

**The Self Created:
A Multi-Disciplinary Review of
Internalizing the Context of our World**

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Individually, the social sciences have made great strides in understanding personality, behaviors and social processes, ultimately with the hope to find what it is that makes an individual just that: an individual. The fields of developmental psychology, social psychology, sociology, cognitive and neuropsychology have attempted to define the self and the components of our being that make up consciousness. Consciousness is sometimes thought of as having an origin within the brain (Demasio, 2000), a collection and integration of chemical and cognitive processes. The self however, is often understood through personal expression within social interaction, often changing slightly with varying interpersonal activity (Schlitz, Vieten & Miller, 2010). On the other hand, personal stories define the self through exploration, revelation and ultimately the acceptance of our strangest character traits, even those we sometimes wish to reject (Hustvedt, 2011). The literature tends to vary on either side of this dichotomy and authors only briefly acknowledge opposing views, consequently resulting in a biased, single-minded approach to research and theory, leaving many unanswered questions. To this day, the questions of what the self is, what creates an individual and how the behaviors we adopt become an integral part of who we are, still plague the mind of researchers across disciplines. Of course, these are only a few approaches to defining the self, but what remains clear is the various approaches have composed a large amount of literature to define a single concept, generally confounded with the researchers' biases. Important to this concept, and largely overlooked in the literature, is the implication of context. This review aims to integrate this concept into the research while combining the aforementioned fields of study in hopes of

bridging the gap between disciplines and offering greater insight through their synergy than each currently yields in solitude.

Largely complex, context consists of the people that surround us, the things people own, use, and want and the historical significance of people's lives. This review will examine a number of disciplinary approaches to define the self, offering a framework in which the self is not just defined, but created, with a focus on the context of social interaction. To create a single cohesive representation of the self, external and internal factors are applied to developmental, cognitive and neuroscience approaches to learning and memory. The internal reciprocity of cognitive and neural processes facilitates change, so the self is not just created or found, but plastic and adaptive.

Borrowing from developmental psychological theories, research in social cognition and more recent literature on neural processes and plasticity, bridges can be built to create a comprehensive understanding of the self. This review begins by first examining external factors to understand a broad social scope of the self and work gradually to examine smaller factors that make up the whole and eventually turn inward toward cognitive and neural processes that represent, reward and recall behaviors in our social world. As made clear and contended by Donald (2000), it is important to keep in mind that interpersonal processes at the interface where person meets person, or person meets environment, are bidirectional and reciprocal. There is constant and consistent implication from either and all directions, but to keep a clear focus, the review begins with the context that makes up the environment before explaining the effect of environment on the self and how the self reciprocates.

Self In World Context: To first understand the context of the world, humans take part in the section that borrows from developmental psychology to frame the human environment as a multilayered, bidirectional interaction with an individual. Developmental psychologists have provided a strong foundation to which other disciplines should look to and build upon as this review attempts to do in following sections.

To begin a comprehensive understanding of the extent that context defines an individual, it is important to first understand that where and how learning takes place is just as important as what is being learned. For example, state-dependent learning argues that retrieving information occurs more fluidly and efficiently if the individual retrieving the information is in the same physiological state as when the information was learned (Duncan et al. 1985; Schramke & Bauer, 1997). The test taking tip that suggests taking an exam in the same or similar room that studying and learning took place will yield greater results is built on this premise. Of course, it is not the location that is uniquely important, but the state of mind and body for which the location allows. In short, our environment plays a substantial role on what it is that we do, how we feel and what we are capable of. If the self is an expression of our thoughts, beliefs and behaviors, then the environment that surrounds the body ultimately helps define the self.

Today it is rare to find an academic who would contest the impact environment has on development. Some believe in minimal environmental influence, but Bronfenbrenner (2006) has confidently created a framework (micro-, meso-, exo-, macro-, and chronosystems) that outlines a multilayered model providing contextual implication to define the self. Each layer of the model should be considered equally as a part of human development. As development over

the life course contributes to the growth and advancement of an individual, so too should it apply to what makes the self. Spencer (2006) takes care in acknowledging the details of Bronfenbrenner's bioecological model by emphasizing the details of each layer. The chronosystem acts as a function of historical time (a person born during a war may adopt different tendencies and morals than during a time of peace, recession, etc.), the macrosystem is a function of large societal systems (governments, media, etc.), exosystem is even smaller systems such as towns and communities, the mesosystem constitutes small groups of interpersonal relationships (schools, friends and families) and at the smallest level, the microsystem is the person themselves and the separate individual relationships he or she may have (Spencer, 2006).

Bronfenbrenner (1995) also insists that each layer of his model is substantial to development alone, but also interacts with adjacent layers regularly and without boundary, affecting one another simultaneously throughout the lifespan. Likewise, Elder and Giele (2009) confirm that geographic location, social ties and human agency are applicable to the full life span of development. Culture, traditions and trends are all a product of time and influence how individuals behave. The short hand abbreviations such as "TMI," "OMG," and "OMW" (too much information, oh my god and on my way, respectively) did not exist a century ago and likely would not exist in culture today if technology was not so accessible and abundant. Vygotsky (1978) believes language carries meaning and influences behaviors. Historical and geographical locations we live through also affect development, and alter our beliefs, morals and traditions. Whether it is language, fashion trends, or a change in legislation or location, the self adopts and adapts, becoming something new, whether conscious or not.

To further understand how the context of environment shapes the self, a closer examination of Brofenbrenner's (1995) mesosystem and microsystem is required. Consider the amount of effort put in to raising a child. From the moment of conception to the time a child leaves the home, resources are consumed on life preparation. In the presence of our caretakers—even from before we are born—toys, games, books and mobile devices surround us, all of which serve to stimulate and teach. However, as social beings, tangible objects are not all we learn from and Wormann et al's. (2014) research has it made clear that infants as young as 3 months old are capable of reciprocating facial expressions with their caretakers. In fact, Tharp-Taylor (2005) illustrates that the longer a child lives with emotional deprivation the more likely they are to have depressive symptoms or anxiety. Without interpersonal interaction, the self is at risk. The tangible environmental and psychological interactions that take place in infancy are the very foundation of what Wertsch and Tulviste (1992) observe as to be "cultural tools." Otherwise observed by Vygotsky (1981) (reviewed and supported by Cole and Wertsch [1996]) as semiotic mediation, cultural tools are anything and everything that the individual comes into contact with physically, mentally, spiritually or otherwise. These tools dictate how specific items, behaviors or ideas are used and adapted so that they can be used. For example, a cup is used typically to hold liquids to drink but many are shocked when they first realize the telephone cup trick actually works. Learning to use a cup as a form of a communication is a new tool learned only through experience that would generally require access to someone who has that knowledge or an environment that provides a way to gather that information. A culture without paper cups or have other means of entertainment, may not learn this type of tool or learn it at a different time. Vygotsky (1981) insists that semiotic mediation changes the "entire

flow and structure of mental functions.” In other words, the implication for this tool has greater implication when one learns the function of the telephone cup and can expand knowledge if a deeper understanding of the vibration that carries sound is what extends the voice. Not only does one learn two cups connected on a string can be used to communicate, but when the why and how are understood the tool can be applied through basic science. The functional, physical tool of the cup as something other than a cup is a behavior the self can perform and replicate while the understanding of its function influences knowledge and cognitive awareness, or consciousness, through a psychological tool. The author then suggests that as more tools are introduced to individuals the greater their toolbox expands and the more efficient their tools become. Traditions can be thought of as cultural tools that are passed down and sometimes these traditions change to accommodate new families and new beliefs. In this way, each generation adds its own addendum to a tradition, a new use for the tool or a new way it is used, and in doing so an accumulation of prior generations, or prior forms of the self, are passed down to newer ones.

Experience and learning influence the versatility of social mediation and cultural tools that add to the structure of the self. Not only do new tools expand the overall ability to perform socially, emotionally and academically, but experience can also modify and expand the use of a single tool for multiple purposes or experience can guide the use of multiple tools for a single purpose. These tools act as an extension of who we are and what we learn, they shape and mold our ability to process information and to think critically about problems. However, without the ability to apply behaviors and cognitive processes to new ideas, we cannot have the ability to create new stable responses for specific interactions or problems. Vygotsky (1978,

1981)) would argue it is the caretaker's responsibility to effectively teach a child or student about any number of things. To do so, Cole and Wertsch (1996) insisted it is best that one who has a greater mastery of his or her skills and tools should teach others less capable within a their specific potential, or rather within their Zone of Proximal Development (ZPD). Two points are not generally understood about Vygotsky's ZPD that apply to this argument. The first point, is that most of ZPD's use is thought to be for classrooms or specifically for traditional teachers. However, humans constantly come in contact with novel information, and without the necessary guidance to process the information available, they are left to their own devices. This information is not always easily understood, but Donald (2000) asserts that human consciousness is the ability to understand and decipher symbols in our surroundings. Misunderstood information is nothing more than variables and pieces of a puzzle without a blue print to guide its construction, so whether it is in school, playing sports, following procedure at the DMV or using soap to wash the dishes, humans need to be taught to problem solve or at least be capable of understanding the symbols around them. To be conscious and to adapt the self, we must learn. The second misunderstood point of Vygotsky's original text is an actual mistranslation. Cole and Wertsch (1996) point out that the true definition of ZPD translates as a bidirectional process rather than a unidirectional, teacher-to-student classroom transaction. Not only is it the responsibility of a teacher to teach, but in teaching they too are required to learn. As discussed above, each individual is different and each child is raised within a unique context (ethnicity, socioeconomic status, gender norms, etc.), so his or her proximal development is based on the factors that currently make up his or her environment and self. An effective teacher (teacher does not necessarily mean a traditional teacher but rather anyone

with information that can be passed on) is aware of these differences and teaches accordingly. Ultimately, new skill sets are added to their own, furthering their experiences that then contribute to an adaptation or accommodation of the self. The more a teacher is aware of the contextual differences of to whom they are teaching, the more effective they become in passing along information to new students. This also includes any peers and/or social groups that might then trickle upward to communities and governments. The correct understanding of ZPD is of a process more than teaching, but a system that affects each layer of the bioecological model by outlining the true nature of the teaching/learning dynamic. Experience—whether positive or negative—are interpreted by individuals involved in an interaction with a part of their environment or another person/group. Beliefs are formed through these interactions that can either be rejected from the self or internalized and adopted by the self.

World Context Concluded: Up to this point the environmental and contextual implications of development that ultimately creates and molds the self has been solely focused on a world view of the self and how the self is molded. This view has described that changes in perspective and how cultural and psychological tools are used change how an individual's relationship with tools are perceived, resulting in a transformation of the self. Schlitz, Vieten, and Miller (2010) suggest the self is made up of the changes through personal experience, and as social beings, consciousness is explicit awareness of how we affect—or are affected by—others. While this broadly summarizes the argument above, to understand the stability of the self and the processes that can cause changes or adaptations to the self, the discussion that follows describes how the body reacts to the world that structures the self and consciousness.

Self Stabilized and Rewarded: The contextual world we live in provides a broad but necessary foundation for how the self is defined. In continuing the review, the following section turns to cognitive and neuroscientific functions. As individuals, we experience different environments that ultimately help to create different versions of the self. This section examines embodiment constructs and processes, how specific behaviors form and, ultimately, how goal-oriented functions are internalized to neural systems that can be managed, maintained and recalled.

The world we live in provides ample opportunity for new experiences and encounters with novel stimuli. When we consider the amount of colors, shapes and sounds the brain ingests each moment, we can appreciate the world's complexity. The human ability to effectively decipher what each stimuli represents is no small feat. It is an even greater accomplishment to consider how no two experiences are exactly the same and yet humans are capable of adapting, understanding and applying past lessons to new principles, most of the time unconsciously. This fluidity first requires a certain amount of functional stability. In her experience and research with children, Thelen (2008) discusses the human mind embodied in the world around it. The ways that humans manipulate their surroundings to better understand the world is a part of what makes up the self. Beginning in infant years, we respond to our perceived environment through the replication of actions, the function of a perceptual-motor system is created and stabilized (Thelen, 2008). Simply put, even infants have goals and whether motivated by curiosity or the need for food, they are rewarded when their goals are met. Infants are capable of perceiving stimulus and responding to it resulting in what Thelen (2005) observes as a cascade of trial and error, where goals are met and through repetition the

perceptual-motor network required is stabilized into a fluid response and behavior. This is no different with emotional, behavioral, relational or psychological goals. Some processes are more abstract than a simple reach-and-grab method an infant might perform trying to obtain or adjust a bottle for feeding, but what remains the same is that something new is learned or something familiar is reinforced.

Cleeremans (2014) points out that processing information for goal obtaining is a consequence of learning, and through that learning change is made in how the information is further processed. It is common knowledge that information processing takes place in the brain as neural networks fire to transmit messages across neural systems. Constant firing of similar networks reinforces the association of stimuli and the neural network that corresponds to the stimuli and the thoughts or behaviors that follow. The network then strengthens as a collaborative system and in efficacy. These very ideas are confirmed by Gantt and Agazarian (2011) whose recent research continues to support Hebb's model, and that ongoing plasticity of networks depends on new experiences that are built on old experiences. One could say that the neural networks become more stable as associated neurons and cognitive systems continue to fire together. Because motor functions and perceptual signals are also processed in the brain, we can expect that stable embodiment as described by Thelen (2005) to be reflected in the corresponding brain regions.

Social behaviors also require a certain structure and a lack of stability of social functioning is reflected in the self and consciousness as a disorder. For example, Autism is considered debilitating because of the lack of ability to function socially. However, studies show that Autistic children with social anxiety become more efficient in social situations with reduced

anxiety through cognitive-behavioral therapy that focuses on exposure (Wood et. al. 2015). As a neural disorder, Autism cannot be cured, but it would seem practice certainly improves behavior and ultimately neural stability, even in severe cases. The environment is explored and different perceptual-motor systems are created, validated, and reused. Neural networks reflect these systems within our brain and stabilization occurs not only between body and environment, but also the neural processes involved. Through exploration and exposure, different perceptual systems respond to the world and different behaviors manifest to deal with stimuli. The neural networks that process the information as much as the behaviors that guide our responses become an integrated part of the body and mind, and consequently, of the self.

Having a series of stable responses and networks is only part of the equation that provides effective behaviors for a given situation. A variety of tools are only as useful as the mechanic's ability to use the correct tools for a given problem. A bolt cannot be screwed in with a pair of pliers and it would be inappropriate to smile and high-five a friend at funeral. However, all experience leads to opportunity, and with luck something new is learned each time. Gantt and Agazarian (2011) would argue that the new experiences are then mapped to a similar network that also connects behaviors, perceptions and emotions, providing a pattern that links each variable to the perceived experience. The neuronal firing patterns that emerge as a function of these linked stable actions and behaviors are what Little and Shaw (1975) believe to be memories. These patterns can represent short-term and long-term memory. Research has shown that single neurons, or groups of neurons, vary in firing rates and show signs of memory retention depending on the type of memory and memory task manipulation

associated to the measured neuronal network (Nacher et al., 2006; Govindarajan, Kellehe, & Tonegawa, 2006). Little and Shaw (1975) suggest the longer the pattern persists and is active (short-term memory) the more stable the function of the pattern becomes (long-term memory) and can later be recalled. Exposure to the environment—whether it is simple interaction with other individuals or the trends of the time—facilitates patterns that guide the self into structured behavior and creates neural maps. However, the brain is not static, and each pattern that emerges creates new bonds, while existing bonds are also rewired and reconnected between perception, behaviors and the neurons that map them.

With many patterns, the process of choice between them follows. What becomes the best option is again based on experiences and the current context of the problem presented. Discussed above is how behaviors are internalized and become a part of memory. A choice between them relies on what an individual understands as a possible use for any specific response. In reviewing Eleanor Gibson's research, Pick (2012) acknowledges Gibson's construct of affordance, which is the perceived utility of objects or tools to an organism. Affordances are first learned through childhood development, where close interrelationships shape the way individuals learn and behave. It should follow that expanding knowledge during education provides greater affordances both in quantity of affordances and variety of utility. Human ability to decipher symbols and choose appropriate responses for social situations depends on what tools are learned and their utility. The knowledge of utility, the memory recall of similar experiences and the choice of use pattern, result in the behavioral projection of stable patterns previously learned. Of the choices available, that which we choose is what ultimately defines us. Which choice is the right choice? This is a question we may ask ourselves when conscious of

a difficult decision, but in terms of learned behavior, the right choice is one that was previously rewarded. As Schulz and Reynolds (2013) conclude, the reward network and positive reinforcement help to increase acquisition, so we can assume the actions the self performs are directly linked to our behaviors and what we afford objects. Positive reinforcement would also explain how we behave and when we behave, and is reliant on the responses that have worked previously to reach expected goals. More recently, Yamagata and colleagues (2015) have observed a link between dopamine and the processing of short-term and long-term memories. It is then highly probable that the self is made up of behaviors that advocate goal achievement. Goal achievement is rewarding, and the release of dopamine not only reinforces that goal achieving behavior, but also plays a part of storing it in memory.

Stability and Reward Concluded: Beginning with the world that surrounds us, there are external factors that effect decision-making and behaviors at every moment. This section furthers the discussion of context to the individual within the world. Here, through perception and goal obtaining, patterns are internalized creating stable networks between body and mind that are reinforced as the patterns are found to be successful. Repetition and reward strengthen the networks and facilitate acquisition that allows patterns to be recalled from memory and performed. The self is then both internalized and externalized through constant interaction with the environment, and when goals are achieved the brain's reward system reinforces behaviors and actions that work within a given context so they can be reused when appropriate.

Self Through Others: To understand the full extent to which the environment shapes us there is still a large component to be discussed: other humans. Interrelationships have been discussed thus far as catalysts for internalization and stabilization for social behaviors, but a contextual argument for what creates the self requires greater insight on the direct influence other people have on our behaviors. This section will highlight human interaction and how individuals can and do affect the personality and behavior of each other while relating social functions back to cognitive neural processes that work to internalize context and environment.

Humans are linked socially and the core of what makes up a person largely depends on the company he or she keeps. Matthew Lieberman (2014) discusses in his book that a person's need to socialize is innate and during times of mental rest, a social network takes over in our brain that he calls the "default network." Lieberman believes this network is the core human consciousness and guides deliberate examination into the function of our social lives that allows us to master our social world the same way an elite competitor practices their trade. We are so connected to others, that in his research he has found people generally discuss personal losses in similar terms as physical pain, and neural networks that are correlated with physical pain are active during social pain and can be treated with aspirin just the same (Lieberman, 2014).

With a strong connection to others, others are then a part of who we are. In defining embodiment, Overton (2004) contends the understanding and manipulation of objects and tools in our environment changes the how the self is identified. A blind person guided by a dog and a cane to get around safely learns to use his or her tools and may struggle without them. Their tools soon become an extension of their person and define them, as they are required to

live. The environment is not just what shapes us, but can also a part of us, and the people in our environment are no different. As social beings, other people can be obstacles, tools or solutions. At the very least, during infancy and much of our childhood living without social interaction is absolutely impossible, we would not survive. There is great harm with the lack of social interaction and Berkefel and Braus (2011) declare neglectful parents run the risk of causing increased fear reactions and anxiety in their neglected children when exposed to social settings. Ill-prepared children then face a social world without the tools to navigate. Humans need other humans to live functional lives, but humans also change how humans function in their own lives.

A large component of how others affect the individual is the human ability to empathize. Discussed above is Donald's (2000) argument that humans live in a symbolic culture and consciousness is the understanding and ability to decipher symbols. Symbols are more than tools and objects in our environment and the affordances we give them, but the actions and behaviors that others perform. *Social Consciousness* then, must be what Graziano and Kastner (2011) argue is the unique human ability to perceive the focus of the attention of others and to decipher the intent of their actions, an ability only emulated in other species. Some neural systems even fire in a similar fashion as they would in behavior when only perceiving others perform a behavior as Liebermans (2014) discusses and further contended in recent research by Maeda et al. (2015). By understanding what others intend, our default network can then help us understand how they feel. This interpersonal sensitivity allows us to feel for others, and much more deeply, Decety and Batson (2007) add that humans can place themselves in the mind of others and feel *as* they feel, not just *what* they feel. Mirror neurons and interpersonal

sensitivity allow us to adopt the intent of others, understand their expectations and feel as they do. In short, our self is reliant on the actions of other selves with which we share bonds.

While empathy may allow the opportunity to behave in a way that seems appropriate for a situation like consoling a friend, avoiding conflict or celebrating success, how others act does not always provide the ability for conscious reactions. Often times the expectations of others and their mental projections of who and what they think we are, serve as a sort of self-fulfilling prophecy (Rosenthal, 2002). Rosenthal's (2002) animal experiments found that when researchers suggest control and experimental groups are expected to act or perform differently (some rats are "maze smart", some rats are "maze-dull" and when testing the two the smart rats *should* perform and behave better), the research assistants report the expected "maze-smart" rats did not just complete mazes faster, but were easier to handle, friendlier and more responsive, even though the rats truthfully were no different. As it turns out, the research assistants that *expected* the rats to perform well treated the rats better, resulting in better performance. Most notable in expectancy error is that which results from interpersonal relationships specifically from those in leadership or guidance roles such as teachers, parents or even peers. If those we seek advice from have expectations of what we should do or who they think we are, they are likely to guide us toward those expectations. Rosenthal (2002) continues his discussion with a student experiment where teachers were provided randomly assigned expectancy of new students and those students were significantly more likely to perform better in class. The self becomes a product of what others think or want us to be without our conscious consent. Although generally more affective when expectancies are projected by

people with power, those in our social circles have the ability to unconsciously guide expected behavioral patterns into fruition.

Social influence is not always negative, however. Self-Expansion theory in recent research as defined by Beckes and Coan (2015), reasons that humans look to others to form close relationships through which we can have new experiences to associate with the self. To create a more complex self and expand on the tools gained through development, interpersonal relationships offer a window into a new world where novel mind/body patterns are forged through new experiences. In developing the self, we tend to be drawn to others with similar selves or with traits that we find appealing and hope to internalize for our own. Rusbult et al. (2009) emphasizes this attraction to others as the Michelangelo Phenomenon, which is a process in which people search for and create/influence the qualities and behaviors of others, and when applied to couples specifically, provides a process where each partner sculpts each other into that others' ideal self. Multiple interpersonal relationships then, would allow for multiple traits to be identified and sculpted. Self-expansion guides us to others while the Michelangelo Phenomenon allows individuals to benefit each other into becoming a better version of who they are and ultimately the self they want to be.

Self Through Others Concluded: A self through context requires exploring the effect the social world has on an individual. Humans are innately social creatures that look to others for support. Consequently, due to human social nature to empathize and internalize, we often fall prey to the negative effects of expectancy and stereotype threats. Fortunately however, stable patterns and networks create a stable self in which we look to others to expand on. Through

others, we are able to create the self we wish to be by finding people with qualities we admire that compliment our own and internalizing their traits as they help to sculpt our own that benefit their person.

The Self in Context Concluded: Who we are and what defines us is a question that continues to plague the social sciences. While it is important to understand the various aspects of the person, from the outside world to the internal networks that release chemicals that affect our being, multiple disciplines have defined different processes, systems and phenomenon independently that ultimately can be used to answer a unified question. This review has examined multiple developmental, neural and social cognitive approaches that offer understanding into the creation, retention and stability of what the self is in the context that we live.

This discussion began with environments, structured in various ways consisting of multiple levels. Measurements like time may not provide a solid structural context (although it does have implications for the self) but governments are generally created for the purpose of structure. So too are our communities and schools in place to guide those within the structure. Similarly, a child at home is surrounded by a set of house rules, traditions and customs put in place to help regulate and develop children. These structured systems provide a series of stimuli, symbols and tools, that we are taught have meaning and through learning grant them several affordances. Replication and variation of use of what we are afforded stabilizes a perceptual-motor system reflected within the neural networks that process the information related to this system. Even those we share our space with, the parents, peers and teachers

have expectations of us that may guide us, but also traits that we hope to internalize as a part of our self.

Each science will do well to consider the implications of researchers and literature in similar fields. The self is an abstract concept that requires insight from multiple points of view, from the context of our lives, however complex it might be. There is great depth to contextualizing the self, but given the layers and variation of the self may be, it is important to understand the interpenetrating synergistic processes of the world around us and within.

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