitation and participation and participation restrictions. The ICF replaced handicap and disability with these terms. It defines activities as “the execution of a task or action by an individual” and “activity limitations are difficulties an individual may have in executing activities”. Likewise “participation is involvement in a life situation” and “participation restrictions are problems an individual may experience in involvement in life situations” (p 10). Although a distinction was made between activities and participation, the document treats these as a single component and lists nine domains shown in Table x.

Table 2. Activities and participation contained in the ICF system.

Activities and Participation Domains	Performance	Capacity
Learning and applying knowledge		

General tasks and demands

Mobility

Self-care

Domestic life

Interpersonal interactions and
relationships

Major life areas

Community, social and civic life

Communication

Functioning in these areas is then qualified -that is they are rated on a 1-10 scale about two areas: performance and capacity. The performance qualifier describes what an individual does in his or her current environment and the capacity qualifier describes an individual's ability to execute a task or an action in a standard or uniform environment such as a standardized test. The determination of a performance or capacity limitation or restriction is based upon performance expectations based on a population standard that is derived from the performance of individuals without the health condition. Coding of the limitation or restriction represents "the discordance between the observed and the expected performance (p. 15-16)". Again, we see that this system employs a statistical approach to the determination of limitations and restrictions and in so doing is reflective of a culturally neutral view of health.

Environmental and Personal Factors. The ICF does allow for health to be influenced by extrinsic and intrinsic contextual conditions in the form of environmental and personal factors

and some of these could be culturally based. The environmental factors are “physical, social and attitudinal environment in which people live and conduct their lives. These factors are external to individuals and can have a positive or negative influence on the individual’s performance as a member of society, on the individual’s capacity to execute actions or tasks, or on the individual’s body function or structure (p. 16)”. In this regard, environmental factors seem to largely be viewed as moderators of the basic health condition and thus alter the severity of the condition. Thus, social and cultural factors can have a role in the degree of impact of health status but are largely external to health. Personal factors “are the particular background of an individual’s life and living, and comprise features of the individual that are not part of a health condition or health states” (p. 17). These personal factors are viewed as background factors and are explicitly not a part of the notion of health or ill health.

Aligning the MFN model with the ICF.

The ICF and the field of Disability Studies, in general, continue to influence public policies. As noted earlier, there has been little if any interchange between the debates in the Philosophy of Medicine and those in Disabilities Studies. The MFN model was focused on addressing issues within the Philosophy of Psychology and Medicine. As I have pointed out, the MFN model shares an acknowledgment that much of what determines health and ill health is socially determined by cultural beliefs and practices. Whereas the field of Disability Studies treats these cultural factors as oppressive, the MFN model does not ascribe a positive or negative motivation for these values. Also, as noted, the MFN model allows for social values to play a role in defining and explaining disease. In much of the Disability literature, there is an explicit or implicit view that disease represents a natural class of biological structure and function and thus reflects a naturalist view of disease. In one case, social constructionism, where even disease is

viewed as normative, a naturalist account of objective biological and mental structures and operations is rejected. The MFN model fully accepts that complex functions arise from interactions of natural structures and functions and that a part of this natural process is that there will be variability. Thus, different levels of function are a part of the natural system and are not inherently healthy or diseased. This variability does provide the opportunity for culturally based evaluation, but the evaluation is applied to the value-free natural variation.

Most of the focus of the ICF and discourse in Disability Studies is concerned with the domain of illness in the philosophy of medicine. The notion of illness in the philosophy of medicine does not differentiate between impairment (body structure and function), activity (limitation), and participation (restriction). A key issue with the earlier proposed MFN model is that it does employ what might be viewed as pejorative terminology of disease and illness. Certainly, most individuals with DLD are not viewed as ill or diseased. It is not difficult, however for the MFN model to align with some of the terms used in the Disability literature. This is shown in Figure 9 In place of disease, I suggest we label this domain for what it does – provides a mechanistic explanation of language and message generation driven by internal states (pragmatic and conceptual knowledge) and sensory/motor input/output systems. These systems enable the functions of communication, teaching/learning, and functions that are influenced by the language that was termed intellectual, and these in turn enable activity and participation. Levels of function are viewed as limited or restricted when they are associated with social disvalue. When the mechanistic explanation is concerned with functional limitations and restrictions we can view these as etiology.

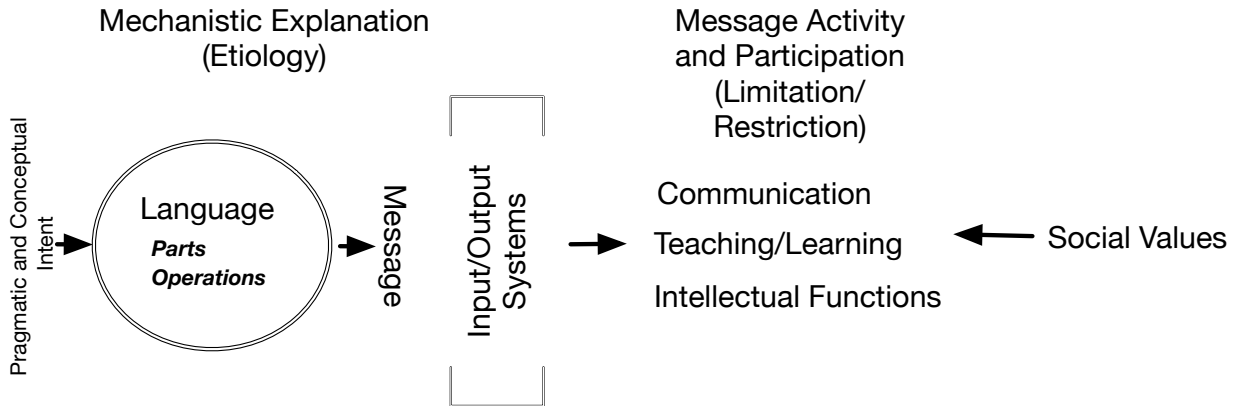


Figure 9. revised MFN model

Research Implications of a Normative Perspective on DLD

At this point, we see that DLD serves as an explanation for functional limitations in several highly valued domains of life. As such we are viewing it as a particular form or level of language learning and processing that limits socially valued functions in Western cultures. Importantly, this means that we will not discover the basic nature of DLD by simply focusing on the mechanisms and processes of language *per se*, even though this has been the dominant approach to research over the past several decades. Instead, this understanding will come from understanding at least two causal processes. The first is **how** language mechanisms and processes operate to enable the various functions language serves and as such can be done via a naturalistic approach that is applied to the full range of individual differences. Secondly, this research program requires that we determine **what** the functions of language are that are socially evaluated within and across cultures. Each of these presents us with a broad set of questions and challenges for research and we will briefly examine some of these.

Given that we believe that DLD is a disease of language development and use, it appears that we need a mechanistic explanatory account. However, this cannot be confined to explaining the normal or modal language users. Rather we need to know how language operates such that it may result in the full range of function and thus the research seeks to understand how individual differences in language mechanisms and processes result in individual differences in the various functions. This is necessary because the kinds and levels of function that are disvalued can change over time and place, thus, the scientific knowledge that is needed for an explanation of illness must be sufficient to explain the full range of function. Importantly, the elements involved in explaining these individual differences are not inherently healthy or disordered, but they can help explain how functions that are disvalued arise.

Conclusions

We have attempted to examine how and why language may be viewed as an important component of human health and ill health. We have adopted a prominent account of health that distinguishes between culturally determined illnesses and the natural processes that explain them. We argued that the cultural evaluation of illness concerns an evaluation of expected and appreciated functions. Our analysis led us to conclude that although language, as a knowledge and cognitive system, is transparent, the functions it enables are more apparent. We have attempted to look at how language function has evolved over time and in particular how new artifacts introduced by technology alter and enhance the place of human language in human culture. Even with this expansion, much of this is attributed to functions such as literacy, school achievement, and learning that are highly valued but not necessarily seen as rooted in language. In particular, when children struggle and fail to accomplish these

valued functions, there is considerable evidence that much of this can be explained by language. DLD therefore can be viewed as a kind of disease that leads to several disvalued states having to do with literacy, education, and limited occupational outcomes.

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