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**Implementation Intentions: Examining the Social Implications
of Establishing Metacognitive Processes which Bypass the Neuropsychological
Planning Fallacy of Self-Employed Adult Individuals with Asperger's
Syndrome**

By

Kate Palmer

FINAL PROJECT SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
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Abstract

This final project will be examining how to bypass the neuropsychological cognitive executive functioning errors that lead to a planning fallacy, a continual underestimation of task duration even with knowledge of correct estimation, of adult individuals with Asperger's Syndrome. Due to these errors, many of these individuals look to self-employment as an economic solution to the rigid constraints of the existing occupational environment. Although self-employment is a viable option, the errors need to be corrected for successful ventures. The proper means to correct these errors is through the use of metacognitive processes called implementation intentions; which create concrete plans of action to facilitate goal oriented behavior. The implications of this research suggest that these individuals can create more appropriate cognitive and metacognitive functioning skills that enable them to interact and work more productively and efficiently within their families and communities, benefiting psychologically, sociologically, and economically.

Implementation Intentions: Examining the Social Implications of Establishing Metacognitive Processes which bypass the Neuropsychological Planning Fallacy of Self-Employed Adult Individuals with Asperger's Syndrome

Society loses out if individuals with Autism Spectrum Disorders are not involved in the world of work. (Grandin, 2010, pg. xi)

Employment is defined as an occupation by which a person earns a living through work or business (Random House, 2012). But, more specifically, it originates from the Latin *implicare*, meaning *to involve*. When we are employed, we are indeed involved. We are committed to and engaged in the moment-to-moment tasks of the position as well as what the larger framework entails. The interpersonal relationships that we forge in order to complete the common goals required carve our character and help us to define how we perceive ourselves. This process aids us in shaping our individual identities and providing much needed self-worth (Attwood, 2006; Grandin, 2008). Our personal perceptions of ourselves are integral in understanding how we navigate the world, how we interact with others, and how we process information. Through this process, we learn about our strengths and weaknesses and how we can capitalize this information (Meyer, 2001). If we have strong leadership capabilities, we can assist in motivating others within the group to achieve a particular shared goal. Or, if we excel in a distinct, specified field of study, we can lend our unique knowledge to others in order to further understanding of an objective (Attwood, 2006). In any case, we give and are given feedback of our performance which we process and internalize and alter our future actions accordingly. We

are able to determine a proper procedure for success and create a plan to execute our intentions. We can then complete our desired, intended goal with satisfaction from our working relationships, family, friends, and ourselves (Hendrickx, 2009). But, what if it was virtually impossible to make those initial connections with individuals around us? What if we did not understand personal space or appropriate topics of conversation? What if we were literally incapable of receiving interpersonal feedback from others concerning our behavior, workplace dynamics, and job performance? (Meyer, 2001). It would be a dramatically different world to navigate. It would be as though we were blind to certain visual stimuli, deaf to certain auditory cues, and simply bewildered about how the world we know functions (Grandin, 2008). We take for granted our ability to perceive these seemingly invisible stimuli when conducting interpersonal relationships. Facial expressions, body language, and ambiguous phrases are all aspects of daily life which we instinctively grasp, but are non-existent for some individuals (Carley, 2008). Because of these perceptual differences, personal relationships, social situations, and employment settings are often highly stressful and difficult to understand (Shore, 2003). Since these deficits affect the interpersonal relationships of these individuals, the benefits of solidifying one's internal perceptions in order to better understand how one navigates the employment world are compromised. In order for these individuals to properly function in an employment setting, however, the psychological difficulties must be overcome. It requires the proper intervention to be successful (Grandin, 2008). Individuals that possess these psychological difficulties have Autism Spectrum Disorders.

Autism Spectrum Disorders (ASD) is a term used to describe a set of separate and distinct developmental disorders which all share a similar symptomology caused by neuropsychological dysfunction (Charman, 2008). Individuals with ASD's are characterized by

qualitative impairments in social interaction and communication, repetitive and stereotyped patterns of behavior, interests and activity, sensory sensitivities, physiological issues, and cognitive issues (APA, 2000). As the name autism spectrum disorders suggests, it is indeed a *spectrum*. On one end, *classic autism*, these characteristics are dominating, all-consuming, and create constant intervention by support members for daily functioning. On the opposite end of the spectrum, *Asperger's Syndrome*, although the same defining characteristics are present, their impact is much less devastating. In many cases, support and services are not necessary for daily functioning. Because the characteristics, deficits, and issues are less severe than their spectrum counterparts, these individuals often do not receive the attention, education, and support that they desperately need to lead successful, productive lives. The issues that need to be acknowledged include positive cognitions such as increased ability for visualization, mental imagery, and detail oriented perceptual skills as well as more challenging deficits in executive functioning (Attwood, 1999; Grandin, 1998). Understanding executive functioning here is important because it describes mental abilities such as working memory, impulse control, inhibition and shifting set, initiation, action monitoring, and specifically time management and planning (Hill, 2006; Zaks, 2006). Having deficits in these areas severely impact the daily operation of individuals with AS. Because of this, this population has a decreased ability to process and apply information in social and work situations. If an individual has an insufficient capacity to manage and plan current and future activities, then it is virtually impossible to achieve the goals necessary to provide a productive existence (Gaus, 2007; Lawson, 2009). This decreased ability, or executive dysfunction, is crucial in understanding how an AS individual manages and plans his/her life. For example, if an AS individual has difficulty in working memory, time management, and

planning, it would be nearly impossible to remember to schedule a doctor's appointment, decide how to get to the office, and to arrive on time.

As described, the executive function of planning is extremely important in the daily functioning of the AS individual. Understanding the process of initiating plans is, therefore, crucial in developing proper procedures for managing the planning deficits. The actual creation of a plan, or planning, refers to the aspects of cognition which describe the procedure for achieving particular goals or outcomes (Morris, 2005). This process involves developing a series of steps which lead from the beginning to the successful completion of a project. During the development process, individuals must create a proper framework for decision making and problem solving by organizing their knowledge and skills, understanding the scope of the project, constructing an appropriate course of action, and recognizing contingencies that may interrupt goal realization (Buehler, Griffin, & Ross, 2002). This process will facilitate efficient project completion. And formulating an efficient plan for project completion is especially important for the faction of the workforce who might consider self-employment as an option. However, for AS individuals, the planning process from initiation through completion is impaired due to the neuropsychological differences associated with the disorder. These neurological difficulties will need to be addressed in order for AS individuals to develop appropriate and efficient organizational planning skills necessary for the employment world.

These errors cause an individual to employ inaccurate mental heuristics instead of thoughtfully executed steps in the initial structural planning phase leading to a phenomenon known as the Planning Fallacy: an unrealistic optimism in task completion predictions (Kahneman & Tversky, 1979). As a result, this optimistic bias, which people make overly conservative time estimates for task completion although they are fully aware that similar tasks

have exceeded predicted timetables in the past, coupled with the already existing neuropsychological differences in executive functioning of an individual with AS leads to economic, sociological, and personal failures unless corrected. The inaccurate estimates of task completion times present financial, social, and personal ramifications (Buehler, Griffin, & Ross, 1994). Those ramifications include employment.

Self-employment, therefore, is an important economic solution to the rigid constraints of the existing occupational environment for the AS individual (Attwood, 2006; Grandin, 2009; Meyer 2001; Robison, 2008; Simone, 2010a; Zaks, 2006). Due to the restrictive characteristics of AS, including social and communication impairments and executive functioning issues, creating a work situation that involves a specific field of interest and a flexible work schedule can be a viable option. However, self-employed individuals have an increased level of responsibility for the day-to-day operations of their business, anxiety for the successful conclusion of projects, and uncertainty about future financial security for themselves and their families (Ardichvili, 2000; Grandin, 2008, Meyer, 2001; Simone, 2010b; Zaks, 2006). The self-employed individual's heightened level of responsibility and stress results in cognitive errors during the planning process, including a failure to incorporate past experiences, an overly optimistic view of abilities and skills, an unwillingness to fully commit to the project's completion, and an inability to cope with the nature of the client/worker relationship.

In order to combat these negative consequences, many researchers have explored several possible solutions to correct the estimation process: considering goal interruptions, assessing individual components of the task, objectively observing other people, engaging in scenario thinking, and considering similar situations (Roy, Christenfeld, & McKenzie, 2005). However,

these possible solutions are attempting to remedy the symptoms, not the underlying cause of the issue. An alternative prospect is to employ an implementation intention.

Implementation intentions create concrete action plans that specify where, when, and how to act (Koole & van't Spijker, 2000). Research has demonstrated that implementation intentions are metacognitive processes which cause the mental representation of a given situation or project to become highly activated and thus easily accessible (Aarts, Dijksterhuis, & Midden, 1999, Steller, 1992). These metacognitive processes allow individuals to accurately estimate project completion times by visualizing the goal, creating a plan of action, and anticipating possible obstacles, and initiating goal oriented behavior (Gollwitzer & Brandstatter, 1997). Individuals with Asperger's Syndrome have an increased ability for mental representation and visualization. This is due to the executive dysfunction in the brain causing others areas to compensate. The region involved creates highly visual mental representations of the situation, environment, and context at hand. And because implementation intentions employ mental representations to establish concrete plans of action to make decisions toward goal oriented behavior, these individuals essentially bypass the deficits caused by their executive dysfunction to achieve their desired goals. In other words, the formation of implementation intentions expressly requires that people visualize the situation in which the goal-oriented behavior should occur. This action induces individuals' will-power to commit to the intended behavior thereby enhancing the effectiveness of the implementations. Continued utilization of this system can create automaticity, resulting in the capacity to initiate self-regulated, fluent cognitive actions without high-level mental processes.

Implementation intentions are essential to rectify self-employed AS individuals' planning fallacy issues by creating neuropsychological cognitive processes that reduce optimistic bias in

time estimation and incorporate past experiences to future predictions, establish realistic and appropriate skill levels, commit to project completion, and facilitate client relations.

Implementation intentions can, therefore, allow these AS individuals, a seemingly invisible population in society, to enhance their lives and the lives of those who interact with them. The implications of this research suggest that these individuals can create more appropriate cognitive and metacognitive functioning skills that enable them to work more productively and efficiently allowing them to be involved in the world. This involvement creates the self-identity, self-confidence, and self-esteem that manifest successful personal relationships, employment situations, and social interactions opening doors to continued advantageous experiences. In order to achieve this understanding, and explanation of autism spectrum disorders, Asperger's Syndrome, the Planning Fallacy, self-employment, and implementation intentions will facilitate the synthesis for appreciating the necessity for an intervention to create circumstances for AS individuals to thrive.

Autism Spectrum Disorders

Having autism can mean having great abilities, but it can also mean never leaving the home of one's parents, never holding down a job for any extended period of time, and perhaps never enjoying a satisfying intimate relationship. yet, if this condition were understood on a broad level, circumstances would enable most diagnosees to lead happy and productive lives. (Carley, 2008, pg. 12)

The term *autism* is derived from the Greek word *autos* meaning self. Psychiatrist Eugen Bleuler in 1911 used autism to describe individuals who withdraw completely from the outside world into themselves. Bleuler noticed this behavior in his patients diagnosed with schizophrenia (Sicile-Kira, 2004). Nearly thirty years later, American child psychiatrist working at Johns Hopkins in Baltimore, Maryland, Leo Kanner was the first to identify autism as a

distinct neurological condition in his publications (Woodbury-Smith, 2009). Dr. Kanner's observations of his patients concluded an inability to properly use verbal communication, a preference for objects over people, and issues with change in routine (Carley, 2008). Kanner believed in a specific underlying intelligence in individuals with autism and his research gained notoriety. However, in the 1950's, many clinicians had difficulty observing the intelligence in autistic individuals as Kanner described. Because of this, Kanner's ideas were widely discounted. In addition, Kanner also believed that autism's cause was environmental in nature and recommended removal of autistic children from their families. Unfortunately, a man named Bruno Bettelheim also agreed.

Bruno Bettelheim, a Hungarian psychotherapist, spent a portion of World War II in a Nazi concentration camp. There he noticed similar behavioral patterns between the mentally isolated and tortured individuals in the camp and individuals with autism. As Kanner had previously concluded, Bettelheim also believed that autistic children suffered from emotional neglect in the home. As a result, Bettelheim coined the phrase, "refrigerator mothers", referring to uncaring, unfeeling parents who forced their children into mental isolation (Sicile-Kira, 2004). Unfortunately, this idea was widely accepted and led to the belief that autism was a mental illness instead of the neurological developmental disorder it is considered to be today. Since the 1960's and the days of "refrigerator mothers", Bettelheim's volatile behavior and fraudulent credentials marred his findings, but the damage from theories was already done.

During the late 1960's and 1970's, families did everything they could to avoid the diagnoses of autism due to its incredibly negative stigma. This avoidance created the *antilabelism* movement (Carley, 2008). Parents and families felt that by avoiding the label and potentially devastating potential that the stigma implied, they could keep their children's

individuality and positive attributes. While this made sense and was a logical outcome of the Bettelheim mind-set, it not only perpetuated the stigma, it also prevented individuals with autism from gaining the appropriate skills for self-care. Since the 1970's, the psychological community and society have changed their perspective and view autism for what it is: a neurologically-based disorder that is evaluated and treated as such.

As a neurological condition, autism's broad range of symptoms encompass deficits in an individual's sensory, cognitive, motor, language, and social development (Baker, 2005). The broad nature of characteristics of autism gave rise to the term *spectrum* in reference to the disorder. Consequently, *autism spectrum disorders* is the umbrella term used to describe all disorders with these similar areas of difficulty. These disorders include: classic autism, pervasive developmental disorder not otherwise specified (PDD-NOS), high-functioning autism (HFA), and Asperger's Syndrome (AS). The specific characteristics that all ASD's share, as previously noted, effect the social, communication, psychological, and physiological functioning and are prevalent before the age of three (Autism Society of America, 2004; DSM-IV TR, APA, 2000; ICD-10, 1993). More specifically, the social component is described as a qualitative impairment with at least two of the following characteristics: significant impairment in the use of nonverbal behaviors, including eye contact, facial expressions, and physical and social gestures; the inability to establish age-appropriate relationships; the failure to seek opportunities to socially interact; and poor emotional reciprocity. The communication component has a qualitative impairment in at least one of the following categories: an observable delay or lack of verbal language development; stereotyped and repetitive language; and lack of age-appropriate play. The psychological and physical component is marked by at least one of the following: preoccupation with one or more restricted patterns of interest which is abnormal in focus and/or

intensity; inflexibility to nonfunctional routines; repetitive motor movements; and persistent preoccupation with specific objects (Simpson, 2005). In other words, individuals with ASD might have trouble understanding what to do or say at a social gathering. They may have difficulty saying the right thing in a conversation. They could say the same thing over and over or flap their hands if stressed. ASD individuals experience high levels of stress, frustration, and anxiety on a daily basis because of these difficulties in social situation and environmental changes (Myles, 1999). Many researchers have posited possible underlying theories for the nature of the disorder. The most widely accepted are the following: the theory of mind, weak central coherence, and executive dysfunction.

Theory of mind is defined as the inability to understand the thoughts and feelings of others, as well as oneself, and to infer what other people believe to be the case in a given situation (Premack, 1978). Theory of mind, which has been made a prominent theory by Simon Baron-Cohen, is a cognitive process which allows individuals to make sense of the world by understanding that people have thoughts, knowledge, beliefs, and desires that will influence their behaviors (Winner, 2002). Individuals with ASD's have difficulties conceptualizing the mental states of others, called *mind-blindness* (Attwood, 1998). This means that ASD individuals, for instance, may not be aware that they are speaking in a way that may hurt or anger others, be able to distinguish when others are being deceptive, or that other people's beliefs about a situation may be different than their own. An example of this is demonstrated by research conducted by Baron-Cohen, Leslie, and Frith (1985) which suggests that ASD individuals routinely fail the theory of mind tasks because they attribute their own beliefs and thoughts about specific circumstances onto others causing an inability to properly predict others actions.

Central Coherence refers specifically to the tendency to process information within its context or to bring information together to create a greater, broader meaning (Frith, 1989). This means that people tend to determine the larger picture and lose sight of the details involved. If an individual has weak central coherence, he/she loses the larger context and processes information on a local, not global, basis only due to the inability to hold information in the mind for later use (O'Conner, 2008). Weak central coherence's proponent, Uta Frith, has suggested that individuals with ASD's lack the ability to extract global meaning creating cognitive deficits. For example, people with autism recall exact words of a story, instead of the gist.

Executive functioning refers to cognitive processes allowing for flexibility of thoughts and behaviors in response to changing contexts (Stuss, 1992). These cognitive processes are impulse control, set-shifting, action monitoring, decision making, problem solving, working memory, planning, and time management (Frith, 2003). Individuals with ASD's have demonstrated a significant deficit, or executive dysfunction, in these higher-order processes (Hill, 2006). For example, ASD individuals lack the ability to set goals and plan their day which can lead to disorganized thoughts and behaviors and a cascade effect of daily living skills disruption.

As each of these theories for the underlying cognitive deficits of ASD accurately describe characteristics of the disorder and have been extensively researched by many experimenters, executive dysfunction explains not only the cognitive processes of ASD's, but more specifically, that of Asperger's Syndrome, which as previously listed, is a sub-classification of ASD. In the following section, the history and characteristics will be explained as well as the importance of understanding executive dysfunction as the central component to Asperger's Syndrome (Hill & Bird, 2006).

Asperger's Syndrome

We as autistic people – wherever we are on the spectrum – can maximize our potential to contribute to life and enjoy and experience all life has to offer. (Zaks, 2006, pg. 2)

In 1944, while Leo Kanner was conducting his research, an Austrian pediatrician, Hans Asperger published a doctoral thesis using *autistic psychopathy* to describe the individuals in his study. Where Kanner's population consisted of children with severe autism, Asperger's youth were considerably more able. He explained that these individuals were unusual in their social, language, and cognitive abilities (Asperger, 1991). He also felt that there may be some positive aspects to autism which could lead to important successes as adults (Sicile-Kira, 2004). However, as Kanner's work began to gain notoriety globally, Asperger's did not. This was primarily due to the lingering stigma of conducting his research in Nazi governed Austria (Carley, 2008). Despite the rejection of this work, Asperger continued to treat these children and initiated a facility dedicated to education programs involving speech therapy, drama, and physical education (Frith, 1991). Hans Asperger died in 1980, only a short period of time before his work achieved global recognition.

Lorna Wing, an English psychiatrist and physician, coined the term Asperger Syndrome in her 1981 paper, *Asperger Syndrome: A Clinical Account*, after she discovered a group of individuals' characteristics that resembled the previous profile of behaviors originally delineated by Hans Asperger (Attwood, 1998; Wing, 1981). Wing specifically chose the term *Asperger's Syndrome* in the paper because she was concerned that the term *autistic psychopathy*, that Asperger employed, would create a misconception of the syndrome as a psychopathic personality disorder. During this time, there was much debate among clinicians and

professionals surrounding the similarities and differences between classic autism and Asperger's Syndrome. And in 1981, Wing expressed that the two disorders were more similar than different and could be explained in terms of severity and impairment (Sicile-Kira, 2004; Wing, 1981). This assertion was based on her 1979 research with colleague Gould, where they conducted an epidemiological study to determine whether children were autistic or in an autistic-like state (Wing & Gould, 1979). Their results concluded that autistic behaviors during childhood could be classified into three categories: impairment in social interaction, impairment in communication, and restricted and stereotypic interests and behaviors. These categories together were called *triad impairments*. As a result of these findings, Wing developed the concept of autism as a *spectrum* (Wing, 1988). The severity of the impairments described would determine an individual's place along the spectrum: hence, autism spectrum disorders, with classic autism on the left and Asperger's Syndrome on the right. While Lorna Wing continued her research with autism and Asperger's Syndrome, Uta Frith, who had already made significant contributions to the field of autism, translated Hans Asperger's original works from German to English (Frith, 1991). It seems from her 1991 paper, *Asperger and his Syndrome*, that she believed in Asperger's research and vision. "Hans Asperger deserves to be recognized as a pioneer and champion of all Asperger children... Asperger pleaded for the recognition of such children, pointing out the potential that they had to offer society." Frith's translations brought Asperger's work into the forefront of the psychological community, connecting the historical basis of the syndrome to the contemporary research in the field.

During the early 1990's, there were many differing sets of diagnostic criteria for Asperger's Syndrome. Although, most shared common features, there were still minor differences. This continued until the publication of criteria by the World Health Organization in

the *International Classification of Diseases* (ICD-10, 1992) and the American Psychiatric Association's publication *The Diagnostic and Statistical Manual* (DSM-IV, 1994) (Meyer, 2001). This diagnostic criterion was also later solidified in the *Diagnostic and Statistical Manual IV Text Revision* (APA, 2000). The diagnostic criteria for Asperger's Syndrome (AS) in these publications follow Wing's triad impairment concept. While AS shares the diagnostic criteria with classic autism, including marked impairments in social interaction, communication, and restricted and stereotypic interests and behaviors, individuals with AS lack a significant delay in language development and cognitive ability. Although, as Wing (1981) pointed out, individuals with AS do demonstrate abnormalities in verbal and nonverbal communication, as well as certain cognitive dysfunctions.

Although discussing the previous diagnostic criteria in clinical terms is valid, what exactly does it mean in terms of daily living for the AS individual? Issues, concerns, behaviors, and characteristics can be broken down in the following way: social behaviors, language, interests and routines, motor skills, sensory issues and physiological concerns, and cognitive issues. Describing each of the challenges in these categories will create a more concrete and real-life perspective of functioning for the AS individual.

Social Behaviors

Social interaction is integral and pivotal to human behavior. Humans are social creatures. We are seemingly born with innate ability to observe our surroundings, interact with others, create relationships, and base our understanding of ourselves through our connection with family, friends, and our environment. At an early age, social skills develop without formal instruction in a very organic, natural way. However, this is not the case for those with AS.

Without the proper social functioning skill set, individuals with AS move through academic and social situation, missing important, essential verbal and nonverbal information which is intertwined in everyday social interactions (Grandin, 2011). This missing information is due to the difficulty with maintaining eye contact, properly understanding emotions, issues in reading body language, and overstimulation in large groups.

People with Asperger's have a fight-or-flight reaction to all social contact. We want to be accepted for who we are but it is difficult to be yourself around others when you can't relax. Adrenalin kicks in, so if we don't run away, we might hog everyone's attention, do a little song-n-dance, or standup routine, then afterwards go home and have an after-party meltdown. (Simone, 2010a, pg. 95)

Eye contact is an extremely important aspect to social communication. As part of nonverbal communication, people relay and interpret information with visual gazes. AS individuals lack this ability and therefore miss vital social information, such as a person's mental state and/or feelings. The reason for this is a delay in attentional and visual processing. Which means that AS individuals cannot process the meaning of eye movements because of the constant attention to detail that it requires. Many people with AS do not look directly at others' eyes while in conversation, but might look at their mouths to make sure the words are correct or simply listen. Eye contact breaks their concentration (Attwood, 1998; Baron-Cohen, 1995). Contrary to reigning opinion, lack of eye contact by AS individuals, although different than the rest of the population concerning appropriate social behavior, should not be interpreted as uncaring, rude, or indifferent. Rather, it should be construed as the most efficient way for AS individuals to attempt to understand the conversation at hand (Attwood, 1998; Carley, 2008; Grandin, 2011; Sicile-Kira, 2004; Woodbury-Smith, 2009).

In addition to eye contact, social interactions can be made difficult by the issues in properly understanding emotions. Individuals with AS not only have problems determining other's emotional states, but their own as well. This is most likely the reason that they cannot detect other's emotions and consequently are confused by them. AS individuals have impairments in understanding and expressing their feelings (Attwood, 1998).

A major problem for many people on the spectrum is modulating emotion.
(Grandin, 2008, pg.21)

Researchers Baron-Cohen and Wheelwright (2004) constructed a rating measure, the *Empathy Quotient* or *EQ*, to determine the empathic abilities of those with AS. Their findings suggest that individuals with AS do in fact score lower than typical individuals. However, as Valerie Gaus (2007) points out, the individuals' seemingly reduced ability to assess emotional empathy does not necessarily mean they lack the ability. The problem seems to arise in the difficulty to properly interpret other people's behaviors. This processing error means that they fail to gather vital information "which impedes their ability to experience the emotional component of empathy" (Gaus, 2007). But, although the emotions may be displayed differently, when offered the proper information, the appropriate emotional states will follow (Carley, 2008; Robison, 2007).

Appropriate social behaviors can also be made increasingly difficult by overstimulation in group interactions. By the time typical individuals reach four years of age, they have the understanding of basic social skills (Meyer, 2001). They are able to *just know* how close to stand when talking. They *just know* when someone likes them. They *just know* how to be around other people. This ability to *just know* is inferred from observation and accurate perception of nonverbal feedback that is presented when the rules are violated (Gaus, 2007). They are not

formally instructed on how to do this. The AS individual does not develop these inferences and therefore, must be given explicit instruction in order to build the necessary skills. But, because the AS individual does not automatically have this skill set, group interactions can be confusing, upsetting, and overwhelming (Sicile-Kira, 2004). For instance, playgrounds, lunchrooms, team sports, group projects, and workplace environments can feel like war zones. AS individuals do not know how to act, play, talk, or work with others, not to mention the intense noise, movements, activities, and thought processes involved. Many times they will be discovered alone in a quiet area, more content to be left to their own devices (Attwood, 1998). As previously stated, although the social skill set is not innate, increased understanding of socially normative behaviors can be learned through explanation of specific, concrete social circumstances.

Language

Language and communication play an essential role in social understanding and the day-to-day processes of the individual with AS. AS individuals do not have a marked delay in language development or a notable deficit in formal use of language or sentence production. On the contrary, they often demonstrate grammatical and semantic strengths (Landa, 2000). However, AS individuals have an increased difficulty in understanding and employing language in a flexible way in social contexts (Twachtman-Cullen, 19998). It is not the speech or language aspects that cause difficulty, but the communication, or *pragmatics* (Gaus, 2007; Hobson, 2010; Roy, 2008; Twachtman-Cullen, 1998; Volkmar, 1995). People generally learn the pragmatics of language from modeling their environments during childhood and adolescence (Landa, 2000; Meyer, 2001). AS individuals, however, do not pick up these linguistic cues and continually struggle throughout their lifetimes because of it.

Any kind of talk that goes beyond a simple exchange of information has always been a challenge for me. When I was young, I learned that people would not like when I uttered the first thought that entered my mind when they approached. Since making that discovery, I have slowly taught myself how to succeed at conversation-most of the time. I have learned to begin conversations with a question, like “How are you?” I have learned a range of questions that are socially acceptable. But, my inventory of questions is limited, and it seems other people are a lot more flexible. (Robison, 2008, pg. 191)

Three areas of pragmatic language that cause considerable complication are overly literal translation, constantly changing contexts, and *small talk*.

People often say things that are not literal representations of what they mean. But, they manage to convey their meaning through context, voice, expressions, gestures, and environmental cues (Gaus, 2007). Since AS individuals have trouble using these aspects to convey and perceive intentions from others, they have a tendency to interpret written and verbal language literally rather than contextually (O’Connor, 2008). The overly literal translations may cause confusion with jokes, sarcasm, irony, and metaphor (Willey, 1999). For instance, *I caught his eye* means that an individual finds another attractive, but would be a very confusing phrase to the AS person that takes the sentence word for word (Attwood, 1998).

Conversations often call for changes in context. It is very important during communication exchanges for the participants to alter the formulation of the message conveyed based on what is said. This requires attention regulation, flexibility, and proper language skills. One needs to know what the other is expecting and adjust accordingly (Gaus, 2007). But, individuals with AS display issues with conversational flexibility. Temple Grandin (2005) has described this inflexibility like being a *tape recorder* replaying stock phrases or sentences without regard to outside influences.

Small talk is also an incredibly difficult matter for those with AS (Carley, 2008; Grandin, 2008; Robison, 2008; Simone, 2010b). Small talk is a highly social act that is extremely important in maintaining a variety of relationships and connections. As with the complications in being literal and changing contexts, the issue with small talk is linguistic inflexibility. People with AS are very practical and have generally narrow interests. It is often considerably more difficult to see the value in discussing topics that are of no consequence. Talking about the weather, the Yankees, or the war in the Middle East might seem highly unnecessary.

With regard to language and communicative skills, the issues with the pragmatics cause demonstrated adversity for the AS individual. However, it is also true that these individuals are focused and clear on what is being said, they get right to the point and are passionate about their favorite topics. This can be taken as a refreshing contrast to the often ambiguous and overly verbose nature of typical conversations.

Special Interests and Routines

Individuals with AS have the tendency to become consumed by special interests and routines that dictate their conversations, how they spend their time, and the structure of their daily schedule (Attwood, 1998, 2007; Boyd, 2011; Carley, 2008; Frith, 1994; Gaus, 2007; Gillberg, 1989; Grandin, 2011; Meyer, 2001; Shore, 2003; Simone, 2010a; Volkmar, 1995; Willey, 1999;). It seems that the difference between a typical individual having a hobby or interest and an AS individual's special interests is that these pursuits are often solitary, unconventional, and monopolize their time.

My special interests have had the ability to both imprison and sustain me. They monopolize time that should be delegated toward friendships, employment, and other adult priorities. On the other hand, they have given me a predictable stability that I often haven't been able to find elsewhere. They have also contributed drama

and passion into my life. (Saperstein, 2010, pg. 12)

AS individuals find considerable enjoyment and satisfaction from their interests and routines. It is important to understand why they occur. As discussed previously, language and communication can be difficult for the AS person. Having extreme and prolific knowledge of a topic gives them conversational assurance. The special interest, therefore, reduces stresses caused by the need to have appropriate topics at a social function (Attwood, 1998, 2007; Meyer, 2001). Many people with AS often fear appearing stupid to their peers, family, and colleagues. One way to portray intelligence is by acute fluency in a subject. This can often make others take notice and give appropriate accolades (Carley, 2008).

People with AS generally find difficulty coping with constant change and expectation in everyday life. Many interests require order, patterns, and logic which allow them to feel as though they have some semblance of control. These interests are “our security blanket... they make us feel safe on an otherwise precarious planet” (Simone, 2010). Special interests can also be a means of relaxation and enjoyable activity. The topic of focus can provide the AS individual with a powerful connection to self-sufficiency and satisfaction (Gaus, 2007). Due to the previously discussed social deficits, many AS people have high anxiety levels and few pleasures in their daily lives. Their interests provide much needed excitement, enjoyment, and anxiety reduction (Woodbury-Smith, 2009).

In addition to special interests, the AS individual may have a preoccupation with routines. They seem to impose specific habits and patterns in order to make life predictable and orderly as an alternative to intense, intolerable chaos and uncertainty. It can also act as a means to reduce stress and anxiety. The establishment of routines also ensures the halt of change. “The

constant change of most things never seemed to give me any chance to prepare myself for them. Because of this, I found pleasure and comfort in doing the same things over and over again” (Williams, 1992, pg. 39). Research suggests that the routines become exceedingly elaborate during times of change with people, circumstances, and expectation. They have a desire to control their world and everything in it. Without routines, chaos and the unexpected exist (Simone, 2010b).

Although special interests and routines can lead to a lack of spontaneity, lack of connecting in social relationships, attending functions, and simple going outside, they can also have positive notions. They can make AS individuals extremely reliable by adhering to schedules and commitments which can provide the appropriate stability to maintain daily living and quality of life. It also shows an ability for deep passion, intense focus, and perpetual knowledge (Carley, 2008). By honing these skills, it offers the AS person the opportunity to turn talents and passions into activities that can last a lifetime through access to community and peer groups with similar interests, helping others, self-actualization, and occupation (Meyer, 2001). Using their talent and interests is a great way to establish and maintain long-lasting, satisfying employment opportunities (Grandin, 2008).

Motor Issues

Motor issues are a central component to understanding the impairment of daily living for the AS population (Asperger, 1991; Borremans, 2010; Gaus, 2007; Gillberg, 1989; Kanner, 1943; Manjivona, 1995; Noterdaeme, 2010; Price, 2012; Schultz, 2010; Volkmar, 1995). The motor problems involve various areas of ability including walking, ball and coordination skills, balance, dexterity, handwriting, movements and rhythm. The pervasive nature of these problems

causes significant difficulty that branch beyond the specific areas of dysfunction (Gowen & Miall, 2005).

I suffered from the aforementioned motor clumsiness. I had trouble with balance... coupled with existing uncertainty caused frequent misjudgment... this caused a lack of confidence... no adult around me know that these issues were physiological. They interpreted the issues as based entirely on fear, and not knowing any better, I believed this too. (Carley, 2008, pg. 95)

Examples of the affected abilities are that the AS individual has an unusual, stiff, and awkward gait (Williams, 1995), poor coordination and timing difficulties when throwing and kicking balls (Carley, 2008), deficits in the ability to stand on one leg (Grandin, 1992), difficulty in tying shoelaces or eating with utensils (Attwood, 2007), inability to handwrite neatly and with consistency (Gaus, 2007), and insufficient ability to play musical instruments in groups (Attwood, 1998; Asperger, 1991). A major consequence of these dysfunctional abilities is the exclusion of the AS person from the social arenas of team sports and activities, which can further destroy confidence and increase social isolation. In addition to omission from such activities, poor handwriting skills have often, unfortunately, been an improper measure of intelligence and personality, which also causes much consternation. However, as research suggests (Price, 2012), the AS population can improve their motor skills over time and find appropriate activities that should suffice to increase confidence and counteract social isolation. And further, with the advent of technology, handwriting is of considerably less importance now that the use of typing and computers is so prevalent. This will also further increase their self-confidence and growth.

Sensory Issues and Physiological Concerns

Many AS individuals agree that sensory issues are the primary challenge in their daily lives. "Sensory issues are a daily issue" (Grandin, 2011, pg. 86). Many typical individuals,

professional and non-professional, find difficulty accepting sensory issues and the physiological concerns that arise in this population because they themselves do not experience it personally. It is altogether another sensory reality, that to the non-AS person seems foreign, unusual, and excessive (Gaus, 2007). However, research has suggested, as well as the autobiographical accounts of AS adults and young adults, that sensory problems are real, tangible concerns (Attwood, 1998, 2007; Carley, 2008; Crane, 2009; de la Marche, 2012; Frith, 1991; Grandin, 2007, 2011; Kern, 2006; Lawson, 2009; Myles, 2005; O'Connor, 2008; Rimland, 1990; Simone, 2010a, 2010b).

People used to think that we felt less, felt nothing, were less human in some ways. Actually the opposite is true – we feel everything, we smell everything, we hear everything... and we sense things others can't. (Simone, 2010a, pg. 35)

The most common sensitivities involve sound, light, touch, taste, smell, and pain and temperature. Auditory issues are a major source of challenges for AS people. Sounds such as dogs barking, telephones ringing, laughing, clapping, and lawn mower engines can cause extreme anxiety and the need to remove oneself from the situation until the source of the disturbance has been eliminated (Zaks, 2006).

Another characteristic associated with sensory difficulties is distorted visual perception, specifically light sensitivity. Bright lights, especially fluorescent fixtures, can be blinding and painful. This is due to the fact that they flicker and hum at a rate AS individuals can detect when others cannot (Grandin, 2008; Simone, 2010b). Often headaches, dizziness, lack of concentration and behavioral situations occur as a result.

Tactile sensitivities, or touch, are also a significant concern. Many individuals, due to this issue, are diagnosed with AS because of their inability to be hugged and held. "From as far

back as I can remember, I always hated being hugged, it was just too overwhelming” (Grandin, 1996, pg. 58). Typical people find many different types of touch comforting and pleasurable, such as hugs, kisses, handshakes, and friendly touches on the arm during conversation, or new and different types of clothing. These circumstances can be an uncomfortable nightmare to the AS individuals that have difficulty with adjusting to differentiating pressures and textures (Willey, 1999; Zaks, 2006).

Many also report sensitivities to the taste and textures of foods. Because of this, many adults have a very restricted diet consisting of the same ingredients made in a consistent manner (Attwood, 1998). “I had a big problem with food; I was super-sensitive to the texture... I liked to eat things that were bland and uncomplicated” (Barron & Barron, 1992, pg. 96). Some people prefer crunchy, bright foods, while others prefer intensely spiced foods. The common thread is that individual preferences are very limited and can cause extreme discomfort, pain, and anxiety if altered from the usual, expected presentation (Shore, 2001).

AS people often describe certain smells and odors to be very overpowering. In addition to the smell of certain foods, other smells such as perfumes, car exhaust, chemical cleansers, and personal hygiene items can cause significant distress and physiological reactions. Although individuals with this issue can take measures to purchase and use only products that are properly attuned to their sensitivities, there are many times where circumstances are unavoidable, such as group gatherings and the work environment. This lack of control over sensory overload can generate extreme unease and torment (Lawson, 2005).

Many individuals have sensitivities to pain and temperature. Many times they have exceptionally high thresholds for pain and are unaware of the physiological dangers (Attwood,

1998). There is also a tendency to have *broken internal thermostats*, and may insist on wearing sweaters in the summer and shorts in the winter. They often report feeling fine and feel that nothing is wrong. However, it can be exceedingly detrimental to the AS person to demonstrate minimal, or at times exaggerated, responses to pain and discomfort due to serious physiological consequences if avoided (Bromley, 2004).

As mentioned previously, sensory issues are a daily challenge for the AS population. Although many typical people, professionals, family, friends, and others may not understand the motivations behind the reactions and increased inflexibility, it is vital for the individuals to reduce the impact of the challenges in order to function properly on daily basis. With education and awareness by the AS person and his/her supporters, environmental changes can correct many of these problems (Carley, 2008). In addition, as Zosia Zaks (2006) suggests, it is highly important to carry a *Sensory Emergency Kit* consisting of sunglasses, music devices, ear plugs, masks, snacks, tactile items and distractions that can assist in reducing the effects of overwhelming environmental stimuli. Valerie Paradiz, PhD (2009) also suggests that AS individuals must become aware of their surroundings to learn which environmental triggers will cause them difficulty. Paradiz describes this as a *Sensory Scan*. Once an individual has scanned his/her environment, he/she can determine the appropriate sensory needs and preferences. This allows the individual to *self-advocate* for his/her sensory needs. For example, if loud, crowded spaces are a concern, then the AS person can request a quiet restaurant or location to spend time with someone. Or, if fluorescent lighting is a problem, the person can offer to bring in his/her own lamp as an alternative to the overly flickering and humming light. By advocating for one's own needs, it can reduce the anxiety and distress associated with inordinate sensory issues.

Cognitive Issues

Cognition is defined as the acquisition of knowledge (Matlin, 2007). The use of this knowledge involves complex, higher-order processes, such as attention, decision-making, visual imagery, language, problem-solving, working memory, and planning. These processes are known as executive functions. Executive functioning describes the ability to implement these higher-order processes that are necessary for prioritizing and organizing one's internal thoughts and external environment (Ozonoff, 1995). Executive functions, and their proper functioning, are a crucial component in allowing for flexibility of thoughts and behaviors in response to constantly changing internal and external contexts (Gowen & Miall, 2005; Stuss, 1992). They allow us to self-regulate our behavior. For example, they allow us to make plans, keep track of time, multitask, incorporate past knowledge into current discussions and situations, evaluate and reflect, change our minds, seek assistance, and engage in group activities. We use executive functions every day in a variety of circumstances.

As previously described, many of these processes for the AS individual are either compromised or functioning differently than the typical population. This means that AS individuals have a reduced ability to assimilate knowledge and information about their daily lives. This reduced ability in higher-order functions is known as executive dysfunction (Minshew & Williams, 2007). As Hill and Bird (2006) explain, executive dysfunction is the central component to Asperger's Syndrome.

Originally, executive dysfunction was developed out of the research associated with symptomology discovered in individuals with traumatic brain injury and lesions (Damasio & Mawer, 1978; Lawson, 2009; Posner & Peterson, 1990). The injuries and lesions were

specifically located in the frontal lobe region of the brain. Researchers noticed that the symptomology of acquired frontal lobe damage and autism spectrum disorders were extremely similar in their presentations (Kenworthy, 2008). This prompted a considerable amount of research over the last thirty years concerning executive dysfunction, the frontal lobe region, and ASD's, specifically Asperger's Syndrome and has been established as a concrete, robust theory (Attwood, 1998, 2007; Dawson, 2009; Frith, 2003; Gaus, 2007; Grandin, 2011; Hill & Bird, 2006; Kanne, 2010; Kenworthy, 2008; Lawson, 2009; McCrimmon, 2012; Minshew & Williams, 2007; Ozonoff, 2005; Pennington & Ozonoff, 1996; Roy, 2008; Soufer, 2011).

Whereas individuals with traumatic brain injuries or lesions involving the frontal lobe region of the brain, presenting executive functioning errors, are acquired disorders, why do individuals with AS also have these symptoms? The answer lies in the brain structure, brain activity, and neural system of the AS individual. AS people are born with neurological abnormalities in the functional connectivity of coordinated brain regions. This concept, called the *Underconnectivity Theory* (Just, 2004), suggests that the degree of synchronization of the activation between the frontal and posterior brain regions is significantly reduced in AS individuals versus the typical population (Just, in press). Although this was first observed in a language comprehension task, it has also been reported in a variety of other tasks (Damarla, 2010; Kana et al., 2006, 2007, 2009; Mason, 2008). The *Underconnectivity Theory* follows the reasoning for executive dysfunction by suggesting that the abnormal neural development that causes poor connectivity creates a communication breakdown with the frontal areas that perform functions with other cortical regions (Kenworthy, 2008; Miller, 1999; Morrison, 2012; Stuss & Benson, 1984). This breakdown consequently reduces the flow of information between the frontal and posterior regions and back resulting in substantial deficits. There is, therefore, not

proper feedback of information to the regions of the brain that executes the actions (Gowen & Miall, 2005; Szelag, 2004).

This suggests that even though the cortical regions' interconnectedness comprises the functional network for cognitive control, the lack of monitoring feedback from neural underconnectivity contributes to the aforementioned substantial deficits causing the *inflexibility* in the cognition of the AS individual (Nelson & Narens, 1990, 1999; Shimamura, 2008).

Cognitive flexibility is the ability to perceive, respond, and adjust to differentiating mental and environmental contexts to assist goal attainment and planning (McCrimmon, 2012). Therefore, *inflexibility* is the inability to properly adapt to changing situations and thoughts. For example, individuals with AS have a tendency toward perseveration, one-track mindedness, difficulty in quickly moving from one topic to another, difficulty in quickly moving from one visual cue to another, a failure to generalize from one situation to another, and not learning from past mistakes (Attwood, 1998; Gaus, 2007). Individuals with AS will continue to use old rules for new situations even though they are given feedback that the old rules are no longer correct (Rumsey, 1985). This has led many, professionals and others, to refer to these individuals as *rigid* in their thinking and actions (Attwood, 2007).

Rigidity in both behavior and thinking is a major characteristic of people with Asperger's. They have difficulty understanding the concept that sometimes it's okay to break a rule. I heard about a case where an autistic boy had a severe injury but he did not leave the school bus stop to get help. He had been taught to stay at the bus stop so that he would not miss the bus; he could not break that rule. Common sense would have told most people that getting help for a severe injury would be more important than missing the bus. But not to this young man. (Grandin, 2011, pg.43)

What do all of the characteristics of rigidity and cognitive flexibility, and by extension those of executive dysfunction, have in common? All of the deficits are due to temporal perception and

temporal processing issues at the neural level. Literally, they have an abnormal *internal clock* and cannot accurately estimate time (Meck, 2005; Wing, 2002). As Szlag (2004) suggests, complex functions which are usually severely disturbed in autism spectrum disorders, and AS, are rooted within temporal constraints. In other words, if an individual has an innate, neurological inability to appropriately mark time, he/she will have difficulties negotiating moving objects, judging when to enter a conversation, and transitioning from one situation to another. Because of this timing deficit, AS individuals have a tendency to do the same tasks, eat the same foods, and speak about the same topics repeatedly because they can more easily predict the outcome. This situation is similar to a blind individual's necessity for strict organization in his/her physical space. If items are out of their usual place, it can be confusing and even dangerous. For the AS individual, being temporally out of sync with his/her environment can be equally jarring and detrimental to his/her safety.

Furthering the idea of a temporal component in perception and processing at the neural level, recently, researchers have determined that timing-specific neurons indeed exist. And, these neurons exist within the frontal lobe, specifically the prefrontal cortex, which is the area of the brain that has been established to cause deficits in AS individuals. These timing-specific neurons essentially stamp representations of time and encode the information for retrieval at a later date (Jin, 2009). Therefore, time is encoded as part of the infrastructure of neural representations of events and actions. In other words, every action that we take and thought that we have is dated and filed in our brain so that we know when, where, how, and why it happened because we can retrieve the information. This allows us to control and monitor actions and thoughts because all of the elements necessary to form new associations are available (i.e.: letting go of old rules when they no longer work) (Jin, 2009). The researchers suggest that the

findings are invaluable for determining strategies to improve timing deficits in clinical populations. Because, as it appears from the research presented, the major characteristics of AS (social issues, communication problems, narrow interests and rigid routines, motor skills, and sensory concerns) have roots in improper and abnormal internal timing (Price, 2012; Szlag, 2004).

It has been established that the higher-order, executive functioning abilities are supported and executed within the frontal lobe region of the brain. It has also been established that the timing-specific neurons, and their accompanying neural system, function in that region as well. And, due to the underconnectivity of the infrastructure of the frontal lobe region with other cortical regions of AS individuals, the control and monitoring of actions and thoughts is compromised. This lack of proper neural feedback causes the executive dysfunction, which includes cognitive inflexibility and temporal perception and processing issues. It can, therefore, be posited that individuals with AS have an innate, neurologically-based lack of ability to properly manage time and make appropriate plans, thereby, negatively impacting their daily, personal, social, and occupational lives. And, that in order to correct this deficit, alternative cognitive strategies that facilitate appropriate planning strategies to successfully execute goals must be implemented. In order to identify the correct cognitive strategy, it is first necessary to understand how the ineffectual planning of the AS individual manifests psychologically, physiologically, and sociologically.

The Planning Fallacy

If you want your last day in this world to be a good one, positive, triumphant, and inspiring to all who witness it, then you must work now to make that a certainty... Planning is your greatest friend. (Newport, 2001, pg. 289)

Individuals need to manage time to be able to plan and execute actions in relation to personal goals and environmental demands (Davies, 2002). And, as previously discussed, individuals with AS have difficulties with timing and temporal processing. However, there has been little clinical investigation of time perception and individuals with autism spectrum disorders (ASD) or AS. This is perhaps surprising since evidence from a variety of sources suggests that individuals with ASD and AS have an impaired ability to accurately perceive time (Martin & Poirier, 2010). Clinical accounts often report difficulties which relate to the judgment of time (Boucher, 2001). Various behaviors have been demonstrated by people with ASD and AS in processing time difficulties, such as the desire to be reassured about future events (and when they will occur), and the distress caused by unexpected changes to plans (Wing, 1996). In addition, the performance of people with ASDs on certain cognitive tasks that relate to the passage of time (chronological, autobiographical memories) are consistent with temporal processing difficulties (Bennetto, 1996; Poirier and Martin 2008). Because of this, time management is exceedingly demanding (Attwood, 2007; Gaus, 2007; Janeslatt, 2009, 2010; Norall, 2009; Sicile-Kira, 2008). Research conducted by Janeslatt (2010) demonstrated that of the main temporal processing concerns, time management was the most challenging for AS individuals. It seems that many AS people have trouble understanding how much time has passed and how long a designated activity will take.

Consequently, planning is an extremely challenging endeavor. Planning requires the creation of a series of steps that are necessary to reach a desired goal or outcome (Morris, 2005). “Planning is not a strong suit for most of us” (Meyer, 2001, pg. 98). This sentiment is widely reflected within the AS community. Not simply because it takes a remarkable amount of hard work and thought processes, but also because without the ability to determine and produce time

duration, it is virtually impossible to appropriately make a plan to complete a task. An interview with a parent of an AS individual yielded the following: “My homework will take a half an hour’, says your Asperger’s child, when it’s obvious to you that it will take at least an hour, if not longer” (Norall, 2009, pg. 284). According to many self-reports, family-reports, and research studies, AS individuals have a tendency to underestimate how long a task will take (Gowen & Miall, 2005; Martin, 2010; Szelag, 2004). This constant underestimation of the duration of tasks is known as *the planning fallacy*.

The planning fallacy is an optimistic bias in which people make overly conservative time estimates for task completion although they are fully aware that similar tasks have exceeded predicted timetables in the past (Griffin & Buehler, 1999; Kahneman & Tversky, 1979, 1982). This phenomenon has been widely studied and is considered an extensively robust theory due to its presence in large scale commercial projects, construction, academics, technological endeavors, filing taxes, and day to day activities (Buehler, Griffin, & Ross, 1994). A classic example of the planning fallacy is the construction of the Sydney Opera House. The original estimate made in 1957 stated that the project would be finalized in the early part of 1963 for approximately seven million dollars. However, a markedly scaled-down version of the original plan was completed in 1973 at the cost of one hundred and two million dollars (Hall, 1980). There exist countless examples with the same results: the Canadian transcontinental railway, the Channel Tunnel between France and England, San Francisco’s Bart System, and many others (Hall, 1982). And as Buehler and his colleagues suggest, this phenomenon occurs not only in mega-construction projects, but in smaller undertakings and everyday events.

For example, a professor brings home a giant stack of work on Friday with the full intention of its completion by Monday morning. However, the professor has never completed

more than a small fraction of the stack on any previous weekend. This demonstrates that the planning fallacy causes people to seemingly hold two contradictory beliefs: one, that their previous time estimations have been overly optimistic, and two, that their current time estimations are perfectly realistic (Buehler, Griffin, & Ross, 1994). For the AS population, this inaccurate time estimation also holds true. For instance, research conducted by Martin, Poirier, and Bowler (2010) demonstrated that AS individuals were less accurate at time reproduction and more variable in their responses than the matched typical comparison group. The individuals in the study were furnished with computer programs that began with the auditory presentation of one tone. Then, the word *wait* appeared for 2,000 ms in the center of the screen. A second tone was then presented along with a button in the center of the screen containing the word *stop*. The participants were required to reproduce the study tone duration by clicking the *stop* button with the mouse when they determined that the duration of the second tone was equal to the study tone. Participants were given feedback concerning whether their reproduced tone was too long or too short, and by how much (in seconds or fractions of seconds). Specifically, the results determined a statistically significant difference between the AS group and the typical group, and that the AS individuals continually underestimated the time durations even though they were given the proper information on how to alter their time perception, processing, and estimation.

As described, the planning fallacy can occur for anyone due to the belief that his/her skills and talents are superior to actual reality, stress and pressure to complete a task in a finite time period, and/or inappropriate, unrealistic financial constraints. But, for AS individuals, the planning fallacy and its inaccurate completion times are due to an innate, neurological timing deficit, not unrealistic cognitions. It is more serious than attempting to complete extra work over a weekend, expecting to finish holiday shopping early but waiting until the last minute (Buehler

& Griffin, 2003), choosing a candy bar for 0.2 minutes longer than assumed (Burt & Kemp, 1994), or building a computer stand for an extra 25 minutes than intended (Byrum, 1997). If AS individuals allow the planning fallacy to continue, it means a loss in the functioning of their daily lives, their support systems, and their community. Considering that the planning fallacy exists for typical people, the fact that AS individuals have an innate, neuropsychological dysfunction with timing, time management, planning, and the planning fallacy, makes it even more difficult to correct this bias. And, the ability to appropriately estimate task duration is vital in daily functioning, social situations, and especially the world of employment.

Self-Employment

For people with AS, self-employment can be an excellent way to make a living and be part of the working world. For me, that world has been my savior. Without work of some sort, life would become small and unsatisfying for me. (Grandin, 2008, pg. 149)

Being unemployed *is* extremely difficult. Unemployment not only means a lack of income, but it also means a lack of purpose, daily structure, self-worth, and self-identity (Attwood, 2007). According to the Autism Society of America, the unemployment rate of individuals with disabilities is much higher than that of those without. Only 21% of adults with disabilities participated in the labor force as compared with 69% of the non-disabled population (Bureau of Labor Statistics, 2010). These numbers are consistent with many reports citing that 80% of teens and adults with ASD's are unemployed (Dador, 2012; Lazar, 2006). These statistics are particularly difficult to absorb considering that so many people with AS are educated, hold degrees, have strong skill sets, and have highly specialized interests and talents. AS individuals excel in structured situations such as the academic world, but begin to lose focus

and become depressed in the less structured employment world. There no longer are professors, teachers, counselors, and/or family guiding AS individuals to do their homework, when to start a project, or how to finish an endeavor. The AS person is responsible for his/her own actions and employment situation. But, this responsibility for one's own employment can seem like an excruciating burden. This is due to the executive functioning issues, including planning, and all of the characteristics of AS that affect daily life. However, even considering all of these intense challenges, it is still important for the AS individual to find a suitable vocation because it provides intellectual satisfaction, a sense of identity, self-confidence, and a social community of like-minded people (Grandin, 2008). In order to create the types of employment opportunities necessary to achieve these goals, AS individuals need to exploit their greatest strength: their specialized areas of interest.

We can see in the [Asperger] person, far more clearly than with any normal child, predestination for a particular profession from earliest youth. A particular line of work often grows naturally out of their special abilities. (Asperger, 1991, pg. 88)

The special interests and routines which have been perceived by many to be a detriment can be utilized as an advantage. The AS individual has a unique ability to focus for extended periods of time on his/her special interest or topic. Using this passion as an employment opportunity will allow the AS person to maintain interest and remain intellectually anchored to the project at hand (Simone, 2010b). In other words, working in one's area of interest is a huge motivating factor for individuals with AS (Hendrickx, 2008). Of course, for anyone, doing something that you love and enjoy is important; especially considering how much time is spent on the job. However, for many AS people, their job is an activity that fulfills a sense of identity and is a connection to the social world (Sicile-Kira, 2008). And, the individuals that utilize their special

interests and talents will have the most satisfying job experience and make the best adjustments in life. As Temple Grandin explains; “I am what I do” (Attwood & Grandin, 2006).

Using one’s special interest to provide lasting job satisfaction, and by extension self-confidence and active socialization, is a vital initial step. But, what about an AS individual’s difficulties with social interaction, communication, motor skills, and sensory issues? These issues can be very challenging to accommodate in the workplace and can be overwhelming, even if one self-advocates for his/her needs. To avoid confusing office politics, overly stimulating small talk, sudden noises, fluorescent lighting, constant distractions, and a variety of other equally difficult situations of the workplace environment, self-employment can be a viable alternative (Attwood, 2007; Grandin, 2008, 2011, 2012; Hendrickx, 2008; Lazar, 2006; Meyer, 2001; Robison, 2008; Sicile-Kira, 2004, 2008; Simone, 2010a, 2010b; Zaks, 2006).

People with disabilities already have a proven track record of self-employment and are nearly twice as likely to pursue self-employment as other Americans (Grandin, 2011). And this makes perfect sense. AS individuals are free to pursue their special interests, get paid to do it, and get to leave the difficulties of the workplace behind. Although the social pressures of the workplace are gone, there are fewer interruptions, and an individual can work at his/her own pace, there are challenging responsibilities to self-employment (Zaks, 2006). Self-employment involves setting priorities and goals without a supervisor urging for task completion. Of course, with any employment or business venture, associated risks go with the territory. It is important to take the potential concerns into account before proceeding.

Self-Employment and It's Challenges

Traditionally, an individual's occupational path has been marked by a linear progression of job commitment, promotions, and company loyalty (Prottas, 2006). However, due to the present economic, social, technological, and globally competitive environment, an increasing number of individuals work under alternative organizational arrangements and are of a rapidly changing demographic (Sullivan, 1999). As full-time employment at a single company or corporation has become less applicable, these individuals find themselves responsible for the management of their own occupational goals (King, 2004). This can introduce these individuals to many newly discovered interests and rewarding achievements that they were unable to fully realize within the confines of the prior work situation. Previous research has suggested that because of the broader opportunities experienced and the lessened constraints and pressures of traditional occupational environments and commitments, these individuals, the self-employed, demonstrate higher levels of job satisfaction and autonomy (Prottas & Thompson, 2006).

An increased degree of satisfaction has an enormous positive impact on the psychological and physical well-being of self-employed individuals (Kahn & Byosiére, 1992). A study conducted by Ettner and Grzywacz (2001) demonstrated that self-employed workers were significantly more likely (25% more than their traditionally employed counterparts) to report positive effects of their jobs on their physical and psychological health. But, as the research also suggests, being self-employed is a double-edged sword. Although self-employed individuals report increased satisfaction with their occupational choices and life decisions, they also tend to have increased levels of stress as a result of excessive day-to-day demands and responsibilities (Prottas & Thompson, 2006).

Although stress can serve as a catalyst for positive physical and emotional change and growth, it is more often associated as a precursor to negative physiological and psychological processes. The response to chronic workplace stress can lead to, among other symptoms, an overexposure to the hormone cortisol (Epel, McEwen, & Ickovics, 1998). Cortisol is a glucocorticoid hormone secreted by the adrenal gland effecting numerous behavior and cognitive functions within the brain (Erickson, 2003). Constant exposure to elevated levels of cortisol concentrations can lead to physiological and cognitive consequences including neural atrophy to the frontal lobe and the prefrontal cortex (Erickson, 2003). As previously discussed, the prefrontal cortex is the portion of the brain which governs the complex cognitive executive functions including problem-solving, working memory, and decision-making (Liston, McEwen, & Casey, 2008). For self-employed individuals in the work environment, a reduction in these activities would result in a significant decrease in their ability to properly maintain organization of business functions and obligations in the following respects: failing to incorporate past experiences to present tasks (cognitive inflexibility), sustaining an overly optimistic view of abilities and skills (rigidity), being unwilling to fully commit to the project's completion (time management issues), and being unable to cope with the nature of the client/worker relationship (social issues). A deficit in the executive cognitive process of working memory leads to an increased tendency to neglect previous experiences as relevant to current circumstances (Buehler, Griffin, & Ross, 1994; Pezzo, Pezzo, & Stone, 2006). Many self-employed people determine that past experiences have little or no effect on decisions concerning future events because they incorrectly recall the circumstances as due to external factors: the fundamental attribution error. People take credit for positive outcomes and attribute negative outcomes to external factors regardless of the true origin. Although people are capable of objectively

recognizing others distortions of historical accuracy (MacDonald & Ross, 1999), these individuals have difficulty learning from prior experiences because of a tendency to view themselves in positive manners (Pronin, Lin, & Ross, 2002). And because self-employed individuals desire to view themselves in the brightest possible light, they are inclined to adopt the best case scenario for future events. Ignoring the possibility of learning from past events, these individuals continue to repeat the same errors (perseveration) and give themselves a false sense of optimism concerning their abilities and skills (Koole & van't Spijker, 2000).

This executive functioning error concerning decision-making results in overconfidence (Dougherty, 2001; Kahneman & Lovallo, 2003). Many research studies support the fact that people are systematically overconfident about the accuracy of their knowledge and judgments. The extent to which overconfidence occurs depends significantly on the difficulty of the task (Klayman, Soll, Gonzalez-Vallejo, & Barlas, 1999). And for self-employed individuals, the difficulty of the task can be enormous given the responsibilities of the business and the project itself. The more confident people are, consequently, the more overconfident they tend to be, and overconfidence exceeds accuracy of skills and abilities. The effects of overconfidence coupled with errors in recalling past experience contributes to the executive functioning cognitive processing difficulty in problem-solving. This difficulty is involved in the area of project commitment.

Commitment has been characterized by a psychological link between the individual and the task at hand (Mathieu & Zajac, 1990). Commitment has become more important as the workforce has become more *specialized* and ties to traditional organizational arrangements have become increasingly uncertain (Lee, Carswell, and Alien, 2000). As workplace organization changes, occupational commitment becomes more vital because it is directly linked to the

development of high-level performance in the chosen field of concentration. This requires countless hours of focused work in a particular project (Ericsson & Lehmann, 1996). After prolonged exposure to the same surroundings and the same experiences, many people may find themselves unable to cope. This is especially true for those self-employed individuals. Many self-employed individuals who have not taken the past into account and are overconfident may become overwhelmed and unable to cognitively commit to the project's completion. And because of the contingent nature of the arrangement, self-employed individuals are less committed than traditional employed individuals and may choose to decrease work performance and "cut corners", decrease presence on the project, or leave the project incomplete (Felfe, Schmook, Schyns, & Six, 2008).

Because of the severity of the situation, many self-employed people find themselves in difficult relationships with their clients (Gallagher & Parks, 2001). Their clients question the work, payment schedule, and material usage and may become emotionally charged. And as previously discussed, self-employed individuals tend to succumb to the fundamental attribution error and are seemingly unaware of their role in the failing of a project. They are unconscious of reasons for the difficulty associated with their clients. Many self-employed people then begin to avoid detrimental conflicts with their clients from the beginning by being far too conservative in the initial phases of planning in order to be socially accepted and conduct more favorable interactions (Pezzo, Pezzo, & Stone, 2006). The more times that the self-employed individual conducts business this way, the less chance he/she has to learn from his/her mistakes, thus perpetuating the cycle. This cycle of behavior caused by the executive functioning cognitive processing deficits associated with self-employed individuals' increased level of responsibility

and stress leads to the aforementioned issue of the planning fallacy, or the inaccurate, and continual, underestimation of time duration.

Self-Employment and the AS individual

It has been demonstrated that the stresses of self-employment cause cognitive processing difficulties with executive functioning, including a reduced ability for accurate planning. These executive dysfunctions, and planning deficits, are identical to those innate to the AS individual. Both the self-employed person and the AS individual have frontal lobe issues, from excessive stresses and innate dysfunction respectively, resulting in problem-solving, working memory, and decision-making difficulties as well as social issues, cognitive inflexibility, rigidity, and perseveration. It may seem that adding self-employment stressors to the already existing neuropsychological functioning issues would be inadvisable. However, it was described that individuals who are self-employed have excessive stresses partly due to the intense specialization required as traditional employment arrangements change. It is increasingly vital to develop high-level performance and ability in one's chosen field that may require countless hours of focus, training, and work. This is where the AS individual has the advantage. In many cases, they already possess the high-level, specific knowledge necessary to dedicate and commit to projects completed on one's own timeframe. In addition, the level of focus required to complete the projects is an innate characteristic of the AS person that can be used as an important strength in this situation. For the typical person that is self-employed, the level of focus, occupational specialization, and work commitment causes overly excessive stress that makes this employment choice extremely difficult. But, for the AS person, utilizing one's special interest and talent allows self-employment to be a viable option by alleviating a major component associated with self-employment cognitive stresses.

In order to achieve this, some researchers and authors have suggested that to be successful in a self-employment venture, one needs to have assistance in the planning, organization, and time management processes (Attwood, 1998; Grandin, 2011; Lawson, 2009; Lazar, 2006; Zaks, 2006). In other words, someone will take on the responsibility of executive functioning so that the AS individual can complete the given task or project. But, this is not the answer. Not all AS people have others to assist them, and further, they should be able to lead independent, successful lives using their own cognition and talents. Therefore, in order to make self-employment a truly successful endeavor for the AS person, the executive functioning difficulties involving planning, time management, and time estimation need to be addressed.

Generally, there has been little progress in improving planning, time management, or time estimation. Much of this research concentrates on specific raised by the planning fallacy instead of addressing and correcting the underlying cause: dysfunctional executive cognitive processes. The few studies that showed any improvement at the group means level did not demonstrate an overall reduction in error (Roy, Christenfeld, & McKenzie, 2005). Attempts by researchers to rectify the incorrect estimation include the following: listing possible surprises and interruptions to task (Byrum, 1997; Hinds, 1999), breaking task into component parts (Byrum, 1997; Connolly & Dean, 1997), making predictions for others actions versus self (Buehler, Griffin, & Ross, 1994; Byrum, 1997; Ross, Buehler, Koehler, & Griffin, 2000), scenario-thinking (Byrum, 1997; Connolly & Dean, 1997; Newby-Clark, 2000), individual probabilities versus aggregate frequencies (Griffin & Buehler, 1999), remembering the past (Buehler, Griffin, & Ross, 1994; Hinds, 1999), and implementation intentions (Koole & van't Spijker, 2000). Implementation intentions have been proven to be effective in correcting the time estimation difficulties associated with executive dysfunction and the planning fallacy.

Implementation Intentions

Good Intentions have a bad reputation. (Gollwitzer, 1999, pg. 493)

People have intentions to do things all the time. People even have *good intentions* to do these things. Such things may include going on a diet, taking out the garbage, not being late for work, completing a project on time, or even the infamous New Year's resolution. But, most times, intentions are simply not enough. It takes a much more specific, cognitively accessible plan of action to complete the intended goals.

Metacognition

Metacognition is defined as the monitoring and control of cognitive processes (Matlin, 2007). Metacognition is fundamental for the management of our perceptions, thoughts, memories, and actions (Shimamura, 2008). According to Nelson & Naren's (1990, 1994) influential model of information processing, metacognition is described as the reciprocal exchange of information between the object-level and meta-levels of cognition. The object-level of this model governs the actions and facts of the current situation or environment (monitoring). The meta-level supervises and evaluates the information received from the object-level (control) creating a model or representation of the goal, task, or intention. Through monitoring, the meta-level is informed concerning the current state of the object-level, and, through control, the object-level is informed by the meta-level how to proceed in order to achieve the set goal represented in the meta-level (Achtziger, et al., 2012). With the addition of Shimamura's (2000) neural description of Nelson & Naren's (1990, 1994) model, it offers a more concrete understanding of the effects of metacognition on actions and behaviors and desired goals and intentions.

Shimamura has described the object-level portion of the information processing model as being located within the posterior parietal cortex (PPC) of the brain. This section of the brain governs visual and visiospatial functions as well as long-term recollection of autobiographical memories (Berryhill, 2007). This makes perfect sense considering that the object-level is responsible for the information, facts, and actions that individuals take in from their present and current environments and situations through sensory input. Shimamura has also described the meta-level portion of the information processing model as being located within the pre-frontal cortex (PFC) of the brain. The PFC, as described in previous sections, oversees executive functioning. The meta-level supervises and evaluates incoming information. The process of supervision and evaluation *is* executive functioning and is integral to the decision-making, problem-solving, and planning of goals and intentions (Kahan & Simone, 2005).

Essentially, individuals move through the world updating what is going on and adjusting their actions as a response to their continually changing environment. This behavior and process is known as *self-regulation* (Bandura, 1989; Carver & Scheier, 1981; Metcalfe & Mischel, 1999). Self-regulation comprises the monitoring and controlling model described and its subsequent behaviors of changing our thoughts, emotions, impulses, and performance as a result (Baumeister, Heatherton, & Tice, 1994). The metacognitive process of self-regulation, therefore, coordinates and manages the cognitive, affective, and volitional processes necessary to accurately and appropriately moderate one's behavior toward his/her goals and intentions and is a crucial component in effective human functioning. This process functions well for typical individuals. However, it has been established that executive functioning difficulties are caused by PFC deficits and individuals with AS have PFC issues. And, because the self-regulatory process cannot occur without proper executive, meta-level, functioning to initiate the flow of

information to the object-level and back, the metacognitive strategies of monitoring and control involved in self-regulation are compromised in the AS individual. And, due to the stresses associated with self-employment, these individuals' self-regulation is compromised as well. Despite these neural difficulties, it has been suggested and robustly established, by the extensive research of Peter Gollwitzer and his colleagues, that a means to bypass this neuropsychological processing deficit is available. Forming implementation intentions creates a self-regulatory strategy that compensates for executive dysfunction (Gowrilow, et al., 2011), lasts over extended periods of time (Oettingen & Gollwitzer, 2010), and works for a wide variety of life experiences (Achtziger, et al., 2012). Implementation intentions, therefore, are the most viable, appropriate strategy to bypass the neuropsychological planning deficits associated with self-employed individuals and AS individuals.

Implementation Intentions

The idea of intention is fundamental in explaining goal striving (Bandura, 1991). Research on goal striving suggests that goal intentions are depicted as immediate precursors to goal attainment. However, much of this work has been concerned with the formation of intentions and not on the intervening effects of the intentions on corresponding behavior (Brandstatter, Lengfelder, & Gollwitzer, 2001). Researchers discovered that forming intentions was only one aspect of successful goal attainment (Gollwitzer, 1990). Many issues interrupt the process of goal achievement: procrastination of goal-directed behavior, simultaneous goal intentions, or interruption of goal pursuit (Gollwitzer, 1996). Individuals must make appropriate opportunities for initiating goal-directed behavior in order to achieve the desired goal. This act of free-will in initial goal intention is evident in Bandura's (1986) investigation of self-regulation

and goal theory which suggests that goal motivation is a cognitively-based mechanism which governs the selection, activation, and sustained direction of behavior toward certain goals.

Extending the concept of free-will and intention, Gollwitzer (1993, 1996, & 1999) suggests implementation intentions. *Implementation intentions* involve cognitive and metacognitive processes which specify the behavior and situation necessary to achieve the given goal (structured as If I encounter X, then I will perform behavior Y, in order to reach Z), whereas goal intentions only specify what an individual wants to achieve (structured as I intend to reach Z) (Sheeran, Webb, & Gollwitzer, 2005). Consequently, implementation intentions are metacognitive processes which cause the mental representation of a given situation or project to become highly activated and thus easily accessible by creating concrete action plans that specify where, when, and how to act (Aarts, Dijksterhuis & Midden, 1999; Gollwitzer, 1998; Koole & van't Spijker, 2000). The result is that the initiation of the intended behavior becomes highly automatic. This is exemplified by the process becoming immediate and efficient with a lack of awareness by the individual (Bargh, 1992, 1994). As Bargh and Chartrand (1999) discuss in *The Unbearable Automaticity of Being*, the external environment is capable of directing behavior unconsciously through a process of perceiving activity that automatically elicits certain behavioral tendencies. Bargh and Chartrand's research corroborates Gollwitzer's theory of implementation intentions by explaining the cognitive mechanisms that underlie the process: once the environment (situation X) has been confronted, an immediate, automatic tendency (behavior Y) is evoked, leading to an expected result (goal Z).

In terms of the planning fallacy, implementation intentions allow individuals to overcome optimistic biases in completion times by altering cognitions of the situation to produce new behaviors that generate the aspired objective. For example, Koole and van't Spijker (2000)

conducted a study that sought to employ implementation intentions to reduce unrealistic optimism in specific task-completion predictions by initiating goal-directed behavior and by reducing the number of interruptions during the execution of the goal. To address this, the researchers adapted the report assignment model developed by Gollwitzer and Brandstatter (1997). The researchers gave the participants the assignment to write a report regarding a particular day in the near future. As in Gollwitzer and Brandstatter (1997), one half of the participants were asked to form implementation intentions concerning where and when to write the report (implementation intention condition). The remaining participants were simply requested to write the report. Immediately following this manipulation, participants were asked to predict their completion times (goal intention condition). Participants then recorded their actual initiation and completion times for the given assignment. The analysis of the 2 (condition: implementation intention or goal intention) x 2 (action phase: initiation or completion) x 2 (type of measure: prediction or behavior) mixed-model ANOVA, with repeated measures on the second and third factors revealed that participants in the implementation intentions condition reported faster predicted and actual completion times than the goal intention condition. In addition, the participants in the implementation intentions condition demonstrated a smaller optimistic bias as indicated by the difference between the predicted and actual completion times ($M=0.17$ versus $M=1.23$) and also reported fewer interruptions ($M=0.29$ versus $M=0.62$).

The results suggest that implementation intentions have a powerful influence on thought and action by allowing people to focus on the future: imagining where, when, and how they intend to work on a given task or project (Gollwitzer & Brandstatter, 1997; Koole, 2000). This is due to the fact that formation of implementation intentions expressly requires that people visualize the situation in which the goal-oriented behavior should occur. This action induces

individuals' will-power to commit to the intended behavior thereby enhancing the effectiveness of the implementation intention and reducing the amount of potential obstacles and interruptions. Gollwitzer and colleagues (2010) discovered that in order to maximize the effectiveness of implementation intentions, the visualization of the situation and the will-power to commit to the goal-oriented behavior can be enhanced by introducing and promoting specific, motivational mindsets to the initiation of goals and the formation of implementation intentions: upward counterfactuals, mental contrasting, and self-efficacy. Upward counterfactual thought is a metacognitive process that examines how a previous outcome could have been improved. Mental contrasting is a technique that identifies the differences between the current reality and the future, desired behavior in order to remove potential obstacles. And, self-efficacy refers to motivational self-speech which enhances an individual's confidence concerning the goal in order to improve his/her performance level. Just as with the formation of implementation intentions, upward counterfactuals, mental contrasting, and self-efficacy are produced in the mind as visual representations of the situations. These three mindsets enhance the effectiveness of implementation intentions by creating the statements using specific, representative good opportunities to act toward the desired goal, thus creating a powerful method to strengthen the motivational basis for goal completion.

Research (Gollwitzer, 2010; Koole & van't Spijker, 2000) demonstrates that the forming, initiation, and process of implementation intentions, with the addition of motivational mindsets, significantly reduce optimistic time predictions regarding the rates of goal completion and the number of goal interruptions. This reduction in optimism can end the cycle of negative behavior (failing to incorporate past experiences to present tasks (cognitive inflexibility), sustaining an overly optimistic view of abilities and skills (rigidity), being unwilling to fully commit to the

project's completion (time management), and being unable to cope with the nature of the client/worker relationship (social issues)) caused by the executive cognitive processing deficits in problem-solving, working memory, and decision-making associated with self-employed AS individuals' increased level of responsibility and stress. Implementation intentions are the solution to reducing the planning fallacy's optimistic bias in time prediction for the self-employed AS individual.

Implementation Intentions and the Self-Employed AS Individual

It has been demonstrated that implementation intentions are the most appropriate solution to bypass the neuropsychological planning fallacy of self-employed individuals with Asperger's Syndrome. The reason that this metacognitive strategy works so well is that it specifically requires individuals to *visualize* the situation in which the goal-oriented behavior should occur, creating immediate, *automatic* availability of the goal-oriented behavior. Meaning, higher-order thought is no longer a factor. The goal is presented, the mental representation is activated, the behavior automatically follows, and the goal is achieved. An automatic mental heuristic is thus created. This strategy works for all individuals, but the AS individual has an advantage here. AS individuals have an innate, incredible ability for visual thinking and mental representation (Attwood, 1998, 2007; Grandin, 1996, 2010, 2011, 2012; Kanner, 1951; Plaisted, O'Riordan, & Baron-Cohen, 1998; Sicile-Kira, 2004, 2008; Wallace & Happe, 2007). And, as previously noted, visual representations are elicited and created in the posterior parietal cortex (PPC). AS individuals do not have PPC deficits which allow them to create highly activated, easily accessible mental representations of goal-oriented behavior necessary to commit to and follow through with desired intentions. This is substantiated by Just (in press) who discusses that AS individuals tend to have a preferential visual information processing style most likely due to the

lack of availability of frontal cortex processing. They therefore increasingly rely on posterior parietal processing where visiospatial processing of autobiographical information is activated (Berryhill, 2007). This ability to readily retrieve visiospatial memories and information allows AS individuals to greatly benefit from the implementation intention strategy thereby affording them the opportunity to actively pursue self-employment.

I think in pictures. Words are like a second language to me. I translate both spoken and written words into full-color movies, complete with sound, which run like a VCR tape in my head. When somebody speaks to me, his words are instantly translated into pictures. Language-based thinkers often find this phenomenon difficult to understand, but in my job as an equipment designer for the livestock industry, visual thinking is a tremendous advantage. Visual thinking has enabled me to build entire systems in my imagination. During my career, I have designed all kinds of equipment, ranging from corrals for handling cattle on ranches to systems for handling cattle and hogs during veterinarian procedures and slaughter. I have worked for many major livestock companies. In fact, one third of the cattle and hogs in the United States are handled in equipment I have designed. Some of the people I have worked for don't even know that their systems were designed by someone with autism. I value my ability to think visually, and I would never want to lose it. (Grandin, 1996, pg. 1)

An Implementation Intention Example for Self-Employed Individuals with Asperger's Syndrome

Sam has Asperger's Syndrome. She is 25 years old and has been living at home since she graduated from college at the age of 21. She completed high school with good grades and graduated from college with respectable marks as well. Sam is a highly visual thinker and consequently always enjoyed art as it is her special interest. She majored in art history and studied painting techniques and architectural design. She felt lucky that during her college years, the historical section of the town was undergoing renovations and was fascinated with the entire process. She found herself using what she saw in town and incorporating that into her classwork and projects.

Sam thrived in the academic situations because her daily schedule was highly structured, her activities were known to her in advance, she was intellectually stimulated studying her special interest, and she had friends who also enjoyed the same interests and activities as she did. But, once she left school, she found herself unable to properly cope with the lack of structure and became overwhelmed and overstimulated easily by her environment, family, and the decisions of adult life. Although, she has always had a goal of finding a job that she loves, she has been unable to sustain employment. She has found that traditional employment situations have been very stressful because she was not interested in what she was doing and also found that she was constantly a step behind everyone else when attempting to make friends at work. Not to mention, the overhead lighting gave her terrible headaches and made it difficult to complete projects on time. Because of this, she quit her job and now lives at home aimless and depressed. The longer that she is unemployed, the more depressed she becomes. She feels like she has no self-worth, self-confidence, or self-identity. She also has no social life to speak of and has not had many friends since she was in college. Not since then has she felt like she had a purpose. The only thing that gives her any relief and pleasure is her special interest of art, painting, and studying different types of buildings. She spends countless hours reading about her interests in books and online. She also watches endless television programs on architectural design, residential renovations, and painting. She dreams of someday being able to work for herself in this field sharing her expertise with the world.

Sam is representative of many individuals who attend a GRASP (Global and Regional Asperger's Syndrome Partnership) peer-run support group in upstate New York's Hudson Valley region. Sam, and others like her, unbeknownst to them, has all of the components necessary to have a successful career as a self-employed person. Sam can use her special interest and extreme

focus to her advantage. And, since simply *intending* to get a job doing what she loves has not worked in the past, she needs to create a concrete, plan of action, capitalizing on her success in structured situations, to achieve her goal. Using the implementation intentions model with additional motivational metacognitive statements, Sam could reach her desired destination.

Sam has already made the *goal intention* that she wants to become a self-employed residential renovator and painter. In order to achieve this goal, she needs to create an *if, then* statement specifying the *where, when, and how* the goal will be pursued so that she can *visualize* it in her mind. For example, she could say, “*If* a renovation or painting project arises, *then* I will sit at my computer and write a project proposal and quote.” And, since she now has a plan already in her mind, ready to go, she can help herself by thinking about her goal and how she can accomplish it. She can think about things in relation to her goal such as, “I can do better in my life in the future than I have in the past”, “things are okay now, but will be better when I get a project”, and “I won’t give up when a project comes along, I can do it!”. These will help keep her motivated to work toward self-employment success. So, when a job/project opportunity presents itself, Sam already knows exactly what she needs to do because she has the picture of the *plan* in her mind. She hardly needs to think about it, she simply *automatically* begins the process.

Sociological Implications of Intervention

I finally opened my eyes. I did not have to squeeze myself into that windowless cubicle, corporate-type job after all. I had marketable skills. I could freelance... I had business cards printed up, and, before I knew it, my phone was ringing... At long last, I was being productive, exercising my skills, and performing tasks at which I excelled, while avoiding undue stress and office politics. I had found my own comfort level. (Devnet, in Grandin, 2012, pg. 35)

This quote, as well as the previous example, describes a significant number of individuals all over the world. Individuals with AS have the potential and desire to make a difference and be successful in their lives. However, in order to do that, an intervention is necessary. Utilizing implementation intentions offers the AS individuals the ability to use their own metacognitive abilities to intervene on behalf of themselves to correct, focus, and clarify their goal oriented behaviors. And, when done properly, successful, self-employment opportunities can result. As explained, self-employment gives people self-confidence, self-identity, vital social opportunities, and purpose. These characteristics are important for all people, but are especially essential for AS individuals because of the constant struggles and deficits that they face on a daily basis.

As the prevalence of individuals with autism and Asperger's Syndrome seem to exponentially increase, now at the rate of one in every eighty-eight people in the United States (CDC, 2012), it is becoming more and more vital to find appropriate services for those in need. Allocation of services and financial resources are consequently stretched woefully thin. In addition to this problem, it seems as though the world forgets that autistic and Asperger's Syndrome individuals still have the need for services, funding, and, if nothing else, support after they reach twenty-one. All of the services that these individuals once garnered are suddenly missing or inexplicably reduced. It is almost as if these individuals become *invisible* in society. And, to make matters even more difficult, the proposed changes to the upcoming DSM-5 suggest that services for those at the upper end of the spectrum, Asperger's Syndrome individuals, will be uncertain at best. As Chantal Sicile-Kira (2004, 2008) explains, *we cannot wait for government to take action*. Family members, professionals, organizations, support individuals, and the AS people themselves must take the lead and create solutions involving daily living, academic planning, and especially employment opportunities. These solutions include self-

employment. AS individuals can fulfill their intellectual, social, and financial needs while becoming productive members of their communities and contribute to the economic well-being of society. With the utilization of the implementation intention model as a metacognitive self-intervention, these potential solutions can become a tangible reality. This reality translates into fewer services needed from outside sources and increased self-reliance for the AS individual. Considering the current state of our economic climate, the more individuals that work and provide functional, appropriate services, the better we will all be. And, since it has been described that individuals with AS have so much to offer because of their insights, specialization, focus, and uniqueness, we can all benefit from their inclusion in society as economic contributors and people.

I find meaning in doing things that make real, positive changes in the world...
That provides meaning in my life. (Grandin, 2011, pg. 313)

Conclusion

As an often quoted version of the phrase attributed to the French cleric and mystic Saint Bernard of Clairvaux circa 1150 (Apothegm) states, the path to hell is paved with good intention. And as the wisdom of the proverb suggests, good intention will not direct an individual to a very alluring destination. Intention is a good place to begin, but one needs a plan of action to achieve the desired goal once the intention has been initiated. The plan of action, or implementation intention, can offer a solution for individuals to successfully complete goals in a timely, appropriately predicted fashion. And for those AS individuals who are self-employed, this process is especially important. Self-employed AS individuals have an increased level of responsibility, anxiety, and uncertainty. They have the needs of themselves, their businesses,

and their families to consider. The executive function, cognitive errors associated with the heightened levels of stress that coincide with AS and self-employment can be eradicated by implementation intentions alleviating the pressures and issues which lead to the optimistic biases and planning fallacy. Alleviating burdens and tensions can empower self-employed AS individuals to become continually confident in their assessments of project duration. Self-employed AS individuals will consequently have more productive and satisfying financial, social, and personal realizations. Therefore, if this process follows the line of thought in Saint Bernard's proverb the path to hell is paved with good intention, then heaven should be full of implementation intentions.

Bibliography

- Aarts, H., Dijksterhuis, A., & Midden, C. (1999). To plan or not to plan? Goal achievement or interrupting the performance of mundane behaviors. *European Journal of Social Psychology, 29*, 971–979.
- Achtziger, A., Gollwitzer, P.M., & Sheeran, P. (2008). Implementation intentions and shielding goal striving from unwanted thoughts and feelings. *Personality and Social Psychology Bulletin, 34*, 3, 381-393.
- Achtziger, A., Martiny, S.E., Oettingen, G., & Gollwitzer, P.M. (2012). Metacognitive processes in the self-regulation of goal pursuit. In P. Brinol & K.G. DeMarree (Eds.), *Social Metacognition*. (pp. 121-139). New York: Psychology Press.

Adriaanse, M.A., Gollwitzer, P.M., de Ridder, D.T.D., de Wit, J.B.F., & Kroese, F.M. (2011).

Breaking habits with implementation intentions: A test of underlying processes.

Personality and Social Psychology Bulletin, 37, 4, 502-513.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., text rev). Washington, DC: Author.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.) Washington, DC: Author.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text rev.). Washington, DC: Author.

Ardichvili, A. (2000). Critical dilemmas for the independent consultant. *Consulting Psychology Journal: Practice and Research*, 52, 2, 133-141.

Armor, D.A., & Taylor, S.E. (1999). Situated optimism: Specific outcome expectancies and self-regulation. In L. Berkowitz & M. Zanna (Eds.), *Advances in Experimental and Social Psychology*, (pp. 309-364). Academic Press.

Asperger, H. (1944). Die autischen psychopathen im kindeshalter. *Archiv fur Psychiatrie und Nervenkrankheiten*, 117, 76-136.

Asperger, H. (1991). Autistic psychopathy in childhood. In U. Frith (ed) *Autism and Asperger's Syndrome*. Cambridge: Cambridge University Press.

Attwood, T. (1998). *Asperger's syndrome: A guide for parents and professionals*. London: Kingsley.

Attwood, T. (2007). *The complete guide to Asperger's syndrome*. London: Kingsley.

Attwood, T. (2010, October). *Complete Guide to Autism and Asperger's Syndrome*. Presentation for Herkimer ARC in Verona, New York.

- Baker, J. (2010). *Preparing for Life*. Arlington, Texas: Future Horizons.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs: New Jersey: Prentice Hall.
- Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist*, 44, 1175-1184.
- Bandura, A. (1991). Self-regulation of motivation through anticipatory and self-reactive mechanisms. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation: Vol. 38. Perspectives on motivation* (pp. 69-164). Lincoln: University of Nebraska Press.
- Bandura, A. (2008). Reconstrual of “free-will” from the agentic perspective of social cognitive theory. In J. Baer, J.C. Kaufman, & R.F. Baumeister (Eds.). *Are we free? Psychology and Free Will*, (pp. 86-127). Oxford: Oxford University Press.
- Bargh, J. A. (1992). The ecology of automaticity: Towards establishing the conditions needed to produce automatic processing effects. *American Journal of Psychology*, 105, 181-199.
- Bargh, J. A. (1994). The four horsemen of automaticity: Awareness, efficiency, intention, and control in social interaction. In R. S. Wyer, Jr., & T. K. Srull (Eds.), *Handbook of social cognition* (2nd ed., pp. 1-40). Hillsdale, NJ: Lawrence Erlbaum.
- Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American Psychologist*, 54, 462-479.
- Baron-Cohen, S., Leslie, A.M., & Frith, U. (1985). Does the autistic child have a “theory of mind”? *Cognition*, 21, 37-46.
- Baron-Cohen, S., Campbell, R., Karmiloff-Smith, A., Grant, J., & Walker, J. (1995). Are children with autism blind to the mentalistic significance of the eyes? *British Journal of Developmental Psychology*, 13, 379-398.

- Baron-Cohen, S., Whellwright, S., Skinner, R., Marin, J., and Clubley, E. (2001). The Autism-Spectrum Quotient (AQ): Evidence from Asperger Syndrome/ high functioning autism, males and females, scientists, and mathematicians. *Journal of Autism and Developmental Disorders*, 31, 5-17.
- Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: An investigation of adults with Asperger syndrome or high functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, 34, 163-175.
- Baron-Cohen, S., Hoekstra, R.A., Knickmeyer, R., & Wheelwright, S. (2006). The autism spectrum quotient (AQ)—adolescent version. *Journal of Autism and Developmental Disorders*, 36, 2, 343-351.
- Barron, J., & Barron, S. (1992). *There's a Boy in Here*. New York: Simon and Schuster.
- Baumeister, R.F., Heatherton, T.F., & Tice, D.M. (1994). *Losing Control: How and Why People Fail at Self-Regulation*. San Diego, CA: Academic Press.
- Bennetto, L., Pennington, B., & Rogers, S. (1996). Intact and impaired memory functions in autism. *Child Development*, 67, 1816–1835.
- Berryhill, M.E., Phuong, L., Picasso, L., Cabeza, R., & Olson, I.R. (2007). Parietal lobe and episodic memory: Bilateral damage causes impaired free recall of autobiographical memory. *The Journal of Neuroscience*, 27, 52, 14415-14423.
- Borremans, E., Rintala, P., & McCubbin, J.A. (2010). Motor skills of young adults with Asperger's syndrome: A comparative study. *European Journal of Adapted Physical Activity*, 2, 1, 21-33.
- Boucher, J. (2001). Lost in a sea of time. In T. McCormack & C. Hoerl (Eds.), *Time and memory: Issues in philosophy and psychology*. Oxford: Oxford University Press.

- Brandstatter, V., Lengfelder, A., & Gollwitzer, P.M. (2001). Implementation intentions and efficient action initiation. *Journal of Personality and Social Psychology*, 81, 3, 946-960.
- Bromley, J., Hare, D., Davison, K. & Emerson, E. (2004). Mothers supporting a child with autistic spectrum disorders: Social support, mental health status, and satisfaction with services. *Autism*, 8, 419-433.
- Buehler, R., & Griffin, D. (2003). Planning, personality, and prediction: The role of future focus in optimistic time predictions. *Organizational Behavior and Human Decision Processes*, 92, 80-90.
- Buehler, R., Griffin, D., & Messervey, D. (2005). Collaborative planning and prediction: Does group discussion affect biases in time estimation? *Organizational Behavior and Human Decision Processes*, 97, 47-63.
- Buehler, R., Griffin, D., & Ross, M. (1994). Exploring the “planning fallacy”: Why people underestimate their task completion times. *Journal of Personality and Social Psychology*, 67, 3, 366-381.
- Buehler, R., Griffin, D., & Ross, M. (2002). Inside the “planning fallacy”: The causes and consequences of optimistic time predictions. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.). *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge, MA: Cambridge University Press.
- Burt, C. D. B., & Kemp, S. (1994). Construction of activity duration and time management potential. *Applied Cognitive Psychology*, 8, 155–168.
- Byram, S. J. (1997). Cognitive and motivational factors influencing time prediction. *Journal of Experimental Psychology: Applied*, 3, 216–239.
- Carley, J. M. (2008). *Asperger's From the Inside Out*. New York, New York: Penguin Group.

- Carver, C.S., & Scheier, M.F. (1981). *Attention and Self-Regulation: A Control Theory Approach to Human Behavior*. New York, New York: Springer.
- Cassar, G. (2007). Are individuals entering self-employment overly optimistic? An empirical test of plans and projections on nascent entrepreneur expectations. In Process with *Strategic Management Journal*.
- Center for Disease Control and Prevention. (2012). Autism Spectrum Disorders, retrieved from www.cdc.gov/autism/.
- Charman, T. (2008). Autism Spectrum Disorders. *Psychiatry*, 7, 8, 331-334.
- Christ, S.E., Kanne, S.M., & Reiersen, A.M. (2010). Executive function in individuals with subthreshold autism traits. *Neuropsychology*, 24, 5, 590-598
- Cicatello, D. (2010, April). Diagnostic assessment of autism spectrum disorder. *Vassar Brothers Autism Awareness Presentation*. Poughkeepsie, New York.
- Clark, A., & Chalmers, D. 1998. *The Extended Mind*. *Analysis*. 58: 10-23.
- Colle, L., Baron-Cohen, S., Wheelwright, S., & van der Lely, H.K.J. (2008). Narrative discourse in adults with high functioning autism or asperger's syndrome. *Journal of Autism and Developmental Disorder*, 38, 28-40.
- Connolly, T., & Dean, D. (1997). Decomposed versus holistic estimates of effort required for software writing tasks. *Management Science*, 43, 1029-1045.
- Corden, B., Chilvers, R., and Skuse, D. (2008). Emotional modulation of perception in Asperger Syndrome. *Journal of Autism and Developmental Disorders*, 38, 1072-1080.
- Crane, L., Goddard, L., & Pring, L. (2009). Sensory processing in adults with autism spectrum disorders. *Autism*, 13, 215-228.
- Current Population Survey. (December 2010). *Bureau of Labor Statistics*, Washington, DC.

- Dahl, N., and Arici, A. (2008). Employment planning for people with autism spectrum disorder. *Speaker's Journal*, 8, 157-164.
- Dador, D. (2012). *Education, employment, and adults with autism*. ABCNews.com: Los Angeles.
- Damarla S. R., Keller, T. A., Kana, R. K. Cherkassky, V. L. Williams, D. L., Minshew, N. J. Just, M. A., (2010). Cortical underconnectivity coupled with preserved visuospatial cognition in autism: evidence from an fMRI study of an embedded figures task. *Autism Research*, 5, 273-279.
- Davies, D. K., Stock, S. E., & Wehmeyer M. L. (2002). Enhancing independent time management skills of individuals with mental retardation using a palmtop personal computer. *Mental Retardation*, 40, 358–365.
- Dawson, P. (2010). *Executive Skills in children and Adolescents: A Practical Guide for Asperger's Syndrome*, New York, New York: Guildord Press.
- De la Marche, W., Steyaert, J. & Noens, I. (2012). Atypical sensory processing in adolescents with an autism spectrum disorder and their non-affected siblings. *Research in Autism Spectrum Disorders*, 6, 639-645.
- Deutsch, J. (2010). From pariah to life coach and presenter: Aspies linking with neurotypicals. *AWARES.org*, 2010 online conference.
- Diekhof, E.K., Falkai, P., & Gruber, O. (2008). Functional neuroimaging of reward processing and decision-making: A review of aberrant motivational and affective processing in addiction and mood disorders. *Brain Research Reviews*, 59, 164-184.

- Dougherty, M.P.R. (2001). Integration of the ecological and error models of overconfidence using a multiple trace memory model. *Journal of Experimental Psychology: General*, 130, 4, 579-599.
- Droit-Volet, S. & Gil, S. (2009). The time-emotion paradox. *Philosophical Transactions of the Royal Society of Biological Sciences*, 364, 1943-1953.
- Duckworth, A.L., Grant, H., Loew, B., Oettingen, G., & Gollwitzer, D.M. (2011). Self-regulation strategies improve self-discipline in adolescents: Benefits of mental contrasting and implementation intentions. *Education Psychology*, 31, 1, 17-26.
- Dunning, D. (2006). Strangers to ourselves? *The Psychologist*, 19, 10, 600-602.
- Edmonds, B. 1998. *Social Embeddedness and Agent Development*. UKMAS Report. Manchester, UK.
- Employment. (n.d.). Dictionary.com Unabridged. Retrieved March 21, 2012, from Dictionary.com website: <http://dictionary.reference.com/browse/employment>
- Epel, E.S., McEwen, B.S., Ickovics, J.R. (1998). Embodying Psychological Thriving: Physical Thriving in Response to Stress. *Journal of Social Issues*, 54, 2, 301-322.
- Erickson, K., Drevets, W., and Schulkin, J. (2003). Glucocorticoid Regulation of Diverse Cognitive Functions in Normal and Pathological States. *Neuroscience and Behavioral Reviews*, 27, 233-246.
- Ericsson, K. A., & Lehmann, A. C. (1996). Expert and exceptional performance: Evidence of maximal adaptation to task constraints. *Annual Review of Psychology*, 47, 273-305.
- Ettner, S.L., & Grzywacz, J.G. (2001). Workers' perceptions of how jobs affect health: a social ecological perspective. *Journal of Occupational Health Psychology*, 6, 2, 101-113.

- Frith, U. (1989). Autism and "Theory of Mind". In C. Gillberg (Ed.), *Diagnosis and Treatment of Autism*. (pp. 33-52). New York: Plenum Press.
- Frith, U. (1991). *Autism and Asperger's Syndrome*. Cambridge: Cambridge University Press.
- Frith, U., & Happe, F. (1994). Autism: beyond theory of mind. *Cognition*, 50, 115-132.
- Gaus, V. L. (2007). *Cognitive-Behavioral Therapy for Adult Asperger Syndrome (Guides to Individualized Evidence Based Treatment)*. New York, New York: Guilford Press.
- Ghaziuddin, M. (2008). Defining the behavioral phenotype of Asperger's syndrome. *Journal of Autism and Developmental Disorders*, 38, 138-142.
- Gollwitzer, P. M. (1990). Action phases and mind-sets. In E. T. Higgins & R. M. Sorrentino (Eds.), *Handbook of motivation and cognition* (Vol. 2, pp. 53-92). New York: Guilford Press.
- Gollwitzer, P.M. (1993). Goal achievement: The role of intentions. *European Review of Social Psychology*, 4, 141-142.
- Gollwitzer, P.M. (1996). The volitional benefits of planning. In P.M. Gollwitzer & J.A. Bargh (eds.), *The Psychology of Action*, Guilford: New York; 287-312.
- Gollwitzer, P.M., & Brandstatter V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology*, 73, 186-199.
- Gollwitzer, P.M., & Schaal, B. (1998). Metacognition in Action: The importance of implementation intentions. *Personality and Social Psychology Review*, 2, 2, 124-136.
- Gollwitzer, P.M. (1999). Implementation intentions: Strong effects of simple plans. *American Psychologist*, 54, 493-503.

- Gollwitzer, P. M., Fujita, K., & Oettingen, G. (2004). Planning and the implementation of goals. In R. Baumeister & K. Vohs (Eds.), *Handbook of self-regulation: Research, theory and applications* (pp. 211-228). New York : Guilford Press.
- Gollwitzer, P.M., Wieber, F., Myers, A.L., & McCrea, S.M. (2010). How to maximize implementation intention effects. In C.R. Agnew, D.E. Carlston, W.G. Graziano, J.R. Kelly (Eds.), *Then a miracle occurs: Focusing on behavior in social psychological theory and research* (pp. 137-161). New York: Oxford Press.
- Gallagher, D.G., & Parks, J.M. (2001). I pledge thee my troth...contingently: Commitment and the contingent work relationship. *Human Resource Management Review*, 11, 181, 208.
- Geller, L. (2009). Asperger Syndrome in adulthood: Does diagnosis matter? *Asperger Center for Education and Training*. New York, New York: Asperger Center Inc.
- Geller, L. (2010). Bewitched, bothered, and bewildered: Understanding and treating executive functioning difficulties: the STOP model. *Presented at the Annual AHA Association Conference: Issues in Independent Living for Adolescents and Adults on the Autism Spectrum*, Adelphi University, Garden City, New York.
- Gillberg, C. & Gillberg, I.C. (1989). Asperger syndrome- some epidemiological considerations: A research note. *Journal of Child Psychology and Psychiatry*, 30, 631-638.
- Grandin, T. (1996). *Thinking in Pictures*. New York: Vintage Books.
- Grandin, T. & Johnson, C. (2005). *Animals in Translation*. New York: Scribner.

- Grandin, T & Duffy, K. (2008). *Developing Talents: Careers for Individuals with Asperger Syndrome and High-Functioning Autism*. Kansas: Autism Asperger Publishing Company.
- Grandin, T. (2011). *The Way I See It*. Texas: Future Horizons.
- Grandin, T. (2012). *Different... Not Less*. Arlington, TX: Future Horizons.
- Greenberg, J., Pyszczynski, T., Warner, S., & Brawlow, D. (1994). A prognostic utility bias in judgments of similarity between past and present instances: how available information is deemed useful for prediction. *European Journal of Social Psychology*, 24, 593-610.
- Griffin, D., & Buehler, R. (2005). Biases and fallacies, memories and predictions: Comment on Roy, Christenfeld, and McKenzie (2005). *Psychological Bulletin*, 131, 5, 757-760.
- Hakim, C. (2004). *We are all self-employed (2nd Ed.)*. Berret-Koehler Publishers: San Francisco, CA.
- Hall, P. (1980). *Great planning disasters*. London: Weidenfeld & Nicolson.
- Hall, P. (1982). *Great planning disasters*. University of California Press.
- Happe, F. & Frith U. (2006). The weak coherence account: detail-focused cognitive style in autism spectrum disorders. *Journal of Autism and Developmental Disorders*.
- Hayes, K.M. (2007). High functioning autism and Asperger's disorder: A neuropsychological comparison. Unpublished doctoral thesis, Drexel University.
- Hendrickx, S. (2009). *Asperger Syndrome and Employment*. London: Jessica Kingsley Publishers.
- Hill, E.L. & Bird, C.M. (2006). Executive processes in Asperger's syndrome: Patterns of performance in a multiple case series. *Neuropsychologia*, 44, 2822-2835.

- Hill, E.L. & Frith, U. (2003). Understanding autism: insights from mind and brain. *Philosophical Transactions of the Royal Society of London B*, 358, 281-289.
- Hinds, P. J. (1999). The curse of expertise: The effects of expertise and debiasing methods on predictions of novice performance. *Journal of Experimental Psychology: Applied*, 5, 205–221.
- Holland, R.W., Aarts, H., & Langendam, D. (2006). Breaking and creating habits on the working floor: A field experiment on the power of implementation intentions. *Journal of Experimental Social Psychology*, 42, 776-783.
- Janeslatt, G., Granland, M., & Kottorp, A. (2009). Measurement of time processing ability and daily time management in children with disabilities. *Disability and Health Journal*, 2, 1, 15-19.
- Janeslatt, G., Granland, M., Kottorp, A., & Almqvist, L. (2010). Patterns of time processing ability in children with and without developmental disabilities. *Journal of Applied Research in Intellectual Disabilities*, 23, 250-262.
- Jin, D.Z., Fujii, N., Graybiel, A.M. (2009). Neural Representation of time in corticobasal ganglia circuits. *Proceedings of the National Academy of Sciences*, 106, 45, 19156-19161.
- Just, M. A., Cherkassky, V. L., Keller, T. A., Minshew, N. J., (2004). Cortical activation and synchronization during sentence comprehension in high-functioning autism: Evidence of underconnectivity. *Brain*, 127, 1811-1821.
- Just, M.A., Keller, T.A., Malare, V.L., Kana, R.K., & Varma, S. (In Press). Autism as neural systems disorder: A theory of frontal-posterior underconnectivity. *Neuroscience and Behavioral Reviews*.

- Kahan, T.L., & Simone, P.M. (2005). Where neurocognition meets the master: Attention and metacognition in Zen. In K. Bulkeley (Ed.), *Soul, Psyche, Brain: New Directions in the Study of Religion and Brain-Mind Science*. New York, New York: Palgrave Macmillan.
- Kahn, M. (2010, October). Promoting Independence for Adults with Autism Spectrum Disorders: Employment and Beyond. Presentation for Life'sWORC: *Building Bridges Through Life's Connections*, Uniondale, New York.
- Kahn, R. L., & Byosiere, P. (1992). Stress in organizations. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., pp. 571–650). Palo Alto, CA: Consulting Psychologists Press.
- Kahneman, D., & Tversky, A. (1979). Intuitive prediction: Biases and corrective procedures. *TIMS Studies in Management Science*, 12, 313-327.
- Kana, R. K., Keller, T. A., Cherkassky, V. L., Minshew, N. J., Just, M. A., (2006). Sentence comprehension in autism: thinking in pictures with decreased functional connectivity. *Brain*, 129, 2484-2493.
- Kana, R. K., Keller, T. A., Minshew, N. J., Just, M. A., (2007). Inhibitory control in high functioning autism: Decreased activation and underconnectivity in inhibition networks. *Biological Psychiatry*, 62, 198-206.
- Kana, R. K., Keller, T. A., Cherkassky, V. L., Minshew, N. J., Just, M. A., (2009). Atypical frontal-posterior synchronization of Theory of Mind regions in autism during mental state attribution. *Social Neuroscience*, 4, 135-152.
- Kanner, L. (1943). Autistic disturbances of affective contact. *Nervous Child*, 2, 217-250.
- Kanner, L. (1951). The conception of wholes and parts in early infantile autism. *American Journal of Psychiatry*, 108, 23–26.

- Kanner, L., and Eisenberg, L. (1957). Early infantile autism 1943-1955. *Psychiatric Report for American Psychiatric Association*, 55-65.
- Kern, J.K., Trivedi, M.H., Garver, C.R., Granneman, B.D., Andrew, A.A., Savla, J.S., et al. (2006). The pattern of sensory abnormalities in autism. *Autism*, 10, 480-494.
- King, Z. (2004). Career self-management: It's nature, causes, and consequences. *Journal of Vocational Behavior*, 65, 112-133.
- Kita, Y. & Hosokawa, T. (2011). *History of autism spectrum disorders: Historical controversy over the diagnosis*. Japan Society for the Promotion of Science.
- Koehler, D.J. & Poon, C.S.K. (2006). Self-predictions overweight strength of current intentions. *Journal of Experimental Social Psychology*, 42, 517-524.
- Koole, S., & Spijker, M.V. (2000). Overcoming the planning fallacy through willpower: effects of implementation intentions on actual and predicted task completion times. *European Journal of Social Psychology*, 30, 873-888.
- Jordan, C. J. (2010). Evolution of autism support and understanding via the world wide web. *Intellectual and Developmental Disabilities*, 48(3), 220-227.
- Landa, R. (2000). Social language use in Asperger syndrome and high-functioning autism. In A. Klin, F.R. Volkmar, & S.S. Sparrow (Eds.), *Asperger syndrome* (pp. 211-237). New York: Guilford Press.
- Langeson, E.A. (2010). Predicting treatment success in social skills training for adolescents with autism spectrum disorder: The UCLA PEERS Programme. UCLA Semel Institute for Neuroscience and Human Behavior manuscript. Los Angeles, CA.
- Lawson, W. (2009). *Single attention and associated cognition in autism*, Doctoral dissertation for Deakin University.

- Lazar, M.T. (2007). More than just a paycheck: Self-employment as a career option for individuals with autism spectrum disorders. Unpublished Thesis: San Diego State University, College of Education.
- Lee, K., Carswell, J. J., & Alien, N. J. (2000). A meta-analytic review of occupational commitment: Relations with person-and-work-related variables. *Journal of Applied Psychology, 55*, 799-811.
- Lind, S. E., and Bowler, D. M. (2010). Episodic memory and episodic future thinking in adults with autism. *Journal of Abnormal Psychology*. Advance online publication. Doi: 10.1037/a0020631.
- Liston, C., McEwen, B.S., and Casey, B.J. (2008). Psychosocial Stress Reversibly Disrupts Prefrontal Processing and Attentional Control. *Proceedings of the National Academy of the Sciences of the United States of America*.
- MacDonald, T.K., & Ross, M. (1999). Assessing the accuracy of predictions about dating relationships: How and why do lovers' predictions differ from those made by observers. *Personality and Social Psychology Bulletin, 25*, 1417-1429.
- Manjiviona, J. & Prior, M. (1995). Comparison of Asperger's syndrome and high functioning autistic children on a test of motor impairment. *Journal of Autism and Developmental Disorders, 25*, 23-39.
- Martin, J. S., Poirier, M., and Bowler, P. M. (2010). Brief Report: Impaired temporal reproduction performance in adults with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 40*, 640-646.

- Mason, R. A., Williams, D. L., Kana, R. K., Minshew, N., Just, M. A., (2008). Theory of Mind disruption and recruitment of the right hemisphere during narrative comprehension in autism. *Neuropsychologia*, 46, 269-280.
- Mathieu, J. E., & Zajac, D. M. (1990). A review and meta-analysis of the antecedents, correlates, and consequences of organizational commitment. *Psychological Bulletin*, 180, 171–194.
- McClamrock, R. 1995. *Existential Cognition*. Chicago and London: The University of Chicago Press.
- McCrimmon, A.W., Schwean, V.L., Saklotske, D.H., & Montgomery, J.M. (2012). Executive functions in Asperger’s syndrome: An empirical investigation of verbal and non-verbal skills. *Research in Autism Spectrum Disorders*, 6, 224–233.
- Meck, W.H. (2005). Neuropsychology of timing and perception. *Brain and Cognition*, 58, 18.
- Metcalf, J., & Mischel, W. (1999). A hot-/cool-system analysis of delay of gratification: Dynamics of willpower. *Psychological Review*, 106, 3-19.
- Meyer, R.N. (2001). *Asperger Syndrome Employment Workbook*. London and Philadelphia: Jessica Kingsley Publishers.
- Miller, E. K. (1999). The prefrontal cortex: complex neural properties for complex behavior. *Neuron*, 22, 15–17.
- Miller, L.S. & Ahmed, F.S. (2008). Neuropsychology in asperger’s disorder. In J.L. Rauch, M.E. Johnson, & M.F. Casanova (Eds.), *Asperger’s Syndrome*, (pp. 111-130). Informa Health.
- Minshew, N. & Williams, D.L. (2007). The New Neurobiology of Autism: Cortex, Connectivity, and Neuronal Organization, *Archives of Neurology*, 64, 7.

- Morris, R., & Ward, G. (2005). *The cognitive psychology of planning*. Psychology Press: London.
- Morrison, R.G., & Knowlton, B.J. (2012). Neurocognitive methods in higher cognition. In Holyoake and R.G. Morrison (Eds.), *The Oxford Handbook of Thinking*, (pp. 67-90). Oxford University Press.
- Myles, B.S. & Southwick, J. (1999). *Asperger's Syndrome and Difficult Moments Practical Solutions for Tantrums, Rage, and Meltdowns*. Shawnee Mission, KS: Autism Asperger Publishing Company.
- Myles, B.S., Adreon, D., Hagen, K., Hoverstott, J., Hubbard, A., Smith, S.M., et al. (2005). *Life Journey through Autism: An Educator's Guide to Asperger Syndrome*. Arlington, VA: Organization for Autism Research.
- Nelson, T. O., & Narens, L. (1990). Metamemory: A theoretical framework and new findings. In G. H. Bower (Ed.), *The psychology of learning and motivation* (pp. 1–45). New York: Academic Press.
- Nelson, T. O., & Narens, L. (1994). Why investigate metacognition? In J. Metcalfe & A. P. Shimamura (Eds.), *Metacognition: Knowing about knowing* (pp. 1–25). Cambridge, MA: MIT Press.
- Newby-Clark, I. R., Ross, M., Buehler, R., Koehler, D. J., & Griffin, D. (2000). People focus on optimistic scenarios and disregard pessimistic scenarios while predicting task completion times. *Journal of Experimental Psychology: Applied*, 6, 171–182.
- Newport, J. (2001). *Your Life is Not a Label*. Texas: Future Horizons.
- Norall, C. L. B. (2009). *Quirky, Yes, Hopeless, No: Practical Tips to Help Your Child with Asperger's Syndrome Be More Socially Accepted*. New York: St. Martin's Press.

- Noterdaeme, M, Wriedt, E., & Hohne, C. (2010). Asperger's syndrome and high functioning autism: Language, motor, and cognitive profiles. *European Child Adolescent Psychiatry*, 19, 475-481.
- Nussbaum, S., Liberman, N., & Trope, Y. (2006). Predicting the near and distant future. *Journal of Experimental Psychology: General*, 135, 2, 152-161.
- O'Connor, K. & Kirk, I. (2008). Brief Report: Atypical social cognition and social behaviours in autism spectrum disorder: A different way of processing rather than impairment. *Journal of Autism and Developmental Disorders*, 38, 1989-1997.
- Oettingen, G., & Gollwitzer, P. M. (2010). Strategies of setting and implementing goals: Mental contrasting and implementation intentions. In J. E. Maddux & J. P. Tangney (Eds.), *Social Psychological Foundations of Clinical Psychology*. New York: Guilford.
- Ozonoff, S. (1995). Executive functions in autism. In E. Schopler & G. Mesibov (Eds.), *Learning and Cognition in Autism* (pp. 199-220). New York: Plenum Press.
- Ozonoff, S., South, M., & Provençal, S. (2005). Executive functions. In F.R. Volkmar, R. Paul, A. Klin, & D. Cohen (Eds.), *Handbook of autism and pervasive developmental disorders: Vol. 1. Diagnosis, development, neurobiology, and behavior* (3rd ed., pp.606-627). Hoboken, NJ: Wiley.
- Paradiz, V. (2009). *The Integrated Self-Advocacy ISA Curriculum*. Shawnee Mission, Kansas: Autism Asperger Publishing Company.
- Paul, R. (2008). Auditory processing disorder. *Journal of autism and developmental disorders*, 38, 208-209.
- Peele, S., & Inkson, K. (2004). Contracting and careers: choosing between self and organizational employment. *Career Development International*, 9, 6, 542-568.

- Pennington, B. (1997). *Dimensions of executive functions in normal and abnormal development*. Baltimore, MD, US: Paul H. Brookes Publishing.
- Pennington, B. F. (2009). *Diagnosing Learning Disorders: A neuropsychological framework*. New York, New York: Guilford Press.
- Pennington, B., & Ozonoff, S. (1996). Executive functions and developmental psychopathology. *Journal of Child Psychology and Psychiatry*, 37, 51–87.
- Perry, N. (2010). *Executive functioning in everyday life*. *Autism Spectrum Quarterly*, Summer, 19-22.
- Plaisted, K. C., O’Riordan, M., & Baron-Cohen, S. (1998). Enhanced discrimination of novel, highly similar stimuli by adults with autism during a perceptual learning task. *Journal of Child Psychology and Psychiatry*, 39, 765–775.
- Pezzo, M.V., & Pezzo, S.P. (2007). Making sense of failure: A motivated model of hindsight bias. *Social Cognition*, 25, 1, 147-164.
- Poirier, M., & Martin, J. S. (2008). Working memory and immediate memory in autism spectrum disorders. In J. Boucher & D. M. Bowler (Eds.), *Memory in autism: Theory and evidence*. Cambridge: CUP.
- Posner, M. I., & Petersen, S. E. (1990). The attention system of the human brain. *Annual Review of Neuroscience*, 13, 25-42.
- Premack, D., & Woodruff, G. (1978) Does the chimpanzee have a ‘theory of mind’? *Behavioral and Brain Sciences*, 4, 515-526.
- Price, K.J., Edgell, D., & Kerns, K.A. (2012). Timing deficits are implicated in motor dysfunction in Asperger’s syndrome. *Research in Autism Spectrum Disorders*, 6, 857-860.

- Price, K.J., Schiffar, M., & Kerns, K.A. (2012). Movement perception and movement production in Asperger's syndrome. *Research in Autism Spectrum Disorders*, 6, 391-398.
- Prottas, D. (2007). Attitudes towards occupation, job, life, and family: translators as independent contractors, owners, and employees. *Journal of Business and Entrepreneurship*, October 2007.
- Prottas, D. (2008). Do the self-employed value autonomy more than employees? Research across four samples. *Career Development International*, 13, 1, 33-45.
- Prottas, D., & Thompson, C.A. (2006). Stress, satisfaction, and the work-family interface: a comparison of self-employed business owners, independents, and organizational employees. *Journal of Occupational Health Psychology*, 11, 4, 366-378.
- Reed, S.K. (2007). *Cognition: Theory and Applications*. Belmont, CA: Thompson Wadsworth.
- Rimland, B. (1990). Sound sensitivity in autism. *Autism Research Review International*, 4, 1 and 6.
- Robison, J.E. (2008). *Look Me in the Eye: My Life with Asperger's*. New York: Random House.
- Roese, N.J. (1997). Counterfactual Thinking. *Psychological Bulletin*, 121, 1, 133-148.
- Roy, M., Dillo, W., Emrich, H.M., & Ohlmeier, M.D. (2009). Asperger's syndrome in adulthood. *Deutsches Arzteblatt International*, 106, 5, 59-64.
- Roy, M.M., Christenfeld, N.J.S., & McKenzie, C.R.M. (2005). Underestimating the duration of future events: Memory incorrectly used or memory bias? *Psychological Bulletin*, 131, 5, 738-756.

- Rumsey, J.M. (1985). Conceptual problem-solving in highly verbal, nonretarded autistic men. *Journal of Autism and Developmental Disorders*, 15, 23-26.
- Saperstein, J. (2010). *Atypical: Life with Asperger's Syndrome in 201/2 Chapters*. New York: Penguin.
- Sheeran, P. & Orbell, S. (1999). Implementation intentions and repeated behavior: Augmenting the predictive validity of the theory of planned behavior. *European Journal of Social Psychology*, 29, 349-369.
- Sheeran, P., Webb, T.L., & Gollwitzer, P.M. (2005). The interplay between goal intentions and implementation intentions. *Personality and Social Psychology Bulletin*, 31, 1, 87-98.
- Shimamura, A.P. (2008). A neurocognitive approach to metacognitive monitoring and control. In J. Dunlosky & R. Bjork, (Eds.), *Handbook of Memory and Metacognition*, Mahwah, New Jersey: Erlbaum Publishers.
- Shore, S. (2003). *Beyond the Wall: Personal Experiences with Autism and Asperger's Syndrome*. Shawnee Mission, Kansas: Autism Asperger Publishing Company.
- Sicile-Kira, C. (2004). *Autism Spectrum Disorders: The Complete to Understanding Autism, Asperger's Syndrome, Pervasive Developmental Disorder, and other Autism Spectrum Disorders*. New York, New York: Berkley Publishing Group.
- Sicile-Kira, C. (2008). *Autism Life Skills*. New York: Perigee Books.
- Simone, R. (2010a). *Asperger's on the Job*. Texas: Future Horizons.
- Simone, R. (2010b). *Aspergirls*. London and Philadelphia: Jessica Kingsley Publishers.
- Simpson, R. (2005). *Autism Spectrum Disorders: Interventions and Treatments for Children and Youth*. London, California, and New Delhi: Sage Publications, Ltd.

- Singfield, G. (2010, October). We do grow up: Anticipating the future needs of older adolescents and adults with autism. Presentation for Life'sWORC: *Building Bridges Through Life's Connections*, Uniondale, New York.
- Soufer, R., & Sandler, S. (2011). Executive functions: Skills to promote success in school and beyond. *Autism Spectrum Quarterly*, 3, 4.
- Stuss, D. (1992). Biological and psychological development of executive functions. *Brain and Cognition*, 20, 8-23.
- Stuss, D. T., & Benson, D. F. (1984). Neuropsychological studies of the frontal lobes. *Psychological Bulletin*, 95, 3-28.
- Sullivan, S.E. (1999). The changing nature of careers: A review and research agenda. *Journal of Management*, 25, 3, 457-484.
- Szelag, E., Kowalska, J., Galkowski, T., & Poppel, E. (2004). Temporal processing deficits in high-functioning children with autism. *British Journal of Psychology*, 95, 269-282.
- Taylor, J.L. (2010). Changes in the autism behavior phenotype during the transition to adulthood. *AWARES.org*, 2010 online conference.
- Taylor, S.E., Pham, L.B., Rivkin, I.D., & Armor, D.A. (1998). Harnessing the Imagination. *American Psychologist*, 53, 4, 429-439.
- Thompson, C.A, Kopelman, R.E., & Schriesheim, C.A. (1992). Putting all one's eggs in the same basket: a comparison of commitment and satisfaction among self and organizationally employed men. *Journal of Applied Psychology*, 77, 5, 738-743.
- Twachtman-Cullen, D. (1998). Language and communication in high-functioning autism and Asperger syndrome. In E. Schopler, G.B. Mesibov, & L. J. Kuncze (Eds.), *Asperger syndrome or high functioning autism?* (pp. 199-225). New York: Plenum Press.

Verdejo-Garcia, A.J., Lopez-Torrecillas, F., Aguilar de Arcos, F., & Perez-Garcia, M. (2005).

Differential effects of MDMA, cocaine, and cannabis use severity on distinctive components of the executive functions in polysubstance users: A multiple regression analysis. *Addictive Behaviors*, 30, 89-101.

Verdejo-Garcia, A.J., Perales, J.C., & Perez-Garcia, M. (2007). Cognitive impulsivity in cocaine and heroin polysubstance abusers. *Addictive Behaviors*, 32, 950-966.

Voigt, R.G., Macias, M.M., & Myers, S.M. (2011). Developmental and behavioral pediatrics. *American Academy of Pediatrics*, 249-292.

Volkmar, et al. (1994). DSM IV Autism /P.D.D. field trial. *American Journal of Psychiatry*, 151, 1361-1367.

Wallace, G.L. & Happe, F. (2008). Time perception in autism spectrum disorders. *Research in Autism Spectrum Disorders*, 2, 447-455.

Walsh, D. (2010, October). Positive Behavioral Supports: Meeting Unmet Needs. Presentation for Life'sWORC: *Building Bridges Through Life's Connections*, Uniondale, New York.

Wearden, J.H. & Lejeune, H. (2008). Scalar properties in human timing: conformity and violations. *The Quarterly Journal of Experimental Psychology*, 61, 4, 569-587.

Whitney, R. V. (2008). *Nonverbal Learning Disorder*. New York, New York: Penguin Group.

Williams, D. (1992). *Nobody Nowhere*. London: Transworld Publishers.

Williams, D. (1996). *Autism: An Inside Out Approach*. London: Jessica Kingsley Publishers.

Williams, K. (1995). Understanding the student with Asperger syndrome: Guidelines for teachers. *Focus on Autistic Behavior*, 10, 2.

- Willy, L. H. (1999). *Pretending to be Normal: Living with Asperger's Syndrome*. London: Jessica Kingsley Publishing.
- Wilson, M. *Six Views of Embodied Cognition*. In Press: Psychonomic Bulletin and Review.
- Wing, A. M. (2002). Voluntary timing and brain function: An information processing approach. *Brain and Cognition*, 48, 7–30.
- Wing, L. (1981). Asperger's syndrome: A clinical account. *Psychological Medicine*, 11, 115–130.
- Wing, L. (1996). *The autistic spectrum*. London: Jessica Kingsley Publishers.
- Wing, L., & Gould, J. (1979) Severe impairments of social interaction and associated abnormalities in children. *Epidemiology and classification Journal of Autism and Developmental Disorders*, 9, 11-29
- Winner, M. (2002). Assessment of social skills for students with Asperger syndrome and high functioning autism. *Assessment for Effective Intervention*, 27, 73-80.
- Woodbury-Smith, M.R. & Volkmar, F.R. (2009). Asperger Syndrome. *European Child and Adolescent Psychiatry*, 18, 2-11.
- World Health Organization. (1992). *ICD-10, the ICD-10 classification of mental and behavioural disorders: Diagnostic criteria for research*. Geneva: World Health Organization.
- Yurkemicz, C. (2010, October). Assessment of individuals with autism spectrum disorders across the lifespan. Presentation for Life'sWORC: *Building Bridges Through Life's Connections*, Uniondale, New York.

- Zaks, Z. (2006). *Life and Love: Positive Strategies for Autistic Adults*. Kansas: Autism Asperger Publishing Company.
- Zakzanis, K.K., & Birze, A.A. (2000). Executive dysfunction in abstinent MDMA (Ecstasy) users. *Archives of Clinical Neuropsychology*, 15, 756.
- Zhang, Y., Fishback, A., & Dhar, R. (2008). When thinking beats doing: the role of optimistic expectations in goal-based choice. *Journal of Consumer Research*, 24, 567-578.

Appendix

Resources, Websites, and Links

- Global and Regional Asperger's Syndrome Partnership (GRASP): Peer-run regional support groups and online resources, www.grasp.org
- Online Asperger's Syndrome Information and Support (OASIS @ MAAP): Resource for Autism Spectrum Disorders and Asperger's Syndrome, www.aspergersyndrome.org
- Tony Attwood: Information and current research on Asperger's Syndrome, www.tonyattwood.com
- Autism Society of America (ASA): Information, resources, and links for families, professionals, and individuals with autism and regional support groups and chapters, www.autismsociety.org
- Asperger Syndrome and High Functioning Autism Association (AHA): Provides support and resources for the New York area, www.ahany.org

Temple Grandin: Information on her books, research, autism, Asperger's Syndrome, and her life, www.templegrandin.com

Rudy Simone: Information on her books, employment, women with AS, and relationships, www.help4aspergers.com

Americans with Disabilities Act: Information on the rights of those with disabilities and ASDs, www.ada.gov

Center for the Study of Autism: Information covering a wide variety of topics, www.autism.org

Stephen Shore: Information on his publications and to provide awareness of Asperger's Syndrome, www.autismasperger.net

Jesse Saperstein: Speaker, author, advocate, www.jessesaperstein.com

Peter Gollwitzer: Psychologist at NYU specializing in Implementation Intentions, www.psych.nyu.edu/gollwitzer/

GRASP Hudson Valley: Regional support group for adults with Asperger's Syndrome, www.grasp.org, www.facebook.com/pages/Grasp-Hudson-Valley