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Examining the Relationship Between Parental Overprotection, Use of Assistive Technology, and Independence With Routines Among Children With Physical Disabilities

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EXAMINING THE RELATIONSHIP BETWEEN PARENTAL OVERPROTECTION, USE OF ASSISTIVE TECHNOLOGY, AND INDEPENDENCE WITH ROUTINES AMONG CHILDREN WITH PHYSICAL DISABILITIES

by

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Abstract

The primary purpose of the present study was to investigate the relationships between parental overprotection/overindulgence, assistive technology utilization, and independence with routines among children with physical disabilities. Participants included 26 primary caregivers of children with physical disabilities age 6 to 12 (M = 8.65, SD = 2.00). Data regarding demographic information, parenting practices, the child's gross motor functioning, assistive technology (AT) use, independence with routines, and frequency of routines were obtained from the primary caregiver via an online survey. While no significant relationships between the variables of interest were observed after controlling for the child's age, gross motor functioning, and mental impairment, a moderately significant inverse relationship between parental overprotection and child independence with routines was observed, which may reach significance with a larger sample. Additionally, two new robust findings were discovered. A marginally significant negative correlation between frequency of routines and gross motor functioning was observed in addition to a significant positive correlation between frequency of routines and independence with routines. Finally, the study also contributed to the development of two new scales, the CRQ Independence scale and the Assistive Technology Use Scale. Overall, this study suggests that children with physical disabilities may benefit from more frequent AT use to assist in routine completion; they may also benefit from more frequent routines to assist in increased efficiency with routines, promoting independence.

Key Words: overprotection, assistive technology, independence, routines, children with physical disabilities

Table of Contents

List of Tables

List of Appendices

Examining the Relationship Between Parental Overprotection, Use of Assistive Technology, and Independence with Routines Among Children with Physical Disabilities

Introduction

One of the most difficult tasks that a parent has to face is the decision of when and how to grant their child independence. This difficulty especially holds true for parents of children with physical disabilities. For the parent of a child with a physical disability, a compromise must be established that balances the fine line of granting too much and too little independence (Gordon, 1992). The demands placed on parents of children with physical disabilities are considerable, especially if assistance from others is rarely provided. Such demands, known as caregiver burden, may contribute to the development of a maladaptive routine of "coddling," as opposed to a healthy routine of "assistive caring."

The concept of "coddling," which may be defined as a combination of the parental factors of overprotection and overindulgence, fails to consider typical changes that occur with growth and development for the child with a physical disability (Gordon, 1992). Thus, in relation to self-care routines or tasks in the environment, the parent of the child with a physical disability may develop a preference to complete the routine or task *for* the child, rather than *assisting* the child in the completion of the routine or task. As a result of both variables of parental time constraints and a perception of child vulnerability, parents may learn to "coddle" their child in order to protect their child from a predicted failure, even when the child is completely capable of completing the routine or task on his/her own. Thus, the child with a physical disability will not be granted practice with routines, thereby granting him/her less independence with routines in general.

Child routines of eating, grooming, dressing, maintaining continence, changing positions, moving around, climbing stairs, understanding requests, communicating basic needs, solving problems, playing, and interacting with peers must be established (Østensjø, Carlberg, & Vøllestad, 2005). A variety of environmental modifications, which includes an array of assistive technologies, may be used to support performance of daily activities for the child with a physical disability. The child's functional independence, the amount of caregiver assistance, and the demands associated with day-to-day caregiving all affect the role that assistive technologies play in the functioning of daily living for a child with a physical disability.

Assistive Technology (AT) is an umbrella term that includes assistive, adaptive, and rehabilitative devices for people with disabilities and also includes the process used in selecting, locating, and using them. For the child with a physical disability, AT has the potential to provide independence and facilitate communication by enabling the child in the performance of daily routines and tasks. By adapting to a child's disabilities, and supporting a child's abilities, AT may lessen both the physiological and psychological burden placed upon the child. Despite all of the benefits AT is able to provide, however, the potential of AT is frequently not realized. Studies have shown that AT abandonment rates may range to as much as 75% (Tewey, Barnicle, & Perr, 1994).

The underutilization of AT has been attributed to parent unwillingness to accept device use with their children, provider biases to work on typical skill development, inability to finance devices, lack of consensus about what comprises AT, and limited emphasis on or training about AT in early intervention programs (Kemp & Parette, 2000; Lahm & Sizemore, 2002; Sullivan & Lewis, 2000). Previous research has also focused on

and has indicated, “strategies for increasing assistive technology use are needed so that underutilization and abandonment do not continue to be reported trends” (Kling, Campbell, & Wilcox, 2010, p. 170). However, the present study identifies a gap in the literature. No known studies have examined the relationship between parental factors of overprotection/overindulgence and the utilization of assistive technology or the role of assistive technology use in the relation between parental overprotection/overindulgence and independence with routines among children with physical disabilities. The aim of the present study is to examine these predicted relations.

Independence with Routines

For the child with a physical disability, the acquisition of daily living skills may prove to be just as important as academic qualifications (Gordon, 1992). When observing daily living skills, it may be important to differentiate between what the child is really capable of (capacity) and what the child actually does within the particular context of life (performance; Cruz & Emmel, 2013). Child routines are defined as daily activities that occur on a regular and predictable schedule, supervised by at least one adult, and specific to an individual child (Henderson & Jordan, 2010; Sytsma, Kelley, & Wymer, 2001). Past research has indicated that routines provide the structure, organization, and parental involvement that children look for and may require (Nelson, Duffy, & Erwin, 1998; Nelson, Lott, & Glenn, 1999). However, for children with physical disabilities, routines provide the practice for activities of daily living necessary for long-term independence.

The needs, behaviors, and capacities of a child with a physical disability may either be ignored or enhanced by factors of the physical environment. In cases of overprotective caring and a disregard for the child’s independence, the environment may contribute to a

decreased sense of autonomy or a loss of capacity. The psychological concept of Learned Helplessness explained by Maier and Seligman (1976) might best describe the environment's impact on the independence of the child with a physical disability. If overprotecting/overindulging parenting practices exist, the parent may consistently attempt to perform routines for the child in a better, faster, or neater way. For example, if a child attempts to feed him or herself, but the act of self-feeding is deemed "too messy" or "too time-consuming" by the overprotective/overindulgent parent, the parent may develop a desire to perform the routine or task for the child. In this scenario, the child with a physical disability may eventually "give-up" on the performance of self-feeding because the act of self-feeding will never be performed "well enough" to satisfy the overprotective/overindulgent parent. The overprotective/overindulgent parent may continue to assist the child, without consideration of the child's need for independence. This assistance reinforces to the child with a physical disability that he or she is unable to perform a routine or task in the "correct" way; subsequently, the child learns that his/her behavior does not have an effect on his/her environment.

Ironically, in the parent's attempt to relieve the child's physical burden, the parent is doing more harm than good. For example, if personal assistance is provided for routines or tasks, even if the completion of the routine or task is in the child's performance capacity, the ability for the child to perform the routine or task independently may disappear with time. As a result of parental overprotection/overindulgence, it becomes redundant for the child to autonomously complete the routines or tasks. In this redundancy, the child misses training with the routine or task, and may eventually unlearn what was previously in his/her performance

capacity; thus, the child loses a sense of independence. It may be that the phenomenon of Learned Helplessness is especially prevalent among children with physical disabilities because parental perceptions tend to ignore competencies while focusing on vulnerabilities.

Rotter's (1954) Locus of Control Theory may also play an important role in the independence of the child with a physical disability. High internal locus of control is defined as the ability for an individual to attribute life events as a direct consequence of one's own behavior. Beier's research (as cited in Kranz, Gallenkamp, & Picot, 2010) has demonstrated that individuals with a high internal locus of control have more success when using technology. However, in environments of overprotective and overindulgent caring, the development of a child's internal locus of control may be greatly prohibited. An environment typical of constant parental assistance and supervision may prompt the child with a physical disability in the development of external control beliefs.

Bandura (1999) described a concept of self-efficacy, which may additionally influence a child with a physical disability's sense of independence. Self-efficacy may be described as individuals' perceptions concerning their capacity to manipulate life situations and events. Individuals with strong perceptions of self-efficacy tend to regard difficult tasks as challenging rather than intimidating (Bandura, 1999). Additionally, failures are more likely to be attributed to personal factors, such as a lack of effort or knowledge. Thus, perceptions of self-efficacy may greatly impact factors of motivation in the utilization of assistive technology. Research has demonstrated that a higher internal locus of control is significantly correlated with higher assistive technology utilization (Tacken, Marcellini, Mollenkopf, Ruoppila, & Szeman, 2005). However, in

overprotecting and overindulging environments, the development of self-efficacy among children with physical disabilities may be hindered.

Parental Factors of Overprotection/Overindulgence

As the result of an increased perception of child vulnerability, intensive medical management, and a plethora of caregiving demands placed upon parents of children with physical disabilities, parental factors of overprotection and overindulgence are common (Holmbeck et al., 1997; Kazak, Segal-Andrews, & Johnson, 1995; Quittner, 1992). In many cases, parents of children with physical disabilities are warranted in their protective behaviors. However, *excessive* protection may develop for many parents of children with physical disabilities, which may hinder the child's independence as a whole. Studies have suggested that parental overprotection may have detrimental effects on the developing child or adolescent; for example, parental overprotection may produce externalizing behavior problems, higher rates of oppositional behavior, or symptoms of depression (Burbach, Kashani, & Rosenberg, 1989; Cappelli, McGrath, MacDonald, Katsanis, & Lascelles, 1989; Mayes, Handford, Kowalski, & Schaefer, 1988; McFarlane, 1987; Miller, King, Shain, & Naylor, 1992).

The components of parental overprotection include interchangeable terms such as over anxiousness, overindulgence, over solicitousness, and over protectiveness. Both parental behaviors of indulgence and control have been regarded as overprotective; however, the antecedents and consequences of indulgence and control may be rather dissimilar. While attempting to protect a child from external threats is normative, the term "overprotection" implies behaviors beyond what the majority of parents would do when presented with analogous situations.

Levy's (1931) original work on overprotection defined parental overprotection as levels of maternal or paternal protection that are excessive, taking into account the developmental level and abilities of the child. Subsequent literature has explored different "types" of overprotection. Specifically, Green and Solnit (1964) suggest a Vulnerable Child Syndrome that may prompt a more indulgent style of parenting.

The Vulnerable Child Syndrome considers parental feelings regarding the health of children with chronic illnesses or physical disabilities. Specifically, the Vulnerable Child Syndrome considers an enduring fear that may be unconscious to the parent that the child will die prematurely. Green and Solnit (1964) identified probable outcomes of the vulnerable child form of overprotection, including excessive use of medical services, psychosomatic illnesses, separation difficulties, and overindulgence.

Parental overindulgence is frequently distinguished by parental feelings of guilt and an anxious attachment to the child. As the child gains increasing levels of independence, however, the parent's ability to set limits becomes increasingly more difficult as thoughts of anxiety and guilt begin to re-emerge. In some scenarios, the parent may even find the child's dependence upon them to be reinforcing. Thus, an overprotective/overindulgent style of parenting is characterized by a parent who has difficulties in the separation from the child, is highly supervising and vigilant, and discourages independent behavior (Thomasgard & Metz, 1993).

In a study conducted by Holmbeck et al. (2002), a negative correlation between parental overprotection and general independence among children with physical disabilities was observed. By both observational and self-report measures, excessive levels of overprotection were found to be associated with low levels of preadolescent

decision-making autonomy as well as with parents being unlikely to grant their child independence in the future (Holmbeck et al., 2002). Therefore, it is a rational prediction that parental overprotection/overindulgence and independence with routines among children with physical disabilities will also be negatively correlated.

Utilization of Assistive Technology

By identifying the factors that influence the utilization of AT, interventionists may be better assisted in the design and implementation of successful interventions to increase the use of AT (Johnston & Evans, 2005). The manipulation of certain parameters of reinforcement in order to influence an individual's outcome behavior may be identified as the concept of matching theory (Mace & Roberts, 1993). Matching theory is grounded in the notion that, when an individual has the opportunity to decide between two or more possible responses, the response that the individual perceives as most efficient will be selected. The perception of efficiency is influenced by the rate of reinforcement and by the response effort.

Herrnstein (1961) argued that when an individual is presented with two or more decisions, the individual's selection would be directly dependent on the rate of reinforcement delivered for each option; that is, unless one response proves more effortful than the other. For example, if an individual is reinforced twice as often for saying, "please," as they are for throwing a tantrum, matching theory would predict that the individual will choose to use manners more frequently than they will choose to tantrum; that is, unless the effort required to say, "please," requires more effort than throwing a tantrum. In the implementation of assistive technology interventions, matching theory plays a significant role.

To better illustrate this point, consider a child with a physical disability who makes the decision to abstain from utilizing assistive technology, such as an adaptive utensil or plate, while eating. The child thereby fails to eat autonomously, although the utilization of assistive technology might have enabled the child to do so. In this scenario, the child's lack of independence may be associated with the amount of physical effort required to utilize the assistive technology. For example, the motor demands necessary to utilize the adaptive utensil or plate may pose a physical burden, in which case the child would have no preference to utilize the assistive technology. However, the child may also choose to refrain from utilizing assistive technology because the quality of reinforcement provided is not great enough to justify its use. For example, if the child receives food from a personal assistant regardless of whether he or she eats autonomously, the child thereby may have little incentive to exert both the time and the practice towards gaining a sense of independence.

The physical burden that AT imposes may greatly contribute to its underutilization. Parents and children alike may not wish to spend the extra time and effort to "set up" or "put on" the AT devices. It is easily plausible that AT may increase the response effort while delaying the reinforcer. In addressing the problem that the physical burden of AT inflicts, the parent may desire to complete routines and tasks for the child in order to lessen the burden placed on both parties involved. Additionally, some AT devices may place physical discomforts on the child, thus increasing potential punishment contingencies as well. If the child fusses that the AT device is physically burdensome or uncomfortable, for example, parental feelings of guilt may arise if the parent forces the child to use his or her AT device.

A pilot study conducted by Gitlin, Levine, and Geiger (1993) examined the reasons for the abandonment and underutilization of assistive technologies that assisted users with activities of daily living. The study found that one of the most common reasons for the underutilization of assistive devises was the fact that the individuals were able to rely on personal assistance to complete the routines or tasks. However, in the dependence upon personal assistance to complete daily routines, the child with a physical disability was unlikely to learn how to perform simple routines or tasks that were in his/her performance capacity, even in the transition to adult life. Assistive technologies and environmental modifications, when appropriate, are generally preferred for healthy development. AT may enhance a sense of independence among children with physical disabilities and offer benefits to parents through a decrease in both monetary expenses and long-term caregiver burden. Thus, the utilization of AT may assist both parties involved in enhancing quality of life.

Despite theoretical support, there is no known empirical examination of the relationship between parental factors of overprotection/overindulgence and the utilization of assistive technology. Additionally, although the role of assistive technology use in the relation between parental overprotection/overindulgence and children's independence with routines among children with physical disabilities has been supported in psychological theory, there is no known study that empirically examines the relationship.

Hypotheses

The primary purpose of the present study was to investigate the relationships between parental overprotection/overindulgence, assistive technology utilization, and independence with routines among children with physical disabilities. Specifically, it was

hypothesized that parental overprotection/overindulgence would inversely correlate with assistive technology use and independence with routines and that assistive technology use would positively correlate with independence with routines among children with physical disabilities.

Pending support of these relations, a secondary hypothesis was proposed examining assistive technology use as a mediator in the relationship between parental factors of overprotection/overindulgence and independence with routines among children with physical disabilities. Specifically, the secondary hypothesis proposed that use of assistive technology may be a mechanism through which parental overprotection/overindulgence relates to children's independence with routines. Thus, parents of children with physical disabilities who are more overprotective/overindulgent are less likely to utilize assistive technology, thus leading to less child independence with routines; similarly, less overprotective/overindulgent parents of children with physical disabilities are more likely to utilize assistive technology, thus leading to greater independence with routines.

Method

Participants

The present study sampled 26 primary caregivers of children with physical disabilities age 6 to 12 ($M = 8.65$, $SD = 2.00$) drawn from organizations serving children with physical disabilities. In order to qualify for participation, the parent had to be 18 years or older and the child had to have a primary physical disability. Primary caregivers were excluded if the child's physical disability was exclusively due to mental retardation or a pervasive cognitive developmental disorder; if they reported to have a child less than

6 years or more than 12 years in age; or if they reported to have a child without a physical disability. Of the 26 children reported on, 19 were male and 22 were White. Of the physical disabilities reported, 8 were diagnosed with Cerebral palsy, 11 were diagnosed with Muscular Dystrophy, and 7 were diagnosed with various other physical disabilities. Additionally, 10 were reported to have dual diagnoses of a mild to moderate mental delay. The majority of the caregivers were biological parents (n = 23), mothers (n = 22), and married (n = 20). The median education level for caregivers and their spouse was that of a University graduate and the median household income was approximately $90,000. Further details regarding demographic features of the sample are provided in Table 1.

Measures

Demographics. General demographic information was collected about the family through the caregiver. The information gathered about the caregivers included gender, age, race, marital status, relationship to child, occupation, education level, and household income. In addition to information regarding their physical disability and cognitive ability, the child's sex, age, race, and gross motor classification were obtained.

Functional Impairment. The Gross Motor Function Classification System – Expanded and Revised (GMFCS – E & R; Palisano, Rosenbaum, Bartlett, & Livingston, 2007) is a five-level classification system (*1-walks without limitations* to *5-transported in a manual wheelchair*) separated between age groups designed for use with children with Cerebral palsy, but with application to other conditions. Distinctions are based on functional limitations, the need for hand-held mobility devices (such as walkers, crutches, or canes) or wheeled mobility, and to a much lesser extent, quality of movement. Although the GMFCS was designed as a clinician rating based on operationally defined

definitions of mobility, the present study obtained parent-reported classifications of the child with a physical disability based on those definitions. The GMFCS has demonstrated moderately high inter-rater reliability, Kappa = 0.662, $p < 0.01$. The age grouping, "between 6th and 12th birthday" was used. The GMFCS – E & R was included as a control variable in the present study.

Independence with Routines. A modified version of the Child Routines Questionnaire (CRQ; Jordan, 2003; Sytsma et al., 2001) was used to measure independence with routines. The CRQ is a 39-item measure that uses a 5-point Likert scale (*0-almost never* to *4-nearly always*) to examine the frequency of child routines from the parent's report. Four domains of routines are assessed with the CRQ, which include Daily Living Routines, Household Responsibilities, Discipline Routines, and Homework Routines, and are summed to form a Total Score. The CRQ has reported strong internal consistency (.90) and test-retest reliability (.86). Coefficient alpha for the CRQ Total (Frequency) scale in the present sample was also .90.

The CRQ was modified to include a second scale because an instrument to examine the variable "independence with routines" did not exist. In addition to rating each item with respect to frequency of routine occurrence, participants were also asked to rate how independently the child completed the routine. Independence is scored on a 5-point Likert scale from "not at all" independently to "fully" independently. The additional scale used 25 of the original 39 items from the CRQ. Items from the original CRQ that were excluded from the CRQ Independence scale included 3 validity items and 11 items not applicable to the concept of independence. The modified CRQ including the

Independence scale is provided in Appendix A. Coefficient alpha for the CRQ Independence scale was .97 with item-total correlations ranging from .49 to .87.

Parental Overprotection/Overindulgence. The Vulnerable Child/Overprotecting Parent Scale (VCOPS; Wright, Mullen, West, & Wyatt, 1993) is a 28-item questionnaire that uses a 6-point Likert scale (*1-extremely true* to *6-extremely untrue*) to measure the overprotecting vs. optimal developmental stimulation tendencies for parents of physically "vulnerable" children. The VCOPS has demonstrated great internal consistency (coefficient alpha = .84), high validity (.97), and adequate test-retest reliability (.74 – .77). Weighted and unweighted scores were calculated and compared with respect to item-total correlations and coefficient alpha in the present sample. For both the weighted and unweighted scoring, the VCOPS demonstrated poor alphas in the present study; the weighted alpha was .195, while the unweighted alpha was .771. Wording on items 13 and 24 with negative item-total coefficients suggested that these items warranted reverse scoring (i.e., "I encourage my child…" vs. "I do not encourage my child…"). Following this, item-total correlations were calculated and items were removed in batches until all remaining items had item-total correlations > .10. This resulted in exclusion of items 1, 3, 12, 14, 21, 22, and 28 and an improvement in coefficient alpha to .838 for the new 21-item unweighted VCOPS.

Assistive Technology Use Scale. Participants were given a list of 15 examples of assistive technologies that relate to the performance of a particular routine developed for this study based on commonly occurring child routines measured by the CRQ. For example, when asked about eating routines, participants were asked about the frequency with which the child with a physical disability utilizes assistive technology in the

performance of that particular routine. Participants were prompted that, “adaptive feeding equipment includes, but is not limited to: utensil with an adapted handle, weighted utensil, rocker knife, rimmed plate, flexible straw, or tube feeding machine.” The participants’ answers followed a 5-point Likert scale (*0-never/not applicable* to *4-nearly always*) to measure the utilization of assistive technologies during a given routine. Participants were also permitted to mark an item not applicable (NA). All NA coded items were scored as 0 in summing the measure, in accord with the scoring used for the CRQ. Coefficient alpha was .903 with item-total correlations ranging from .28 to .85 in the present sample.

Procedures

Following university IRB approval, various parent support groups and clinics serving youth with MD and CP were approached about inviting parents to participate in the study. Organizations were asked to provide parents of children meeting study criteria with information about the study via flyers, newsletters, or email communications providing a link to the online survey. Interested caregivers were asked to navigate through a packet of instructions, consent form, and various parent report questionnaires via a secure online website (Qualtrics). The child did not directly participate. The measures that were collected include: demographic information, measures of functional impairment, parental overprotection/overindulgence, child utilization of assistive technology, and child independence with routines. The first part of the online form included both a consent form for participating in the present study as well as study criteria for participating. The criteria included the caregiver’s relationship with the child, the physical disability of the child, the cognitive ability of the child, as well as the child’s age. Navigation to the subsequent study measures would terminate if the participant

failed to provide an electronic signature, reported to have a child less than 6 years or more than 12 years in age, or reported to have a child without a physical disability. Although 36 participants responded to the survey, 6 of those individuals failed to complete the survey. Of those 30 participants, 4 participants were excluded from the study due to exclusion criteria. Study participants who provided their contact information were entered into a drawing for several gift cards to a national retailer (e.g., Amazon) upon conclusion of data collection as an incentive to individuals who participated. All data were entered into a spreadsheet and cleaned for analysis.

Results

Missing Data

Participant questionnaires that were identified as incomplete were prorated through a process of averaging the participant's completed items on the subscale and replacing the incomplete items with the averaged value. If subscales were not applicable for a given measure, items comprising the scale as a whole were used to treat missing data. For the VCOPS, 1.09% of total data were missing; for the CRQ, 0.59% of total data were missing; for the CRQ Independence scale, 0.62% of total data were missing; and for the AT Use Scale, 0.51% of total data were missing.

Preliminary Analyses

To determine if any variables would need to be controlled in the main analysis, preliminary analyses were conducted. Correlations between the demographic variables and the dependent variable were created using Pearson's *r* (for continuous variables) and point-biserial correlations to establish zero-order relations. Demographic variables that were significantly related to the dependent variable (independence with routines) were

identified for control in the main analyses (see Table 3). Results indicated significant correlations between independence with child routines and the child's age, $r = .395$, $p = .046$; presence or absence of mental impairment, $r = .675$, $p < .001$; and gross motor functional impairment, $r = -.542$, $p = .004$. Thus, these variables were identified as covariates in the main analyses.

Main Analyses

To test the first set of hypotheses, bivariate correlations among parental overprotection/overindulgence, assistive technology utilization, frequency of routines, and independence with routines were examined after controlling for demographic covariates (see Table 4). No significant relationships between variables of parental overprotection, child AT use, and child independence with routines were supported. However, the variables independence with routines and frequency of routines were significantly correlated, $r = .492$, $p = .017$.

Before testing for mediation to address the secondary hypothesis, the zero-order correlations between the initial variable (parental overprotection) and the outcome variable (independence with routines) must be identified as significant. A significant correlation must also exist between the initial variable and the mediator (AT use) and between the mediator and the outcome. If these relationships are not supported, there is no reason to run a multiple regression analysis testing for mediation (Baron & Kenny, 1986).

Preliminary analysis correlations did not prove significant for further mediational testing. The variable parental overprotection was not significantly correlated with AT use, $r = .003$, $p = .988$. Additionally, the variable parental overprotection was significantly

correlated with child independence with routines when running zero-order correlations, r = -.392, p = .048. However, parental overprotection and child independence with routines were no longer significantly correlated after controlling for child age, gross motor functioning, and mental impairment (see Table 4).

Aside from the predicted relations, other significant relations were observed: gross motor functioning and AT use were significantly correlated, r = .640, p < .001, and independence with routines and gross motor functioning were significantly correlated, r = -.542, p = .004. Additionally, an inverse relation between frequency of routines and gross motor functioning was marginally significant, r = -.369, p = .064 (see Table 3).

Discussion

The primary purpose of the present study was to examine the relations among parent overprotection, children's use of assistive technology, and independence with routines. A secondary purpose was to test assistive technology use as a mediator of parental overprotection and independence with routines among children with physical disabilities. It was predicted that higher levels of overprotective parenting would be associated with less frequent AT use, which would be further associated with less independence with routines. Similarly, parents who were identified as granting their child optimal developmental stimulation would prompt their child to use AT more frequently; therefore, children would have more independence with routines.

After controlling for significant relations with child age, mental impairment, and a particularly strong relation with gross motor functioning, no significant relationships between variables of parental overprotection, child AT use, and child independence with routines were supported. However, an explanation for the insignificant relationship

between the variables of parental overprotection and child independence with routines may be attributed to the small sample size. The magnitude was moderately strong and the relation was in the expected direction, r = -.323, suggesting that this relation may reach significance in a larger sample. The relation between AT use and independence with routines was of similar magnitude, yet in the opposite of the expected direction, with higher AT use being related to lower independence with routines. If this finding is maintained in a larger sample, it may suggest that the relationship between independence with routines and AT use needs to be re-evaluated. Taken together with the finding that greater gross motor impairment was associated with less independence, these findings suggest that children who are more physically disabled tend to have less independence with routines and use AT more. However, these findings should be interpreted with caution given the limited sample size and the methodology and instrumentation used. Although the Assistive Technology Use Scale demonstrated good initial internal consistency reliability, further evidence is needed to examine the validity of the scale in order to determine if the scale is actually a good indicator of AT use. Future studies may choose to test this finding with alternative methodologies to see if the findings are replicable when other types of instrumentation are used.

A further explanation as to why no significant relationships were observed between the variables of interest after controlling for the covariates may be attributed to the strong, significant relationship between gross motor functioning and AT use. In controlling for gross motor functioning, variability in AT use was substantially reduced. Therefore, the intertwined relationship between gross motor functioning and AT use may

partially contribute to the lack of support for the hypotheses. Future studies should also examine relations with AT use without controlling for gross motor functioning.

The study did contribute to the development of two new scales, the CRQ Independence scale and the Assistive Technology Use Scale, that both had good initial reliability estimates. With further development and psychometric evaluation of these instruments, the newly developed scales may prove useful for future studies pertaining to independence with routines or assistive technology use.

Despite lack of support for the proposed hypotheses and the small sample size, this study did contribute several new and likely robust findings. One finding was the marginally significant inverse relationship between parental overprotection and child independence with routines. It was observed that more overprotective parents have children that are less independent with routines. Similarly, it was observed that less overprotective parents have children that are more independent with routines. Although this relationship was not found to be mediated by AT use, this relationship may suggest that overprotective parents have a tendency to do more routines for their child with a physical disability. Future studies should examine this relationship further to obtain more confirmation for the development of an intervention study.

Another robust finding was the marginally significant negative correlation between frequency with routines and gross motor functioning. In other words, children with more severe physical disabilities have less frequent routines. Conversely, children with less severe physical disabilities have more frequent routines. Although this finding was only marginally significant, the magnitude of the correlation was strong given the small sample. This finding may be attributed to the high energy and time demands placed

on the caregiver. Thus, additional efforts, such as enforcing routines or promoting child independence, may take less precedence over completing activities of daily living due to the child's ever-changing needs and abilities.

A study by Crowe and Florez (2006) stated that mothers of children with physical disabilities reported very few "typical days" and consistently adapted activities of daily living around their child's needs and daily challenges. Additionally, Kellegrew (2000) reported that mothers of children with physical disabilities consistently changed their daily routines in order to support their child's ability for that day. These studies indicate that while a child with a physical disability may be perfectly able to perform a routine independently one day, time limitations, fatigue, or pain may hinder a child from performing that routine with consistent independence.

An additional finding was the positive correlation between frequency with routines and independence with routines. This finding may support the notion that routines assist with child independence. Routines provide the experience necessary for completing a task, experience assists in efficiency, and efficiency results in less energy expended in the performance of a task. By contrast, due to the cross-sectional nature of this study, it may suggest that children with greater independence are more capable in engaging in more regular daily routines and doing so with greater frequency. This finding may also offer preliminary support for the current measure of independence with child routines, the CRQ Independence scale, which was added to the CRQ for the present study. Future studies may choose to utilize this measure when examining the construct of independence with routines.

According to Kellegrew (2000), routines for children with physical disabilities offer many opportunities for skill practice and development necessary for independent living. Thus, children with physical disabilities may benefit from more frequent AT use to assist in routine completion; they may also benefit from more frequent routines to assist in increased efficiency with routines, which may promote independence.

The primary limitation of the present study was the small sample size. One factor that inhibited initiation of data collection was an issue that arose due to finding a particular scale unusable due to copyright laws. Additionally, many of the scales used in this study had to be developed (AT Use Scale) or modified (CRQ Independence scale) due to lack of available measures in the public domain, which was necessary for posting items online via Qualtrics. Although intensive efforts were made to recruit participants through over a thousand organizations serving this specialized sample of children with physical disabilities, it was difficult to reach the proposed number of caregivers with the necessary criteria within the time constraints needed to complete data collection for the Honors Thesis. However, I aim to continue data collection beyond graduation in an effort to obtain publishable findings that may contribute to the literature on independence among children with physical disabilities.

Another limitation was lack of direct, personal contact with families. While targeting large organizations serving children with physical disabilities had potential for reaching a large number of participants, many of the individual organizations did not reply to my requests for advertising the study or had policies against such practices. Future studies should attempt to reach families directly through medical clinics and schools. Additionally, smaller organizations addressing the needs of individuals with

more rare physical disabilities proved to have less legislation in place and were better able to promote recruitment for research studies.

A further limitation included scoring on one of the measures used, the VCOPS. The VCOPS initial development article did report preliminary subscales, but when looking at the individual item correlations, the subscales did not make sense and were confusing to interpret. Additionally, no direct information was given regarding reverse-scoring items, so it was left to the primary investigator to interpret how certain items should be scored. The original 28-item had poor weighted and unweighted alphas, so the 21-item VCOPS was used in order to try to compensate for the measure's shortcomings. Use of this measure may have contributed to the weak, nonsignificant relation between parental overprotection and AT use. Further refinement of the VCOPS or other measures of parental overprotection should be considered for future studies examining this construct.

In conclusion, while the present study did not identify significant relationships between the variables of interest, the study did discover a marginally significant inverse relationship between parental overprotection and child independence with routines, which may reach significance with a larger sample. Future studies may focus on suggested recruitment methods in order to reach a sample size more reflective of children with physical disabilities. Additionally, there was a robust finding that frequency of routines and independence with routines were significantly correlated. A recommendation for future studies may include examining the relationship between frequency of routines and independence with routines for a sample of children without mental or physical disabilities.

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Table 1
Participant Demographics

Variable	Total (n=26) n (%)
Child's Sex	
Male	19 (73.1)
Female	7 (26.9)
Child's Age M (SD)	8.65 (2.00)
6	4 (15.4)
7	6 (23.1)
8	3 (11.5)
9	3 (11.5)
10	5 (19.2)
11	2 (7.7)
12	3 (11.5)
Child's Race	
Caucasian	22 (84.6)
Nonwhite[a]	4 (15.4)
Child's Physical Disability	
Cerebral palsy	8 (30.8)
Muscular Dystrophy	11 (42.3)
Other[b]	7 (26.9)
Cognitive Delay	
None	16 (61.5)
Mild to Moderate	10 (38.5)
Child's GMFCS M (SD)	2.88 (1.03)
Level I	0 (0)
Level II	12 (46.2)
Level III	8 (30.8)
Level IV	3 (11.5)
Level V	3 (11.5)

Note: [a] Nonwhite was 7.7% Asian, 3.8% African American, and 3.8% Mixed or "Other." [b] Other was 7.7% Congenital Myopathy, 3.8% Arthrogryposis Multiplex Congenita, 3.8% Friedreich's Ataxia, 3.8% Peroxisomal Assembly Disorder, 3.8% Shaken Baby Syndrome, and 3.8% Tethered Spinal Cord.

Table 1 (Continued)
Participant Demographics

Variable	Total (n=26) n (%)
Parent Gender	
Male	4 (15.4)
Female	22 (84.6)
Parent Age M (SD)	41 (6.04)
20-29	1 (3.8)
30-39	10 (38.5)
40-49	12 (46.2)
50-59	3 (11.5)
Household Income	
Under $20,000	1 (3.8)
$20,000 - $29,999	1 (3.8)
$30,000 - $39,999	2 (7.7)
$40,000 - $49,999	1 (3.8)
$50,000 - $59,999	1 (3.8)
$60,000 - $69,999	2 (7.7)
$70,000 - $79,999	1 (3.8)
$80,000 - $89,999	4 (15.4)
$90,000 - $99,999	2 (7.7)
$100,000 - $109,999	4 (15.4)
$110,000 - $119,999	3 (11.5)
Over $150,000	4 (15.4)
Marital Status	
Single, Never Married	2 (7.7)
Married	20 (76.9)
Divorced	2 (7.7)
Living with Partner	2 (7.7)

Note: [a] Nonwhite was 7.7% Asian, 3.8% African American, and 3.8% Mixed or "Other." [b] Other was 7.7% Congenital Myopathy, 3.8% Arthrogryposis Multiplex Congenita, 3.8% Friedreich's Ataxia, 3.8% Peroxisomal Assembly Disorder, 3.8% Shaken Baby Syndrome, and 3.8% Tethered Spinal Cord.

Table 2
Reliability Analyses (n = 26)

	Mean	Standard Deviation	Cronbach's Alpha
VCOPS-21	36.555	9.099	.838
AT Use	14.305	14.575	.903
CRQ Independence	51.027	25.987	.971
CRQ Frequency	96.414	21.133	.901

Note. VCOPS = Vulnerable Child/Overprotecting Parent Scale; AT = Assistive Technology ; CRQ = Child Routines Questionnaire.

Table 3
Zero-Order Correlations between Demographics and Control Variables (n = 26)

	1	2	3	4	5	6	7	8	9	10
1. Child Age	–									
2. Child Gender[a]	-.247	–								
3. Child Ethnicity[b]	-.033	.222	–							
4. Gross Motor Functioning	.019	-.016	-.057	–						
5. Mental Impairment[c]	.344	.302	-.101	-.090	–					
6. Household Income	.220	.325	.112	.110	.413*	–				
7. Parental Overprotection	.004	.000	.115	.205	-.234	-.155	–			
8. AT Use	.254	-.194	.073	.640***	.100	.120	.003	–		
9. Independence with Routines	.395*	.187	.052	-.542**	.675***	.272	-.392*	-.321	–	
10. Frequency of Routines	.438*	.059	-.075	-.369	.584**	.050	-.383	-.177	.780***	–

Note. [a] Male = 0, Female = 1, [b] White = 1, Nonwhite = 2, [c] 1 = Present, 2 = Absent
*$p < .05$, ** $p < .01$, *** $p < .001$

Table 4
Partial Correlations Controlling Child Age, Gross Motor Functioning, and Mental Impairment (n=26)

	1	2	3	4
1. Parental Overprotection	–			
2. AT Use	-.160	–		
3. Independence with Routines	-.323	-.301	–	
4. Frequency of Routines	-.316	-.162	.492*	–

Note. AT = Assistive Technology
*$p < .05$

Appendix A

Modified Child Routines Questionnaire

Routines are events that occur at about the same time, in the same order, or in the same way every time. Please rate how often your child engages in each routine by circling a rating ranging from 0 (never) to 4 (nearly always) of *how often* your child has engaged in this routine in the last month. Please rate how independently your child completes a specific routine by selecting a rating ranging from 0 (not at all) to 4 (fully) as to how independently your child has completed a specific routine in the last month. **Please note: do not focus on the level of independence that your child *is able* to complete routines, but do focus on the level of independence your child *truly completes* routines.** If an item does not apply to your child, please mark "0."

Please reference the following descriptions of independence when deciding a rating for your child:
0 – Not independent at all; full assistance required with majority or all of the routine
1 – Minimally independent; caregiver contributes more effort than child
2 – Moderately independent; child and caregiver equally contribute effort
3 – Maximally independent; child contributes more effort than caregiver
4 – Fully independent; no assistance required with majority or all of the routine

My child…	How **often** does it occur at about the **same time** or in the **same way**? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always	How **independently** does your child **complete** this routine? 0 = Not at All 1 = Minimally 2 = Moderately 3 = Maximally 4 = Fully
1) … has a set routine for getting ready in the morning (e.g., brushing teeth, washing face, doing hair, and dressing)	0 1 2 3 4	0 1 2 3 4
2) … knows what will happen if he or she doesn't follow parent instructions or rules	0 1 2 3 4	
3) … takes turns with family members talking about their day	0 1 2 3 4	0 1 2 3 4
4) … has regular chores (e.g., takes out trash, helps with laundry, feeds/cares for family pet)	0 1 2 3 4	0 1 2 3 4
5) … straightens bedroom daily	0 1 2 3 4	0 1 2 3 4
6) … eats meals with family at the table each day	0 1 2 3 4	0 1 2 3 4
7) … hugs / kisses parent before bed	0 1 2 3 4	0 1 2 3 4
8) … cleans up food mess after snack	0 1 2 3 4	0 1 2 3 4
9) … spends special time talking with parent (e.g., in the car or before bed) each day	0 1 2 3 4	0 1 2 3 4
10) … practices for lessons, such as piano or dance at about the same time each day	0 1 2 3 4	
11) … does the same things each night before bed (e.g., brush teeth, read story, say prayers, and kiss parent goodnight)	0 1 2 3 4	0 1 2 3 4
12) … has household rules such as "No cursing", "No talking while eating" or "No running inside"	0 1 2 3 4	
13) … wakes up at about the same time on week days	0 1 2 3 4	0 1 2 3 4
14) … must finish household responsibilities (e.g., homework or chores) **before play time**	0 1 2 3 4	

My child…	How **often** does it occur at about the **same time** or in the **same way**? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always	How **independently** does your child **complete** this routine? 0 = Not at All 1 = Minimally 2 = Moderately 3 = Maximally 4 = Fully
15) … receives rewards or privileges for specific good behavior (e.g., finishing homework or completing chores)	0 1 2 3 4	
16) … eats dinner at about the same time each day	0 1 2 3 4	0 1 2 3 4
17) … brushes teeth before bed	0 1 2 3 4	0 1 2 3 4
18) … picks up dirty clothes after changing	0 1 2 3 4	0 1 2 3 4
19) … washes hands before mealtime	0 1 2 3 4	0 1 2 3 4
20) … reads or listens to the Bible or other devotional book with family each day	0 1 2 3 4	
21) … goes to bed at about the same time on week nights	0 1 2 3 4	0 1 2 3 4
22) … helps clean up after meals	0 1 2 3 4	0 1 2 3 4
23) … has time limits on fun activities (e.g., outside play, TV, video games, or phone use)	0 1 2 3 4	
24) … washes hands after using toilet	0 1 2 3 4	0 1 2 3 4
25) … is disciplined for misbehavior (e.g., time out, loss of a privilege, or spanking)	0 1 2 3 4	
26) … helps decide and prepare for family fun or events	0 1 2 3 4	
27) … receives smaller punishment for minor misbehavior (e.g., not following instructions), and larger punishment for major misbehavior (e.g., fighting)	0 1 2 3 4	
28) … picks up toys and puts them away when done playing	0 1 2 3 4	0 1 2 3 4
29) … eats breakfast at about the same time and place (e.g., at kitchen table or at school) each morning	0 1 2 3 4	0 1 2 3 4
30) … makes bed each morning	0 1 2 3 4	
31) … helps puts things away after shopping	0 1 2 3 4	0 1 2 3 4
32) … is praised or rewarded for specific good behavior (e.g., "I like the way you put away your toys")	0 1 2 3 4	
33) … says prayers before meals	0 1 2 3 4	
34) … takes part in "family time" each week when the family does planned activities together (e.g., play games, watch movies, go out to eat)	0 1 2 3 4	0 1 2 3 4

The next questions are about school and homework.

Does your child attend school?	**YES**	**NO**

If you answered "NO," please stop here and go to the next page. If you answered "YES", please continue.

Has your child attended school in the past month?	**YES**	**NO**

If you answered "YES," please continue with #35.

If you answered "NO," please answer #35 to #39 based on how frequently your child engaged in these activities during the LAST MONTH school was in session.

My child…	How **often** does it occur at about the **same time** or in the **same way**? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always	How **independently** does your child **complete** this routine? 0 = Not at All 1 = Minimally 2 = Moderately 3 = Maximally 4 = Fully
35) … shows parent school work after school (e.g., art work or spelling test)	0 1 2 3 4	0 1 2 3 4
36) … begins homework at about the same time and place (e.g., at the kitchen table) during the week	0 1 2 3 4	0 1 2 3 4
37) … is supervised by an adult who helps child with homework by explaining tasks, demonstrating the task, and/or checking the answers when it is completed.	0 1 2 3 4	
38) … completes homework	0 1 2 3 4	0 1 2 3 4
39) … studies for tests (e.g., weekly spelling test)	0 1 2 3 4	0 1 2 3 4

Appendix B

Assistive Technology Use Scale

Assistive Technology (AT) is any device or piece of equipment that a person with a disability may use in order to maintain or improve functional capacity. AT can range from low-tech devices, such as a specialized pen grip or walker, to high-tech devices, such as a power wheelchair or specialized computer software. Please rate how often your child uses Assistive Technology/Adaptive Equipment with the completion of a specific routine by selecting a rating ranging from 0 (never) to 4 (nearly always) of how often your child used an adaptive device with a given routine in the last month. If an item does not apply to your child, please mark "NA."	How **often** does your child use Assistive Technology (AT) with routines? 0 = Never 1 = Rarely 2 = Sometimes 3 = Often 4 = Nearly Always NA = Not Applicable
1) How often does your child use assistive technology with morning routines? • Adaptive equipment includes, but is not limited to: weighted toothbrush, adaptive clothing, buttonhook, sock aid, or shoehorn.	0 1 2 3 4 NA
2) How often does your child use assistive technology with family communication routines? • Adaptive equipment includes, but is not limited to: adapted telephone, adaptive communication device, or hearing aid.	0 1 2 3 4 NA
3) How often does your child use assistive technology with a chore routine? • Adaptive equipment includes, but is not limited to: electric wheelchair, manual wheelchair, walker, cane, ramps, reacher/grabber tool, or crutches.	0 1 2 3 4 NA
4) How often does your child use assistive technology with routines for straightening his/her bedroom? • Adaptive equipment includes, but is not limited to: electric wheelchair, manual wheelchair, walker, cane, ramps, reacher/grabber tool, or crutches.	0 1 2 3 4 NA
5) How often does your child use assistive technology with mealtime routines? • Adaptive equipment includes, but is not limited to: utensil with an adapted handle, weighted utensil, rocker knife, rimmed plate, flexible straw, or tube feeding machine.	0 1 2 3 4 NA
6) How often does your child use assistive technology with routines for helping to clean up food? • Adaptive equipment includes, but is not limited to: electric wheelchair, manual wheelchair, walker, cane, ramps, reacher/grabber tool, or crutches.	0 1 2 3 4 NA
7) How often does your child use assistive technology with bedtime routines (e.g., brush teeth, read story, say prayers, and kiss parent goodnight)? • Adaptive equipment includes, but is not limited to: grab bars, bath bench, shower chair, extended back brush, or extended handle wash mitt.	0 1 2 3 4 NA
8) How often does your child use assistive technology with wake-up routines? • Adaptive equipment includes, but is not limited to: adapted alarm clock or adapted light switch.	0 1 2 3 4 NA
9) How often does your child use assistive technology with dental hygiene routines? • Adaptive equipment includes, but is not limited to: electric toothbrush, water pick, or weighted toothbrush.	0 1 2 3 4 NA
10) How often does your child use assistive technology with routines for picking up clothing? • Adaptive equipment includes, but is not limited to: electric wheelchair, manual wheelchair, walker, cane, ramps, reacher/grabber tool, or crutches.	0 1 2 3 4 NA
11) How often does your child use assistive technology with hand-washing routines? • Adaptive equipment includes, but is not limited to: grab bars or hand wipes.	0 1 2 3 4 NA

12) How often does your child use assistive technology with routines for putting away toys? • Adaptive equipment includes, but is not limited to: electric wheelchair, manual wheelchair, walker, cane, ramps, reacher/grabber tool, or crutches.	0 1 2 3 4 NA
13) How often does your child use assistive technology with routines for putting away shopping items? • Adaptive equipment includes, but is not limited to: electric wheelchair, manual wheelchair, walker, cane, ramps, reacher/grabber tool, or crutches.	0 1 2 3 4 NA
14) How often does your child use assistive technology with homework routines? • Adaptive equipment includes, but is not limited to: electronic page-turners, magnifier, adaptive writing device, or adaptive educational computer software system.	0 1 2 3 4 NA
15) How often does your child use assistive technology with test-studying routines? • Adaptive equipment includes, but is not limited to: electronic page-turners, magnifier, adaptive writing device, or adaptive educational computer software system.	0 1 2 3 4 NA

Appendix C

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NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.
  Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **13101708**
PROJECT TITLE: **Parenting, Assistive Technology Use, and Independence with Routines Among Children with Physical Disabilities**
PROJECT TYPE: **New Project**
RESEARCHER(S): **Kelsey Shinnick**
COLLEGE/DIVISION: **College of Education and Psychology**
DEPARTMENT: **Psychology**
FUNDING AGENCY/SPONSOR: **N/A**
IRB COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF APPROVAL: **10/22/2013 to 10/21/2014**

Lawrence A. Hosman, Ph.D.
Institutional Review Board