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Virtual Child-Rearing: An Examination of Positive Parenting Practices through the Theory of Planned Behavior

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Virtual Child-Rearing: An Examination of Positive Parenting Practices through the Theory of

Planned Behavior

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Abstract

Ajzen's theory of planned behavior (TPB) evaluates attitudes, subjective norms and perceived behavioral control toward a specific behavior as a way to predict intentions to perform a given behavior. Increase in intentions is said to increase the accuracy of predictions of the actual performance of that behavior. The theory has received considerable support and has been used to predict a wide array of behaviors. In the present study, the MyVirtualChild© program was used to examine positive parenting practices through the TPB constructs. Twenty-two participants completed the study and were randomly assigned to the experimental *(n* = 12) or control group *(n* = 10). Both groups completed pre- and post-test questionnaires, and their responses were compared to examine differences between the experimental and control group at post-test. Results indicated that there were no significant differences between pre- and post-test scores in the TPB variables (attitudes, subjective norm, perceived behavior control and intentions) for both groups and there were no significant differences between the scores of the two groups on the post-test TPB variables. However, significant differences were found between the pre- and post-test scores on the Child Development Knowledge questionnaire, with the experimental group scoring higher than the control group. Regression analyses also revealed that child development knowledge was the most significant predictor of post-test intention scores. These findings might suggest that increased knowledge of child development may have an influence on intentions to engage in positive parenting behaviors and could be a target for parenting interventions.

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Numerous studies have demonstrated that people, especially children, learn by imitating

others, particularly models that are deemed to be of higher authority and towards whom the

learner has high respect. As such, parents are often models for their children. Not only do

children imitate their parents' behavior, but they often acquire and demonstrate this behavior in a

way that shapes how they will act in future situations (Bandura, 1977). For example,

McCullough, Harding, Shaffer, Han, and Bright (2014) found that mothers who displayed more

anger, psychological control, unavailability and hostility toward their child during a conflict

discussion task were more likely to report having experienced emotional abuse by their parents

during childhood compared to mothers who demonstrated more warm and adaptive behaviors. In

addition, children whose mothers encouraged them to take the perspective of others and who

demonstrated more cognitive empathy in front of them had more developed empathy skills

(Farrant, Devine, Maybery, & Fletcher, 2012). These findings highlight the impact that

children's experiences with their caregivers have on future parenting behaviors.

Besides being a source of learning a wide array of behaviors, parenting behaviors can

have a direct or indirect impact on children's outcomes. Studies that have focused on

distinguishing between positive and negative parenting practices are numerous, but when viewed

in conjunction there are several behaviors that are consistently found to be associated with better

child outcomes. Rowe, Zimmer-Gembeck, Rudolph, and Nesdale (2015), for instance, explained

that positive parenting practices include those that create a supportive, warm and accepting

environment, all of which can affect children's future cognitive development starting as early as

infancy. Furthermore, Landry, Smith, Swank, Assel, and Vellet, (2001) observed parent-child

interactions and determined positive parenting practices as positive mannerisms and tone of voice when the child was an infant, and more use of praise and less criticism during the preschool years. The results indicated that, for optimal cognitive outcomes, consistent responsiveness and use of positive parenting practices starting in infancy and extending into the child's preschool years is imperative. Additionally, for racial minority youth, parental monitoring, warmth and knowledge of their children's activities were positively associated with adolescents' intrinsic motivation in school and their school-related self-esteem, while they were negatively associated with having trouble in school (Lowe & Dotterer, 2013).

Positive parenting is also characterized by appropriate forms of discipline and encouragement through the use of praise and rewards (Frazer & Fite, 2016) and setting limits in a way that is not perceived as coercive or hostile (Rowe et al., 2015). For example, in a three-year longitudinal study focused on children's transition from middle childhood to adolescence, inconsistent discipline at Time 1 predicted higher child externalizing behaviors at Time 3 of the study (Lengua, 2006). Similarly, Mendez and colleagues (2016) found that fathers' use of corporal punishment when a child was 2 years old predicted an increase in externalizing behaviors when the child was 3 years old. Importantly, when mothers interacted with their child using positive behaviors (such as by being clear and responsive), the observed increase in externalizing behavior was diminished (Mendez, Durtschi, Neppl, & Stith, 2016). To continue, mothers who used inductive discipline (e.g. encouraging their child to take others' perspective to understand the effect of their behavior on others) instilled in their children more empathy, which, consequently, led to more prosocial behavior displayed by the child. These results were in contrast to those found when mothers disciplined their children by using their status as authority figures and those who ignored or withdrew parental approval as a form of punishment (Krevans

& Gibbs, 1996). Moreover, recollections of inconsistent discipline and decreased monitoring were associated with higher levels of traits related to psychopathy in male juvenile offenders (Molinuevo, Pardo, González, & Torrubia, 2014).

Providing support and a protective environment can also protect against future negative experiences. For example, researchers found a positive correlation between parent-child conflict and bullying or victimization at school, and a negative correlation between child self-disclosure and bullying or victimization at school. That is, children who felt more at ease to talk to their parents about their days and who were less likely to keep secrets from them were less likely to be the victims or perpetrators of bullying (Georgiou & Stavrinides, 2013). Parenting practices that facilitated positive interactions between parent and child were positively associated with child prosocial behavior towards others, specifically family members and friends (Padilla-Walker, Nielson, & Day, 2016), while higher parental care appeared to decrease the probability of a mood disorder diagnosis later in life across individuals from five European countries (Heider, Matschinger, Bernert, Alonso, & Angermeyer, 2006). Parental monitoring and effective discipline were also found to be protective against drug use in adolescence (Macaulay, Griffin, Gronewold, Williams, & Botvin, 2005).

Negative parenting practices, on the other hand, include overt or covert dismissal and criticism and disapproval without sufficient support or guidance of children's behavior, characterized as 'rejecting' parenting (Rowe et al., 2015) or parenting through the use of psychological control. Using guilt, threatening love withdrawal, and being over-protective and possessive (Frazer & Fite, 2016) have also been associated with negative child outcomes. For example, in the longitudinal study by Rowe et al. (2015), children whose parents used more rejecting and negative parenting practices presented with more anxiety and rejection sensitivity

compared to children whose parents used more positive practices. Additionally, in the three-year longitudinal study by Lengua (2006), parenting behaviors related to rejection at Time 1 predicted higher irritability and fear at Time 3. Additionally, recollection of higher levels of parental care was associated with higher ratings of wellbeing at ages 36, 43 and 60-64 while those of high parental psychological control were associated with poorer wellbeing ratings (Stafford, Kuh, Gale, Mishra, & Richards, 2016). Parental hostility has also been found to be negatively associated with children's prosocial behavior (Padilla-Walker et al., 2016).

It should be noted, however, that the relationship between parenting behaviors and child outcomes is more likely to be bidirectional. A number of researchers, for instance, point to temperament as possibly influencing parenting behaviors that subsequently influence child outcomes; for example, children with increased irritability may be more likely to have parents who use inconsistent discipline, which then predicts increased externalizing symptoms while children transition into adolescence, suggesting a "transactional relation" between child variables and parenting behaviors (Lengua, 2006).

Parenting Interventions

In the past, interventions targeting child problematic behavior focused solely on changing the child's behavior. Understanding of the influence of parenting practices on children's behavior has highlighted the limits of child-focused interventions on evoking behavior change and researchers have therefore turned attention to the parent-child relationship and how interventions can target specific parenting behaviors that can then influence change in child behavior. At present, there are numerous parenting interventions used across different communities that have centered on parents' behavior and its effects on child outcomes. These have ranged from including parent-child dyads wherein both parent and child measures are

assessed pre- and post-intervention (Shaffer, Lindheim, & Kolko, 2017) to ones that focus solely on the parent(s). Though success rates differ across interventions, most parenting interventions have shown to evoke at least some change in parenting behaviors. For instance, Shaffer et al. (2017) found that a four-phase program designed to address problematic parenting practices resulted in a significant reduction in inconsistent and corporal discipline practices as measured through the APQ (Alabama Parenting Questionnaire; Shelton, Frick, & Wootton, 1996), with inconsistent discipline practices continuing to decrease between the 6 and 18 months following the program.

To continue, use of the Triple P-Positive Parenting Program (Sanders, 1999; Sanders, Turner, & Markie-Dadds, 2002), an intervention designed to increase parental knowledge and skills, was found to be effective in reducing child target behaviors and decreasing use of problematic parenting practices. Importantly, the effects observed were maintained at 6-month follow-up (Turner & Sanders, 2006). Morawska and Sanders (2006) who formatted the same program to be self-directed and delivered through a phone counseling service for parents, found that it was effective in decreasing the frequency and intensity of child problematic behaviors and the use of dysfunctional parenting practices (such as over-reactivity and long reprimands). This demonstrates that novel forms of delivering parenting interventions that are brief and self-directed can prove efficacious in improving parent-child interactions.

A meta-analysis reviewed 40 randomized, controlled trials in which long-term effects of parenting interventions were evaluated. The researchers (van Aar, Leijten, Orobio de Castro, & Overbeek, 2017) were particularly interested in examining whether the positive effects of an intervention would be maintained, fade out, or become more pronounced with time. Their review indicated that the skills learned by the parents in the interventions were mostly sustained in

short-term and long-term follow-up evaluations. Similar results were found for decreases in child disruptive behaviors. Despite differences across interventions, their results are promising and suggest that areas targeted in interventions do not merely fade out and lead to a resurgence of problematic behaviors, but are instead sustained in most cases. The authors suggested that a possible reason for sustained improvement may be that changes in child behaviors and parenting practices become reinforcing (i.e. a mother who uses more positive parenting practices that prove to be effective in reducing behavioral issues in her child will continue using them). Similarly, a child whose reductions in problematic behaviors have led to more rewards will keep disruptive behaviors low (van Aar et al., 2017).

Parenting interventions can also be helpful in disadvantaged communities, in which stressors are particularly high. McGilloway and colleagues (2012) conducted a randomized, controlled trial using the Incredible Years BASIC parenting program (IYBP; Webster-Stratton, 2005), a short intervention administered in groups that teaches parenting skills as a means of reducing child disruptive behaviors. Following 14 group intervention sessions, they noted reductions in child behavioral issues; importantly, children who were at risk for delinquency and a future conduct disorder diagnosis fell below the clinical cutoff following the intervention, while there were evident reductions in critical parenting behaviors (e.g. delivering frequent negative commands) and improvement in parental psychosocial functioning, indicating that parenting interventions can be extended to community settings and can be equally efficacious (McGilloway et al., 2012).

In an effort to examine how the inclusion of the family might strengthen bullying interventions, Healy and Sanders (2014) enrolled both parents and children in an anti-bullying intervention. Children were taught appropriate skills and practiced effective responses and

resolution to conflict, while parents were taught strategies that promoted a supportive and warm parent-child relationship, and practiced how best to address instances of bullying. Their results indicated that the experimental group showed significantly greater improvements in bullying victimization, child distress, and in other outcome measures such as teacher reports of aggression (Healy & Sanders, 2014). Inclusion of the family in child interventions may therefore result in larger and more positive intervention effects.

As can be seen above, parenting interventions have been shown to be promising in changing parenting variables and child outcomes. Nevertheless, actual behavior change is underemphasized in the parenting literature as measurement of changes in targeted behaviors has largely relied on self-report and behavioral observations, both of which are susceptible to social desirability bias, meaning that participants may alter their behaviors or responses in order to make others view them more favorably. Given the impracticality of observing and measuring change in parenting practices and behaviors in real time, different measures have been used to predict behavior. One such measure that has been used extensively is Ajzen's theory of planned behavior (Ajzen, 1991), which considers how different variables interact and predict intentions to carry out a behavior and, consequently, how intentions can be used to predict behavior change.

Theory of Planned Behavior

The theory of planned behavior (TPB) was constructed by Icek Ajzen with the purpose of identifying factors that can reliably predict behavior. The theory is an extension of Fishbein and Ajzen's original theory – the theory of reasoned action (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975), which assumes that the main determinant in predicting volitional behavior is one's intention to perform it. Intentions are further proposed to be the consequence of a person's attitude toward the behavior and the social pressure of subjective norms that surround that

behavior (Ajzen, 1985). In essence, if someone evaluates a behavior as positive and believes that close or important others will respond positively to his or her performing it, then intentions to perform that behavior will increase. Despite its popularity, the TRA was criticized for its failure to accurately predict behavior that was outside one's control, meaning that reports of intentions were insufficient in predicting behavior if that was not under the person's volitional control (Ajzen, 1985; 1991; Armitage & Conner, 2001).

In light of these criticisms, Ajzen extended the TRA to include a new factor – perceived behavioral control (PBC; Ajzen, 1985), the addition of which led to the formation of the TPB. PBC of a behavior is viewed as the result of both internal and external factors, with possession of necessary skills and motivation to perform a behavior making up the former, and presence of available resources and opportunities making up the latter (Ajzen, 1985). Ajzen's TPB takes into consideration both the attitude towards and subjective norms related to the behavior as well as one's perceived control over the behavior. Evaluating these three factors together allow for predictions of intentions to carry out the behavior and, then, actual performance of the behavior.

In evaluating the aggregate effects of these factors in increasing intentions, each TPB factor must be examined separately. In addition, Ajzen posits that underlying each TPB factor are the person's beliefs about the behavior; behavioral beliefs underlie attitudes, normative beliefs underlie subjective norms, and control beliefs underlie a person's perceived behavioral control. Because these are thought to shape the TPB factors, a brief description of each will be provided under their associated factors.

Attitudes

Attitudes toward a behavior are concerned with an individual's evaluation of the behavior and whether this evaluation is favorable or unfavorable. According to Ajzen (1985), a more

favorable evaluation of a behavior increases one's intention to perform it, while an unfavorable

evaluation is likely to hamper or decrease prospects of intending to perform it. Within the TPB, it

is said that a person's broader behavioral beliefs underlie attitudes toward a behavior. These

behavioral beliefs are concerned with the end result of a behavior; if a behavior has been

associated with a desirable outcome then this will lead to more favorable attitudes or evaluations

of the behavior (Ajzen, 1991). As it pertains to parenting practices, a mother who believes that

spending more time with her son will improve their relationship is more likely to view spending

one uninterrupted hour engaging in play with her son in a favorable light, which will then

increase her intentions to engage in this behavior.

Subjective Norm

Another determinant of predicting behavior within the TPB is a person's subjective norm,

and it refers to the degree of felt social pressure toward executing or not executing a behavior

(Ajzen, 1991). Specifically, an individual who believes that important referents will approve of a

behavior are more likely to feel social pressure to perform it, thereby increasing their intentions

to do so. Within the TPB, beliefs concerning how others will evaluate the behavior (e.g.

approve/disapprove) are termed 'normative beliefs', and they are considered antecedents to one's

felt social pressure (subjective norm) (Ajzen, 1991). In relation to parenting practices, a mother

who perceives that friends and family will approve of her using inductive discipline (normative

belief) is more likely to do so (subjective norm).

The subjective norm construct has been said to be the weakest factor within the TPB.

Armitage and Conner (2001) suggested that this may be the result of limited measurement, such

as reliance on a single item. Their meta-analytic review showed that though the subjective norm-

intention relationship was weaker than the attitude-intention and PBC-intention relationship, it was stronger when measured through multiple items.

Perceived Behavioral Control

Ajzen (1991, p. 183) defined PBC as "people's perception of the ease or difficulty of performing the behavior of interest." If one believes that he or she will be able to carry out the behavior with relative ease, then it is more likely that he or she will be keen to perform it. Control beliefs are said to underlie PBC, and they stem from the availability of resources, one's past experiences, and exposure to the experiences of others when performing a similar behavior. These beliefs can influence perceptions of control toward the behavior (Ajzen, 1991).

Viewing this in light of the present topic, a mother may differ on her level of belief in being responsible for her child's outcomes, but the actual change in specific behaviors that ensure positive outcomes for her child may be more dependent on her PBC. For example, a mother may be more likely to engage in specific positive parenting practices if she perceives those to be under her control and that she will be able to perform them successfully. As mentioned above, PBC depends on both internal (individual differences in the ability to exercise control over behaviors) and external (availability of necessary resources and opportunities) factors. According to Ajzen (1991), the performance of a particular behavior does not only depend on perceptions of control but also on a person's actual control over that behavior, which includes the aforementioned external factors. Interestingly, Ajzen (1991) explained that in certain situations, perceptions of control may be sufficient and may be more important in successful completion of a behavior.

Ajzen (1991) has proposed that understanding the concept of PBC can be done by looking at Bandura's self-efficacy theory (1977), which is described as a person's perception of

themselves as able to actively perform adequate and necessary behaviors to handle incoming

situations (Bandura, 1982). Similar to PBC, individuals are more intent on carrying out a

behavior if they believe that they will be able to achieve it (Bandura, 1997). However, Bandura

(1992) has explained that self-efficacy is mostly concerned with internal perceptions of control

while PBC extends this to include external factors (resources, opportunities). A number of

studies have demonstrated that despite commonalities, PCB and self-efficacy are distinct

constructs (Armitage & Connor, 2001). Nonetheless, predictions of intentions become more

valid once an individual perceives oneself as capable of performing it. Two individuals with

seemingly equal intentions to carry out the same behavior may differ in their success in doing so

if one is more confident in his or her ability to master it.

Intentions

A person's intention to engage in a particular behavior takes center stage in the TPB.

Intention is a measure of a person's belief that he or she will perform a behavior. Intentions are

frequently subject to change – they may change, for example, as a function of time. With time,

the perceived advantages or disadvantages of a behavior may shift and change, causing a change

in the person's intentions to perform it. Furthermore, an individual may have been intent on

performing a new behavior, but a large amount of time has passed and intentions decrease while

routine responses return (Ajzen, 1985).

Undoubtedly, the occurrence of unforeseeable events can also bring about a change in

intentions. Such events may disrupt the intention-behavior relationship held by the person at that

time, or may bring about a decision not to perform the behavior. The availability of new

information may also change intentions. Information that may be incompatible with the person's

belief system, which may then influence his or her attitude towards the behavior, can produce a

change in intentions (Ajzen, 1985).

Efficacy and Applications of the TPB

Schifter and Ajzen (1985) examined the application of the TPB following its initial

formation. They found a significant correlation between intentions and attitudes, subjective

norms and PBC in predicting weight loss behaviors, with PBC being the biggest predictor of

weight loss. Importantly, they found that mere intention on its own was not enough to predict

behavior – the antecedent TPB factors were required to accurately predict behavior change and

intentions. Godin and Kok (1996) also examined the applicability of the TPB in relation to

health-related behavior. The review was based on 56 studies, and results indicated that both

intention and PBC taken together explained approximately one third of the variations in health-

related behaviors. The review also found equal importance in behavioral control and attitude for

explaining intention and resulting behavior, while the lowest effect was found for social

influence.

To continue, Armitage and Conner (2001) conducted a meta-analytic review of 161

articles related to the TPB. They found that the TPB factor's efficacy was largely supported as a

predictive construct of intentions and subsequent behavior. The strongest TPB factor was found

to be that of PBC, which independently predicted intentions and behavior across various studies.

In line with Godin and Kok's (1996) research, they found the normative component to be the

weakest predictor of intentions, a similar result found in a study by Holmes et al (2012).

Generally, the TPB has been found to successfully predict behavior change in other studies

evaluating health-related behaviors (Riebl et al., 2015; McDermott et al., 2015), exercising

behaviors (Norman, Conner, & Bell, 2000), environmentally friendly behaviors (de Groot &

Steg, 2007; Cheung, Chan, & Wong, 1999) and alcohol use (Marcoux & Shoppe, 1997), among others.

A number of researchers have extended the applications of the TPB and have used it as a predictor of specific parenting practices. For example, Powell and Karraker (2017) have used the TPB to understand parents' intentions to carry out decisions related to child rearing. Because of the TPB's efficacy in predicting health-related behaviors, the extension of the TPB to predict parenting variables has also mostly centered on parenting in relation to health-related behaviors. Hamilton and White (2012), for instance, used the TPB to predict parenting choices that encourage their children to engage in increased physical activity. In a different study which evaluated parents' practices related to reducing their children's screen time and encouraging increased physical activity, Hamilton, Thomson and White (2013) found the TPB variables, particularly attitudes and subjective norms, to significantly predict the participants' behavior. All of the TPB variables – attitudes, subjective norm and PBC – were found to predict parent's intentions to limit children's screen time and to increase their physical activity. The inclusion of a measure of beliefs and how they relate to intentions to change behaviors provided additional information in understanding underlying factors of intentions to change one's behavior (Hamilton, Spinks, White, Kavanagh, & Walsh, 2016). Similar results exist for parenting behaviors related to decreasing childhood obesity and increasing children's engagement in healthy behaviors (Andrews, Silk, & Eneli, 2010). Control, normative and behavioral beliefs have also been examined to predict behaviors of family members that may increase familial conflict (Holmes, Bond, & Byrne, 2012).

These studies demonstrate that the TPB can be used to predict parental intentions to change parenting practices as they pertain to their children's health behavior, suggesting that the

TPB can be an effective measure of intention through evaluation of indirect components that have been shown to predict behavior.

Parenting practices and TPB

Studies using the TPB factors as their premise for predicting behavior suggest that interventions can target the TPB factors and core beliefs as a means of effecting change (Ajzen, 2015; Hamilton et al., 2016). In order to understand how these factors can be targeted, an examination of literature that has centered on each as it relates to parenting variables must be examined.

Parental Attitudes

Studies examining parental attitudes have mostly focused on general attitudes toward child rearing (Holden & Edwards, 1989); more recent studies, however, have also evaluated the effects of parental attitudes on specific factors, such as on children's motivation in school (Madjar, Shklar, & Moshe, 2016). It should be noted that definitions of attitudes have varied in the literature, and often depend on what is being studied (Juby, 2009). 'Child-rearing attitudes', 'parental attitudes' and 'parenting beliefs' are all terms encountered in parenting literature, and are used largely interchangeably.

Parental attitudes include how an individual believes he or she should parent and how they perceive their child's behavior in relation to their parenting. As explained through Ajzen's TPB, parental attitudes, do not serve a direct function; rather, they indirectly influence parents' behaviors and practices. Parental attitudes have been measured using a wide array of items. These items have addressed attitudes concerning control (psychological or behavioral) over one's child, overprotectiveness, and cooperation with the child as well as expectations of children's obedience towards parents (Yurduşen, Erol, & Gençöz, 2013). In the child discipline

literature, results have shown that increased appraisal of corporal punishment increases one's intention to use it and to do so to a more severe degree (Juby, 2009; Socolar & Stein, 1995).

Questionnaires developed in order to measure parental child-rearing attitudes have focused on individuals' evaluation of a situation (e.g. 'a good mother should shelter her child from life's little difficulties'; Parent Attitude Research Instrument; PARI; Schaefer & Bell, 1958), parental beliefs related to expectations of children and parenting behaviors and perceptions toward parenting and parenting values (Holden & Edwards, 1989). These items demonstrate that beliefs predispose attitudes and that both of these affect intentions to act in accordance with those beliefs, lending support to the use of attitudes as predictors of intentions. For instance, parental negative attitudes (Jackson et al., 1999; Juby, 2009; Thompson et al., 1999) were found to be associated with poorer quality of the home environment (Daggett, O'Brien, Zanolli, & Peyton, 2000) and with greater use of corporal punishment compared to parents who did not hold such views (Juby, 2009). These findings point to the link between parental attitudes and parenting practices.

Parental attitudes are also correlated with child outcomes. Yurduşen, Erol and Gençöz (2013), for example, examined how maternal child-rearing attitudes, influenced their children's internalizing and/or externalizing behaviors. Through the use of the PARI (Schaefer & Bell, 1958), the authors found that all maternal attitudes measured by the PARI except 'Equalitarianism and Democratic Attitudes' (which measured beliefs related to cooperation and "friendliness" between mother and child) were significantly correlated with children's behavior problems, indicating that there is at least some association between parental attitudes and child outcomes.

Subjective Norms

Because the subjective norm construct has received the most limited support in the TPB (Armitage & Conner, 2001), researchers have sometimes broadened its definition to include descriptive and injunctive norms (Cialdini, Reno & Kallgren, 1990; White, Smith, Terry, Greenslade, & McKimmie, 2009). Injunctive norms resemble the subjective norm premise of TPB, and reflect whether one perceives that important others will approve or disapprove of a behavior. Descriptive norms, on the other hand, reflect what is viewed as 'normal' and appropriate, and behaviors "of choice" of those around an individual. Unsurprisingly, strong identification with a group makes it more likely that one will be influenced by the norms of that group, or 'ingroup norms' (Terry & Hogg, 1996; White et al., 2009), which may explain perceived differences in parenting behaviors across different regions (Kovess-Masfety et al., 2016). An expansion of what is meant by norms has resulted in improved predictability of intentions through evaluation of normative influences (Park & Smith, 2007).

All in all, perceptions of important others as approving of a behavior and perceptions of others as using that behavior appear to increase one's intention to perform that behavior. For example, descriptive and injunctive norms have been shown to be predictors of both attitudes toward corporal punishment and of its use as a disciplinary method (Taylor, Hamvas, & Paris, 2011). Interestingly, the perceived approval of professionals, such as pediatricians, of corporal punishment, was also found to be a significant predictor of positive attitudes toward the use of corporal punishment (Taylor, McKasson, Hoy, & DeJong, 2017). Perceived approval of providing their children with alcohol after seeing other parents do so with their own children has also been found to be predictive of parenting behavior (Jones, 2016), while parents who consider parenting education to be normative of their referent group are more likely to report intentions to

participate in parenting programs (White & Wellington, 2009). Despite the relatively limited literature on the effects of norms on parenting practices, the aforementioned findings suggest that different norms might indeed exert some influence on parenting behaviors or at least on intentions to perform certain behaviors.

Perceived Behavioral Control

The importance of perceived sense of control and control beliefs cannot be understated in the parenting realm, as an increased sense of influence or responsibility may in turn account for changes in parenting beliefs (Furnham, 2010; Goodnow, 1985) and may have an effect on child outcomes (Mouton & Tuma, 1988). For example, parental sense of control may influence the sense of control felt by that parent's child (Morton, 1997) as well as the development of the child's externalizing or internalizing problems and later competence in various areas (Hagekull, Bohlin, & Hammarberg, 2001), further highlighting how parent variables may indirectly exert influence on child outcomes.

Sense of control also influences parental wellbeing. For example, a higher sense of generalized control over one's life (not specific to parenting) was found to be associated with lower anxiety and depressive symptoms at the beginning of parenthood (Keeton, Perry-Jenkins & Sayer, 2008). Further, an internal 'locus of control' (Rotter, 1966) towards parenting (Moreland, Felton, Hanson, Jackson, & Dumans, 2016) or the sense that their parenting would influence their child's behavior positively mediated the relationship between maternal depression and internalizing problems of their children (Coyne & Thompson, 2011), while less sense of control was associated with more child externalizing problems (Morton, 1997). The effects of sense of control can be observed even very early in parenting. For instance, parents with lower

parental perceived control were less likely to interact in age and developmentally appropriate ways with their infants (Guzell & Vernon-Feagans, 2004).

Low parental sense of control may stem from a number of factors, such as sociodemographic factors. It also may be that child behaviors, particularly externalizing behaviors, may contribute to lower sense of maternal control (Freed & Tompson, 2011). For example, a parenting program which centers on teaching parents effective ways to target their children's behavior (PACE; Begle & Dumas, 2011) was found to be effective in decreasing parental stress and increasing parental locus of control (Moreland et al., 2016). In general, findings of interventions focusing on parental sense of control suggest that change in parenting practices can be evoked at least partially by way of targeting perceived behavioral control (Roberts, Joe, & Rowe-Hallbert, 1992).

General Components Associated with Intervention Success

Parenting interventions have taken many forms across various settings, and have been operating with the foundation of different theoretical underpinnings, making it difficult to focus on any one program as exemplary for future parenting interventions. Choosing a parenting intervention may depend on one's theoretical approaches to parenting, amount of time that can be devoted, areas targeted by the intervention as well as evidence of efficacy of the program. In light of this, and if one were interested in implementing or creating a parenting intervention, intervention components that have been found to strengthen the intervention's outcomes need to be examined. Specifically, it is important to examine the components that lead to the highest success rates, and to closely examine those that appear to decrease their effectiveness. In this way, parenting interventions can be improved to best serve the needs of those who receive them and can pave the way towards evidence-based parenting interventions.

Kaminski, Valle, Filene and Boyle (2008) conducted a meta-analysis of the components of parent training programs that increased their effectiveness in teaching appropriate parenting practices and skills. They also examined which components best improved parent-child relations and reduced child aggression and conduct problems. They found that programs that incorporated the teaching of emotional communication, consistent responding, positive interactions and practice of these skills with the parents' own children were all factors that led to larger program effects.

To continue, Holtrop, Parra-Cardona, and Forgatch (2014) examined the factors that led to change in the parenting practices of parents who participated in the Parent Management Training – the Oregon Model (PMTO™; Forgatch & Kjøbli, 2016), a parenting intervention designed to increase positive parenting practices (Forgatch & Patterson, 2010). The authors took a qualitative approach and conducted interviews with the participants, who were asked to report on the components of the intervention that they found to be the most helpful (Holtrop et al., 2014). Their results showed that opportunities to engage in role-play, practicing what was learned at home and delivery of the material using visual aid were all factors deemed to be important in learning the material. Direct accounts such as these highlight aspects of the delivery method and components that may increase parents' motivation to learn and encourage consideration of these factors when implementing a parenting intervention.

Virtual Reality

The increasing use of and access to the Internet has increased the availability of online resources and has allowed for the delivery of online interventions that can be shaped to be brief, easily accessed, and less costly than in-person interventions, thereby increasing their availability to individuals who are faced with the constraints of time or who may not have immediate access

to certain interventions that are not offered in locations of close proximity. Furthermore, individuals who are reluctant to receive psychological services may be more willing to do so through online interventions that allow for more privacy. As was mentioned above, novel forms of intervention seem successful in improving parent-child interactions, and the use of interactive material, such as videos and visual aid, have been associated with increased motivation to learn.

Interventions that have been adapted to be delivered online, brought about a new field within psychological research in which virtual reality is used as a means of psychological intervention. Virtual reality is often thought of in relation to online games; however, its use has been expanded to incorporate 'virtual worlds' whereby users create 'virtual selves' that interact with the environment and with other users within it (Schroeder, 2008). Unlike online web-pages and other media systems, VR creates a three-dimensional, simulated environment in which the user can interact with objects and others within it (Mandal, 2013).

Because of its 'second reality' nature and interactive basis, it has become a promising avenue wherein real-life events can be simulated. More importantly, evidence of immersion and identification with one's virtual self has led researchers to examine the feasibility of VR methods to effect behavior change. When the virtual self becomes a model of desirable behavior (Fox, Bailenson, & Ricciardi, 2012) then real-life behaviors can be modeled after one's virtual self and shaped to fit one's 'desired self' (Bandura, 1977). A parent who guides his or her virtual self to use different parenting practices and finds that certain practices result in improved child outcomes, for instance, may be more likely to find the virtual self as exemplary and to use those parenting practices in real life.

Indeed, programming the virtual self to resemble one's real self increases identification with the virtual self, further increasing the likelihood that it will be viewed as a model by which

desirable behavior can be imitated in real life (Bailenson, Blascovich, & Guadagno, 2008). For

instance, Fox and Bailenson (2009) used photographs of participants on avatars and provided

participants with head-mounted display, through which participants could view their avatar's

physical changes depending on exercising behaviors (weight gain or loss). Participants who

identified with the avatar were much more likely to engage in exercise behaviors than those who

viewed 'another' performing them and when the behaviors were not rewarded or punished (Fox

& Bailenson, 2009). In a similar study by Fox, Bailenson and Ricciardi (2012), participants wore

the head-mounted display and had sensors placed on their hand to measure physiological arousal.

Viewing one's self performing an exercise behavior resulted in increased physiological arousal

as evidenced by a spike in skin conductance responses compared to viewing another performing

these behaviors, suggesting that connections with the virtual self can happen even at a

physiological level (Fox et al., 2012).

Virtual reality allows us to experiment with taking different courses of actions, or to act

the way that we would like our actual self to behave. In this way, the virtual environment can

become a platform for self-reflection, and its 'role-playing' nature can lead to behavior change

within the virtual environment and perhaps in one's actual behavior (Kukshinov, 2015).

Virtual Reality and Psychological Interventions

One of the biggest areas in virtual reality literature in connection to psychological

treatment is that of virtual reality exposure therapy (VRET). Because of their possible traumatic

nature and limited accessibility to certain phobic situations, virtual reality has become a helpful

alternative to real-life exposure therapies. For example, individuals with claustrophobia were

taught relaxation exercises and were encouraged to interact with the virtual environment that

mimicked their feared situation. This was found to decrease the participants' subjective units of

distress (SUDs) when faced with the feared situation (Botella, Baños, Villa, Perpiñá, & García-Palacios, 2000), and there was evidence that it led to generalization across other phobic aspects that were not specifically targeted (Botella, Villa, Baños, Perpiñá, & García-Palacios, 1999). Similarly, VRET has demonstrated improvement in post-traumatic stress disorder (Gerardi, Rothbaum, Ressler, Heekin, & Rizzo, 2008) and social anxiety (Kampmann, Emmelkamp, & Morina, 2016) symptoms.

Furthermore, VR interventions have been found to be effective in enhancing self-esteem and decreasing depressive symptoms (Nosek, Robinson-Whelen, Hughes, & Nosek, 2016; Pinto, Hickman, Clochesy, & Buchner, 2013), in teaching social skills and behaviors (Rus-Calafell, Gutiérrez-Maldonado, & Ribas-Sabaté, 2012) and decreasing negative symptomatology (Rus-Calafell, Gutiérrez-Maldonado, & Ribas-Sabaté, 2014) in patients with schizophrenia.

As with any intervention, the obstacles of accessibility can come in the way of providing help and assisting individuals to make positive changes in their lives. Unfortunately, parental interventions are lacking in accessibility. The importance of parenting, as presented above, cannot be understated and, therefore, efforts have and must continue to be made to increase accessibility to interventions that lead to positive changes in parenting behavior.

MyVirtualChild©

MyVirtualChild© program was developed by Frank Manis (Manis, 2006; 2011) to accompany developmental psychology and parenting university-level courses. The program is an online, interactive child-rearing program that provides a visual aid of child development (such as physical, behavioral and cognitive changes) and demonstrates the influence of child-rearing practices on child development. Through this simulated parenting experience, users make decisions concerning their child (both direct and indirect), receive feedback on parenting

practices, are able to view changes in various domains of the child as a result of parenting decisions, and are encouraged to reflect on their parenting practices and on their child's development through optional writing assignments.

The program may serve as an effective, brief parenting intervention particularly because it allows a parent to practice and, therefore, role-play with a virtual family to evaluate the efficacy of parenting decisions and practices. For example, the program asks parents to choose how they would respond if their child were angry and displaying overt aggressive behaviors. Due to the fact that the child develops differently based on these decisions, a parent can practice with the use of more effective communication skills, an intervention component that has been found to show large effects (Kaminski et al., 2008) and evaluate the outcomes of that choice. Further, the program provides a platform for self-reflection as, at various times during the program, users are given the opportunity to reflect on their virtual parent-child relationship (Manis, 2011), a necessary means through which one can evaluate actions that facilitate or hamper progressing forward (Bandura, 1986).

Additionally, as the program focuses solely on the virtual parent (i.e. the participant), it makes it more likely that the participant will reap the benefits of this individualized training (Lundahl, Risser, & Lovejoy, 2006), while one-on-one, immediate feedback on parenting practices and their influence on the child can be provided. The feedback component of parenting interventions has previously been shown to be the most important predictor of intervention success (Kaminski et al., 2008), while parents who received the most frequent and responsive feedback at the beginning of the Parent-Child Interaction Therapy (PCIT; McNeil & Hembree-Kigin, 2010) were more likely to complete it. Caron, Bernard, and Dozier (2016), who examined how the effects of feedback on behavior and maintenance of treatment outcomes, found that

higher frequency *and* higher quality (e.g. with more positive regard) of feedback were associated with increased understanding of the treatment's components and with completion of the treatment.

The program has a pedagogical aspect as it provides information on child development in line with psychological research. This aspect of the program is important in that it has the ability to directly target the TPB factors. For instance, more knowledge of child development has been associated with more guidance and maintenance of play behaviors in mothers of preschool-age children (Marjanovič-Umek & Fekonja-Peklaj, 2017), and can facilitate with age-appropriate interactions and better understanding of child behaviors (Bugental & Happaney, 2002). Moreover, increased knowledge is associated with reduced child behavioral problems (Benasich & Brooks-Gunn, 1996) and contributes to developing a sense of competence in the parental role (Bornstein et al., 2003), while decreased knowledge of child development has been postulated to be a possible factor in low parental perceived control (Guzell & Vernon-Feagans, 2004). Finally, increased knowledge, particularly as it concerns developmental milestones, can allow for more appropriate expectations of the child (Scarzello, Arace & Prino, 2016), further influencing perceptions of normative parenting behaviors, and attitudes toward different parenting practices.

Symons and Smith (2014) examined whether psychological engagement would be evident in students using the program. They found that a large majority of the students reported that they were psychologically engaged while using it and that they had developed a connection with their virtual child. The program was also used in order to evaluate attachment styles and caregiver attitudes before and after raising the virtual child. They found that those individuals who presented with more avoidant styles across different areas of their lives and those who presented with more anxiety were more likely to report negative attitudes toward the child

(Symons, Adams, & Smith, 2016), suggesting that parenting variables will indeed be reflected in the parenting choices of the participants using the program.

Present Study

The present study tested the efficacy of the MyVirtualChild© program (Manis, 2006; 2011) as an easily administered, online behavioral intervention by evaluating its effect on parental attitudes, subjective norms, PBC and intentions. Based on the TPB, evidence of change in these three variables and one's intentions following use of the program in comparison to a control group should allow for the prediction of change in parenting practices and behavior. The responses of participants who completed the program were compared against those of participants in a control group.

Hypotheses

It was hypothesized that use of the program would result in changes in parenting behaviors by increasing the positive appraisal of positive parenting practices, changing subjective norms by reports of increased approval of those practices by important others, increasing perceived control over those behaviors and, finally, increasing intentions to use those parenting practices in the future. Due to the positive effects associated with increased knowledge of child development, it was hypothesized that knowledge, as evidenced by an understanding of developmental concepts discussed within the program, would also be predictive of intentions to change parenting behavior.

Hypothesis 1: It was hypothesized that there would be changes in participants' attitudes toward positive parenting practices as evidenced by increased approval/appraisal of positive parenting practices and decreased approval of negative parenting practices in the experimental condition, but not the control condition. To test this hypothesis, an ANCOVA was conducted

with Group (Experimental vs. Control) as the independent variable, pre-test attitude scores as the covariate, and post-test attitude scores as the dependent variable.

Hypothesis 2: It was hypothesized that there would be changes in participants' subjective norms following use of the program, as evidenced by increased reports by participants in the experimental group of important others (family, friends, professionals), positive evaluation of positive parenting practices and a decrease in reports of norms related to negative parenting practices. No such changes were expected to be evident in reports of participants within the control group. To test this hypothesis, an ANCOVA was run with Group (Experimental vs. Control) as the independent variable, pre-test subjective norms as the covariate, and post-test subjective norms as the dependent variable.

Hypothesis 3: It was hypothesized that there would be changes in participants' perceived behavioral control, as evidenced by increased reports of perceived ease of performing behaviors associated with positive parenting, as well as increased reports of sense of control over child outcomes by the participants in the experimental group. In contrast, perceived behavioral control reports were expected to remain the same in the control group. To test this hypothesis, an ANCOVA was conducted with Group (Experimental vs. Control) as the independent variable, pre-test PBC scores as the covariate, and post-test PBC scores as the dependent variable.

Hypothesis 4: It was hypothesized that the experimental group would experience increased reports of intentions to carry out positive parenting behaviors in the future compared to the control group, whose reports should remain largely unchanged. To test this hypothesis, an ANCOVA was conducted with Group (Experimental vs. Control) as the independent variable, pre-test intention scores as the covariate, and post-test intention scores as the dependent variable.

Hypothesis 5: It was hypothesized that, because of the educational orientation of the program and its focus on child development, there would be increased knowledge of child development concepts of participants in the experimental group, as evidenced by higher scores on the child development knowledge measure compared to scores of participants in the control group. To test this hypothesis, an ANCOVA was conducted with Group (Experimental vs. Control) as the independent variable, pre-test knowledge scores as the covariate, and post-test knowledge scores as the dependent measure.

Hypothesis 6: The final hypothesis of the present study was concerned with the predictive power of knowledge and the TPB variables in parents' intentions to use more positive parenting practices. To test this, a hierarchical linear regression was conducted, using child development knowledge and the TPB variables as predictor variables. All pre-scores were entered as control variables at Step 1 of the regression analyses, while post-test scores were entered into Step 2 to analyze the predictive power of post-test intentions.

Method

Participants

Parents over the age of 18 years old were eligible to participate in the study; none of the participants had used the MyVirtualChild© program in the past. The sample of participants consisted of a total of 30 parents; however, the responses of 7 participants were dropped as they only completed the pre-test questionnaire and not the post-test questionnaire. One participant who signed up for the study was excluded as he indicated that he did not have children. A total of 22 participants completed the study (18 women, 4 men; 82% and 18%, respectively), and each participant was randomly assigned to either the control or experimental group, with 10 participants making up the control group and 12 making up the experimental group. Participants

were recruited through various locations in the local community where flyers of the study were posted. Locations included daycare and afterschool centers, YMCAs, churches, the Child Advocacy Center-Aiken, the University of South Carolina Aiken Psychology Clinic, Aiken Technical College and Children's Place-Aiken (Appendix A).

Of the 22 participants, 13 were White/Caucasian (59%), 4 were Black/African-American (18%), 2 were Hispanic/Latino(a) (9%), 1 was Asian/Asian American (5%) and 1 was Native Hawaiian/Other Pacific Islander (5%). One participant did not report race/ethnicity. The mean age of the participants was 34.36 ($SD = 10.19$). All participants had children; 9 participants reported that they had 2 children (41%), 7 reported that they had 1 child (32%), 3 reported that they had 3 children (14%) and 3 participants reported that they had 4 children (14%). The majority of the participants reported that they were married (N=13; 59%), 3 reported that they were single (14%), 2 reported that they were in a relationship (9%), 2 reported that they were engaged (9%) and 2 reported that they were divorced (9%).

To continue, 5 participants, 2 of whom were in the experimental group, indicated that they had taken education courses related to child and adolescent development, while 7 participants (5 of whom were in the experimental group) indicated that they had taken psychology courses. One participant in the experimental group indicated having taken sociology courses while two indicated that they had taken other courses. In addition, 6 participants indicated that they had taken parenting classes in the past; 2 of these participants were in the experimental group. None of the participants had used the MyVirtualChild© program before.

Participants in the experimental condition were given a total of $40 for their participation in the study; this amount was divided into different portions upon completion of each part of the study. Due to the shorter duration and effort of participants in the control condition, their

compensation was a total of $10, with $5 compensation for the first portion and $5 for the last

portion. The procedures section below describes the sequence of the study and compensation

information in detail.

Measures

      Demographic Questionnaire. Participants were asked to provide information on

demographic variables, including age, gender, racial group and current marital status.

Additionally, they were asked if they had any children currently under their care. They were also

asked to report how many children they have and to list their children's ages. They were asked to

report the type of child or adolescent courses they had taken (if applicable), whether they have

had experience using the MyVirtualChild© program - and if they had ever taken any parenting

classes (Appendix B).

      TPB Questionnaire. The participants then answered an online questionnaire assessing

attitudes, subjective norms, and PBC as well as intentions to perform behaviors as they pertain to

parenting practices (Appendix D). All the questions were presented in a randomized order. This

questionnaire was created using Ajzen's guidelines concerning construction of a TPB

measurement (Ajzen, 2006), in which the first step was to define the behavior being measured. In

this study, the behavior of interest was related to positive parenting practices that researchers

consistently report are associated with positive child outcomes in the parenting literature;

namely, displaying warmth and acceptance, being responsive and offering praise, rewards and

reinforcement for appropriate behavior, use of inductive rather than physical or inflexible

discipline, setting appropriate limits and promoting the disclosure of children by being open to

discussion about various topics.

Ajzen suggested that approximately five to six items be created for each of the theory's major constructs, and that these be measured through 7-point bipolar adjective scales. For example, the degree to which a behavior is pleasant or unpleasant could be evaluated by stating the behavior and asking the participant to rate on a 7-point scale the degree to which they find it pleasant or unpleasant. A total of 32 items were used and these were combined and integrated to avoid the face validity and repetitive nature of the items.

Attitudes. Attitudes were assessed using eight, 7-point Likert items that asked the participants to evaluate a behavior and state their 'position' as it pertains to a variety of positive parenting practices. Internal consistency was measured using pre-test attitude scores and was determined to be weak ($\alpha = .33$).

Subjective Norms. Subjective norms were assessed using eight, 7-point Likert items that evaluated the extent to which participants perceived important others as approving of their use of a specific parenting practice. Items also measured the extent to which participants perceived that important others would use a particular parenting practice. Internal consistency was measured using pre-test subjective norms scores and was determined to be weak ($\alpha = .23$).

Perceived Behavioral Control. Perceived behavioral control was assessed using eight, 7-point Likert items that examined the extent to which participants felt confident in their ability to successfully perform a behavior and the extent to which they perceived a behavior to be under their volitional control. The extent to which participants perceived their child's outcomes to be under their control was also assessed. Internal consistency was measured using pre-test PBC scores and was determined to be approaching adequate ($\alpha = .59$).

Intentions. Intentions were assessed through eight, 7-point Likert items that asked participants whether they intended to carry out a specific parenting behavior. Internal

consistency was measured using pre-test intention scores and was determined to be approaching

adequate ($\alpha = .62$).

Child Development Knowledge. The MyVirtual Child program was developed to assist

in students' understanding of child development concepts. Therefore, participants' knowledge

and understanding of developmental concepts explained within the program were assessed in

order to evaluate the degree to which increased knowledge of child development might be

associated with changes in the TPB constructs and intentions to perform behaviors associated

with positive child outcomes. These questions were constructed using the information provided

by Frank Manis in the instructor's manual for the program (Manis, 2011) and in the information

boxes that are presented throughout the program, in which explanations of concepts such as

goodness-of-fit and temperament are provided. The questionnaire was made up of 6 multiple-

choice questions (Appendix E).

Treatment Fidelity Questions. To evaluate the degree of involvement and engagement

with the program of participants in the experimental condition, two treatment fidelity questions

were presented in the mid-test questionnaire. These questions asked participants whether they

had watched any of the instructional videos that were included in the program and whether they

had answered any of the open-ended questions included in the program.

Qualitative Question. In order to gain a better understanding of participants' evaluation

of the program and their perceptions of how it impacted their parenting practices, participants in

the experimental condition were asked to answer a short qualitative question. The question asked

them to talk about their impression of the program overall and to discuss whether they thought

that the program had an impact on their parenting practices.

Material: Experimental Manipulation

MyVirtualChild©. Participants in the experimental condition raised a virtual child from the age of 0 months to 18 years. The program began by having users fill out a questionnaire related to their characteristics, including their personality (questions were designed to reflect the Big Five Personality Factors) and their abilities across various domains, such as in verbal and spatial tasks. Participants were also asked about the physical characteristics of the partner with whom they choose to co-parent. These reports served the function of shaping the virtual child's unique values and predispositions (Manis, 2011). Key aspects of the program included the following:

(a) The virtual baby was born.

(b) Users chose the physical characteristics of the child (all but the sex of the child) to reflect their own characteristics. As the program progressed and the child grew, the physical characteristics of the child also changed to reflect typical development.

(c) Vignettes that described key events that the child experienced were presented, telling the story of the virtual child.

(d) At all stages, users were presented with different choices that ultimately influenced and changed the life course of the child, such as signing up their child for extra-curricular activities. These choices were presented as multiple-choice options of possible parental "responses" to various events or situations (e.g., choosing how they would react after finding out that their virtual child was violent towards another classmate). Decisions that were made by the users could not be changed, though participants were allowed to re-visit the events that occurred and the course of action that they chose to take through the program's timeline.

(e) Users were given the opportunity to answer reflective questions that were presented at

the end of most childhood stages. Additionally, users were provided with progress

reports that were generated from different sources, such as school, cognitive ability,

pediatrician and psychological assessment reports. These also provided comparisons

of their child's progress with other children their age.

(f) Optional short videos were also presented throughout the program, which provided

explanations that could help users better visualize their child's progress.

Procedure

Participants were randomly assigned to two conditions: the experimental condition or the

control condition. Participants in the experimental condition completed the virtual child program,

while participants in the control condition did not. All participants completed online pre-test and

post-test TPB and Child Development Knowledge questionnaires, though participants in the

experimental condition also complete a mid-test TPB and child development knowledge

questionnaire.

Participants who were interested in participating in the study obtained the researchers'

email addresses through flyers placed in various locations and emailed the researchers indicating

that they were interested. The researcher then emailed information and instructions about the

study, which included a link to the online survey program 'SurveyGizmo' where interested

participants received more information about the study. Included in the email was information

about compensation. Participants in both the experimental and control condition received the

same instructions for the first part of the study. Participants who were interested in participating

were prompted to indicate that they read the study information and to provide an email address

that could best be used to communicate with them. Participants then completed the pre-test

questionnaire, which included the demographic, TPB and Child Development Knowledge

questionnaire. Additionally, participants were asked to indicate if they would like to receive

compensation immediately or if they preferred to receive the full compensation amount at the

end of the study. All participants indicated that they would like to receive the compensation at

the end of the study. Participants were made aware in the first email that they would have to set

up a time and place to meet if they wanted to receive compensation immediately, and were also

informed that they would still receive compensation for the parts of the study that they

completed should they choose to terminate participation. Participants in both the control and

experimental group received $5 for completing this part of the study. All participants completed

the program at home or on their personal computers, and were scheduled to complete it over a

two-week period to allow for group comparisons.

Experimental Group:

   After participants completed the pre-test questionnaires, the researcher was notified

through an automatic message generated by the SurveyGizmo program. The researcher then

emailed participants with their participant ID and instructions and a brief description of the

program, as well as an access code to the MyVirtualChild© program. Participants were asked to

raise their child to age 6 and were provided a link to the mid-test questionnaire, which included

the TPB questionnaire and the child development knowledge questionnaire; the child

development knowledge in the mid-test questionnaire included the first three questions that

corresponded to the virtual child's age (i.e., 0 months-6 years) and two treatment fidelity

questions. Participants in the experimental condition received $10 for completing this part of the

study. The researchers were informed that the participant had completed the mid-test

questionnaire, and provided instructions about the third and final part of the study via email.

For the last part of the study, participants were asked to raise their child to the age of 18 years and to complete the post-test questionnaires provided as a link within the email. The post-test questionnaire included the TPB and all of the knowledge questions (i.e., ages 6-18 years), along with a qualitative question regarding their opinion of the program overall and whether they perceived that the program had an impact on their parenting practices. The experimental group's responses on the mid-test questionnaire replaced the first three responses on the post-test questionnaire to decrease the effect of seeing the questions more times than the control group. The participants received $25 for completing the post-test questionnaires, for a total of $40 for their participation.

The researchers were informed when participants completed the final questionnaire and emailed the participants to set up a time and place to meet in order to receive compensation and sign the payment form confirming their reimbursement.

Control Group:

Participants in the control group received no manipulation. Upon completion of the pre-test questionnaire, participants in the control group were informed through email that, because the study was on a strict time schedule, there would be a brief waiting time period before they could proceed to the next part of the study. One week following this email, participants in the control condition were sent an email containing their participant ID number and a link to the post-test questionnaire, which they were asked to complete within one week. The post-test questionnaire was the same as the one completed by participants in the experimental condition. The researchers were notified of the participants' completion of the post-test questionnaire, and emailed the participants in order to set up a time and place to meet. Participants in the control

group received $5 for completing the final part of the study, for a total of $10 study compensation.

In the study information section of the pre-test questionnaire, participants were informed that they would be given a link to the program's website if they were in the experimental group, while participants assigned to the control group would have a brief waiting time period before completing the final part of the study.

Results

Descriptive Analyses

In order to further examine the data, descriptive statistics for all variables are reported in Table 1. Assumptions of normality were carried out and the assumptions were met. The only instance of unequal variances was for the post-intention scores; however, due to the number of participants in each group being similar, the ANCOVA should be robust to this violation (Field, 2013). For the analyses of the TPB variables and Child Development Knowledge variable, the means and SDs at pre- and post-test are presented in Table 2 for each group. Independent t-test analyses examined group differences at pre-test to confirm the effectiveness of random assignment. No pre-test group differences existed (see Table 2).

Hypothesis Testing

Attitudes. Hypothesis 1 predicted that there would be changes in participants' attitudes toward positive parenting practices as evidenced by increased approval/appraisal of positive parenting practices and decreased approval of negative parenting practices in the experimental condition, but not the control condition. To test this hypothesis, an ANCOVA was conducted with Group (Experimental vs. Control) as the independent variable, pre-test attitude scores as the covariate, and post-test attitude scores as the dependent variable. After controlling for pre-test

attitudes, no significant differences were found between the Experimental group ($M = 48.00$, SD = 5.51) and the Control group ($M = 45.70$, $SD = 5.33$) on post-test attitude scores $F(1,19) = 0.30$, $p = .59$, suggesting that the average post-test attitudes scores were roughly the same for both the experimental and the control participants. The range of attitude scores at pre- and post-test remained relatively unchanged and appeared to be high at both times, suggesting that participants' pre-existing attitudes towards positive parenting practices were already highly positive. The range of scores for all TPB variables is presented in Table 1. The ANCOVA results for post-test attitude scores are presented in Table 3.

Subjective norms. Hypothesis 2 predicted that there would be changes in participants' subjective norms following use of the program, as evidenced by increased reports by participants in the experimental group of important others' (family, friends, professionals) positive evaluation of positive parenting practices and a decrease in reports of norms related to negative parenting practices. No such changes were expected to be evident in reports of participants within the control group. To test this hypothesis, an ANCOVA was conducted with Group (Experimental vs. Control) as the independent variable, pre-test subjective norms as the covariate, and post-test subjective norms as the dependent variable. After controlling for pre-test subjective norm scores, there were no significant differences between the Experimental group ($M = 36.25$, $SD = 4.54$) and the Control group ($M = 36.20$, $SD = 5.01$) on post-test subjective norm scores $F(1,19) =$ 0.51, $p = .48$, suggesting that the average post-test subjective norm scores were similar for both the experimental and control participants. As with attitudes, the range of subjective norm scores scores at pre- and post-test remained relatively unchanged and were relatively high both times, suggesting that participants' pre-existing subjective norms were relatively positive. ANCOVA results for post-test subjective norm scores are presented in Table 4.

Perceived behavioral control. Hypothesis 3 predicted that there would be changes in participants' perceived behavioral control, as evidenced by increased reports of perceived ease of performing behaviors associated with positive parenting, as well as increased reports of sense of control over child outcomes by the participants in the experimental group. In contrast, perceived behavioral control reports were expected to remain the same in the control group. To test this hypothesis, an ANCOVA was conducted with Group (Experimental vs. Control) as the independent variable, pre-test PBC scores as the covariate, and post-test PBC scores as the dependent variable. After controlling for pre-test PBC scores, no significant differences were found between the Experimental group ($M = 42.92$, $SD = 2.54$) and the Control group ($M = 42.20$, $SD = 3.23$) on post-test PBC scores $F(1,19) = 0.34$, $p = .57$, suggesting that post-test PBC scores were roughly equal for participants in the experimental and control group. The range of PBC scores at pre- and post-test also remained relatively unchanged and was high at both times, suggesting that participants' pre-existing PBC over positive parenting practices was already high. The ANCOVA results for post-test PBC scores are presented in Table 5.

Intentions. Hypothesis 4 predicted that the experimental group would experience increased reports of intentions to carry out positive parenting behaviors in the future compared to the control group, whose reports were expected to remain largely unchanged. To test this hypothesis, an ANCOVA was conducted with Group (Experimental vs. Control) as the independent variable, pre-test intention scores as the covariate, and post-test intention scores as the dependent variable. After controlling for pre-test intentions, there were no significant differences between the Experimental Group ($M = 47.25$, $SD = 2.63$) and the Control Group ($M = 45.00$, $SD = 7.26$) on post-test intention scores, $F(1,19) = 1.03$, $p = .32$. Similar to the other TPB variables, the range of intention scores at pre- and post-test remained relatively unchanged

and appeared to be high at both times, suggesting that participants' pre-existing intentions to use positive parenting practices were already high. The ANCOVA results for post-test intention scores are presented in Table 6.

Child development knowledge. Hypothesis 5 predicted that, because of the educational orientation of the program and its focus on child development, there would be increased knowledge of child development concepts of participants in the experimental group, as evidenced by higher scores on the Child Development Knowledge measure compared to scores of participants in the control group. To test this hypothesis, an ANCOVA was conducted with Group (Experimental vs. Control) as the independent variable, pre-test knowledge scores as the covariate, and post-test knowledge scores as the dependent measure. Results indicated a significant difference between the groups $F(1,19) = 5.82$, $p = .03$, with the Experimental group ($M = 4.00$, $SD = 1.13$) scoring higher than the Control group ($M = 2.90$, $SD = 1.10$) on the post-test Child Development Knowledge questionnaire. The ANCOVA results for post-test knowledge scores are presented in Table 7. In exploring participants' scores further, it appeared that 82% of participants got question number 5 incorrect. This question asks about the developmental stage at which abstract thinking begins. The percentage of incorrect responses remained unchanged at post-test, suggesting that this question may be particularly difficult to answer. The easiest question appeared to be question 6, with 91% of participants responding correctly at pre-test and 86% at post-test.

Predictive power of knowledge and TPB variables in parents' intentions. The final hypothesis of the present study was concerned with the predictive power of knowledge and the TPB variables in parents' intentions to use more positive parenting practices. To test this, a hierarchical linear regression was conducted, using child development knowledge and the TPB

variables as predictor variables. All pre-scores were entered as control variables at Step 1 of the regression analyses, while post-test scores were entered into Step 2 to analyze the predictive power of post-test knowledge.

Model 1, which included pre-test child development knowledge scores ($\beta = -.057$, $p = .737$), pre-test attitude scores ($\beta = -.216$, $p = .369$), pre-test subjective norm scores ($\beta = .365$, $p = .058$), pre-test PBC scores ($\beta = -.282$, $p = .144$) and pre-test intentions scores ($\beta = .717$, $p = .010$), accounted for 62.3% of the variance. Model 2 included post-test child development knowledge scores ($\beta = .445$, $p = .015$), post-test attitude scores ($\beta = -.165$, $p = .349$), post-test subjective norm scores ($\beta = .403$, $p = .033$) and post-test PBC scores ($\beta = -.300$, $p = .054$). The R^2 change was .235, indicating that Model 2 accounted for and additional 23.5% of the variance. In further explanation of the standardized Beta coefficient, the increased predictive power from Model 2 appeared to be driven primarily by the post-test child development knowledge scores ($\beta = .445$, $p = .015$) and the post-test subjective norm scores ($\beta = .365$, $p = .058$). The correlation matrix for the regression analysis is presented in Table 8. Table 9 presents the results of the regression analysis.

Treatment Fidelity Check

Participants in the experimental group were asked to answer two questions to examine their level of interaction with the program and engagement with optional parts of the program. Participants were asked to indicate whether they had watched any of the instructional videos that were included in the program and whether they answered any of the open-ended questions included in the program. Forty-two percent of participants *(n = 5)* indicated that they watched some of the videos included in the program, while 58% *(n = 7)* indicated that they had not.

Conversely, 58% (N = 7) indicated that they answered some of the open-ended questions, while 42% (N = 5) indicated that they had not.

Qualitative Responses

At the end of the post-test questionnaire, participants who indicated that they had completed the program were asked to take some time to talk about their impression of the program overall, and were asked whether they thought that the program had an impact on their parenting practices. Seven participants had indicated that the program was insightful and allowed them to reflect on decisions they had made with their own children; for example, one participant stated "I think it had a positive impact, in that it showed some of the consequences of the decisions I made that were much more long-term than I expected" Other participants stated that the program had a positive impact because it made them think "of the correct way of approaching [their] kids", that it asked them questions they had not thought and "made [them] think about how [they] parent and what [they] can improve on", that it made them "rethink some of the ways of treating [their] kids" and that "it provided insight into parent-child relationships» and was a «nice exercise in parenting".

Some participants indicated that the program got them to reflect on current and future parenting practices; for instance, one wrote "This program was actually an eye opener for me. My kids are still young and I thought I knew how I wanted to raise them and how I would react in in certain situations. However, when having the different options, I realized I am not completely sure on how I would handle certain situation and [have] some learning and growing to do before then. I even went through some of the questions afterwards with my husband to see where we both stood on certain issues".

Interestingly, three participants indicated that they thought the program was helpful in showing them that they were using correct parenting practices with their children and that the development of their virtual child was in line with that of their own children. For example, one participant wrote "I was suriprised to find that the development of my virtual child matched up well at most stages with that of my actual children" and that it provided "encouragement to keep doing wht we're doing." Another participant wrote "the progam had an impact on my parenting practices by helping me realize that I am doing the right thing by explaining and talking to my child about reasons for discipline".

Finally, two participants explained that, though the program was enjoyable, there were several factors that impact parenting practices that were not present in the program. One participant, for instance, wrote that parenting practices may differ from child to child, making the program somewhat less applicable to "real life situations". Another participant cited factors such as early sleeping habits (such as co-sleeping with a child) and the influence of other family members, who may have to care for the child while the parent is working. All participants had indicated that they found the program interesting and that they enjoyed using it except one participant, who stated that the program was "silly" and that she "had to pick best answer because some of them were totally not how I would have responded in real life".

Discussion

The examination of parenting practices and their influence on children and the parent-child relationship have guided the content of parenting interventions, and researchers are updating protocols geared towards increasing the efficacy of parenting interventions constantly. Parenting interventions are efficacious and demonstrate that targeting parenting variables can have an effect on both parental well-being and child outcomes (Bodenmann, Cina, Ledermann,

& Sanders, 2008; Morawska & Sanders, 2007;). In-person interventions, however, suffer from

some major drawbacks: they may not be easily accessible to individuals without access to

transportation and may be expensive and time-consuming, suggesting that there is a need for

brief, accessible and affordable interventions. Parenting interventions have been demonstrated to

be efficacious when delivered in an online format (Nieuwboer, Fukkink, & Hermanns, 2013),

and may even be preferred by parents (Metzler, Sanders, Rusby, & Crowley, 2012), while the

use of virtual material may increase engagement and improve understanding of the material

(Poling & Hupp, 2009).

Targeting parenting practices is a central feature of these interventions, but the

mechanisms underlying behavior change are complex and multifaceted; therefore, an

understanding of variables that can effect actual behavior change will likely assist in their

effective implementation. Icek Ajzen's TPB (Ajzen, 1985; 1991) was developed as a method of

predicting behavior by evaluating attitudes, subjective norms and PBC as variables affecting

intentions to engage in a behavior; use of the theory has been shown to be efficacious (Armitage

& Conner, 2001; Quine, Rutter, & Arnold, 2001), while interventions targeting the TPB

variables have been effective in influencing behavioral intentions (Norman et al., 2018;

Steinmetz, Knappstein, Ajzen, Schmidt, & Kabst, 2016).

In the present study, the MyVirtualChild© program created by Frank Manis (2006; 2011)

was used to assess its effectiveness in increasing intentions through the TPB variables and

knowledge gain to use positive parenting practices. Contrary to what was hypothesized in

regards to the TPB predictor variables, the results of the current study indicated that there were

no significant changes in post-test attitudes, subjective norms, or perceived behavioral control

towards positive parenting practices in the experimental group in comparison to the control group.

As knowledge of child development may be associated with the use of more positive parenting practices (Stevens, 1984) and better parent-child interactions (Hess, Teti, & Hussey-Gardner, 2004), and because of the educational orientation of the program and its focus on child development, child development knowledge was also assessed using definitions that were presented within the program. Results indicated that there was a significant difference between the two groups' post-test knowledge scores, with the experimental group scoring higher than the control group. This has significant implications, as the analysis of the final hypothesis, which was concerned with the predictive power of knowledge and TPB variables in parents' intentions to use more positive parenting practices, indicated that intentions in both groups were better predicted by the post-knowledge scores. In fact, the strongest predictor of post-intentions (when controlling for pre-intentions in the regression) was the post-test knowledge variable, as were post-test subjective norms. As the program significantly increased the experimental group's knowledge of child development, these results suggest that knowledge gain through the MyVirtualChild© program may indirectly play a role in increasing intentions to engage in positive parenting practices. The analysis also revealed that post-test subjective norm scores were also a strong predictor of post-test intentions. Though subjective norms have been shown to have the weakest association with intention compared to attitude and PBC (e.g., Sutton & White, 2016), the results of this study support Armitage and Conner's (2001) notion that the use of multiple items may increase the predictive power of subjective norms in relation to intentions.

A number of studies have extended the TPB and included other variables that may add to the predictive validity of the TPB (Iwrin, O'Callaghan, & Glendon, 2017), and several studies

that have extended the theory have included knowledge as an additional variable (e.g., Maichum, Parichatnon, & Peng, 2016). In a recent study, Guerin, Toland, Okun, Rojas-Guyler and Bernard (2018) evaluated intentions to engage in work safety behaviors through the TPB with the addition of a knowledge construct examining participants' knowledge of work safety. They found that increased knowledge had an indirect effect on intentions through PBC and attitudes both at pre- and post-test, though they did not find direct effects of knowledge on intentions. This indirect effect of knowledge through the TPB variables was also observed in another study investigating intentions to purchase sustainable products (Maichum, Parichatnon, & Peng, 2016). These results are in contrast to a study conducted by Ajzen, Joyce, Sheikh and Cote (2011), who concluded, "from the perspective of the TPB, information accuracy is neither necessary nor sufficient" (p. 115) but are supported by the results of one of the studies included in their research, in which the knowledge-intention relationship appeared to be mediated by attitudes. The results of the aforementioned studies and present study suggest that knowledge, as an influencing factor in behavior, should be studied more extensively to understand its effects on intentions to engage in certain behaviors.

In the current study, knowledge gain is important because of the educational purpose in the creation of the MyVirtualChild© program. Knowledge of positive parenting practices is a central feature of parenting programs; this knowledge and practice of skills can have a positive impact on actual use of positive parenting practices and on improving child outcomes. For example, in a study by Ros, Hernandez, Graziano and Bagner (2016), parents were asked to use skills that were learned during sessions as home practice, such as providing effective commands and using time-outs appropriately. They found that higher rates of completing the home practice on a weekly basis was associated with increased use of positive parenting practices and with

higher improvement in child externalizing problems. Parenting interventions focused on increasing parental knowledge of effective parenting practices can lead to improvements on how parents handle conflict (Oveisi et al., 2010) and better observed parent-child interactions, discipline practices and use of preventative parenting approaches to reduce child disruptive behavior (Gardner, Shaw, Dishion, Burton, & Supplee, 2007). These interventions can also assist parents to have clearer expectations of their children (Linares, Montalto, Li, & Oza, 2006).

Open-ended questions at the end of the study evaluated participants' views about the program and whether it influenced their parenting. Similar to the results found by Symons and Smith (2014), participants' responses suggested that they engaged with their virtual child and generally regarded the program as positive. All but one of the participants in the experimental group indicated that they thought the program had an impact on their parenting views and practices, that they regarded it as interesting and enjoyable, and that it got them to reflect on their parenting practices with their own children.

Limitations

One of the drawbacks of delivering interventions online, as was evident in the present study, is the high attrition rate (Hall & Bierman, 2015). The sample size of the study was relatively small, so these attrition rates hindered the statistical power of the study. A larger sample size would be beneficial. Additionally, the lack of effect seen in the TPB variables may have been due to a ceiling effect, as the mean scores on the pre-test TPB variables of participants in both groups were already very high. For instance, the range of attitude scores at pre-test were 36-54 and the mean was 46.82; this suggests that a large number of participants, in both the experimental and control group, already evaluated the parenting practices in question in a highly

positive manner. This was also the case for pre-test PBC scores and intention scores, suggesting that the degree to which change could be observed in the TPB variables at post-test was limited.

Although the TPB variable subscales were developed utilizing the guidelines set forth by Azjen (Ajzen, 2006), the internal consistency of the attitudes and subjective norms subscales were weak, and the PBC and intentions subscale were approaching adequate. This is concerning as these subscales were supposed to be measuring a single construct. As such, interpretations utilizing these subscales need to be made with caution. Taken together, the measurement concerns for these constructs could be largely responsible for the null findings involving the TPB variables. As such, it is important to revise the measurement tools and reevaluate the research questions rather than assume that the null findings are correct.

Another limitation of the present study was that the environments in which all components of the study were completed were unknown, including location and devices used to complete the questionnaire. Because the environments were not controlled, it is likely that participants were present in locations with multiple distractors. It is, therefore, also unknown whether participants completed the study in the presence of others. As the majority of the participants indicated that they were married, it is possible that some may have been responding to the questions with their partners, which may have affected their responses. Overall, completing the program in a non-controlled environment means that there may have been a number of factors influencing their responses, though completing it in the participant's preferred setting may have made it more naturalistic. This could contribute to increased applicability in the participants' actually parenting practices.

The amount of time spent on the program and the degree to which participants attended to the material is also a limiting factor. Though reminders were sent to complete the program and

study components in a set time period, a number of participants exceeded the deadline, which could mean that they might have rushed through the program and did not attend adequately to the information presented in the program. This could also be true of participants who completed the study components on time. Furthermore, though these were optional, not all participants in the experimental group viewed the instructional videos or answered the reflection questions at the end of the stages within the program, so it is unknown if doing so might increase engagement and affect their responses. Finally, it is possible that the education courses and parenting classes that some participants had taken might have impacted their responses and their pre-existing parenting variables, which could have contributed to the high scores at pre-test. While these are potential limitations, it is encouraging that knowledge scores increased in the experimental group, which provides some support that participants were adequately attending to the material in the program.

Additionally, though multiple variables were examined to predict intentions, the measures still relied on self-report, which might have been susceptible to participants not responding in an honest, forthright manner in an effort to appear good. This limitation might have been exacerbated by the lack of anonymity, as participants communicated with the researcher via emails often containing their names and as they had to meet with the researcher in person at the end of the study in order to receive compensation.

Another limitation is related to recruitment. Though efforts were made to distribute the flyer in various locations, a large portion of the participants who signed up for the study had done so through information that they found on social media or on the ATC or USCA campus, suggesting that the sample may not have been as socioeconomically diverse as desired. Due to the lack of recruitment of parents from locations where children may be more affected by

familial conflict and strain, it may be that participants who had the time and were able to sign up for the study were of higher SES and might have had a higher level of education, which could contribute to the possibility of a ceiling effect. As was evident in their reports on the demographic questionnaire related to child and adolescent courses that they have taken, a large number of participants had taken courses that might have contributed to high pre-test scores and to the lack of observed effect.

Future Directions

Future studies could attempt to recruit a larger number of participants from a wider array of socio-demographic and economic backgrounds to ensure a diverse sample. This is particularly important as parents of low SES may benefit more from easily accessible, brief and inexpensive interventions administered in a simple and easily navigated format. Though research indicates that internet access in homes of individuals of lower SES may be limited, smartphone ownership is increasing across individuals of all income levels (Anderson, 2017), a factor that could aid in the recruitment of a sample that is more representative of the population. As the number of men who participated in the study was low (18%), efforts could be made to recruit more fathers (Stahlschmidt, Threlfall, Seay, Lewis, & Kohl, 2013).

Future studies could also be conducted in a more controlled environment, in order to minimize the possibility of distractions and ensure treatment fidelity. Since the reflection questions and instructional videos presented in the program were optional, it may be interesting to see if increased interaction with these affects the TPB variable scores. Studies with a larger sample size and statistical power could examine whether knowledge is a moderator or mediator of the TPB variables, in order to gain a better understanding of the effects of knowledge on behavioral intentions.

The impact of both positive and negative parenting practices on child and parent outcomes as well as parent-child relationships has been demonstrated in a wide array of studies and results have informed parenting interventions designed to increase positive parenting practices and decrease ones that may have a negative impact on a child. These interventions have demonstrated efficacy and have been implemented across a wide array of locations. Further, they have been adapted to be delivered in a brief format. There is still, however, a discrepancy between the amount of interventions that exists and the affordability and accessibility that is needed for these to be delivered to those who could benefit the most. The findings of this study suggest that a brief, online program designed to increase knowledge of child development appears to be effective in doing so and that knowledge level following the program appears to be the strongest predictor for parental intentions to engage in certain parenting behaviors. This finding is important as it suggests that a brief, online program, by way of targeting child development knowledge, can increase intentions to engage in positive parenting practices which, as demonstrated through Ajzen's TPB, may be the first step to carrying out a behavior in actuality.

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Table 1

Descriptive Statistics for all TPB and Child Development Knowledge Variables at Pre- and Post-test

	Mean		SD		Range of Scores	
	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
ATT	46.82	46.95	4.49	5.43	36-54	38-55
SN	35.05	36.23	5.45	4.64	26-49	27-44
PBC	46.95	42.59	4.67	2.82	36-52	37-48
INT	46.59	46.23	5.56	5.25	37-56	34-56
KNOW	3.23	3.50	1.15	1.23	1-6	1-6

Note: *ATT = Attitudes, SN = Subjective Norm, PBC = Perceived Behavioral Control, INT = Intentions, KNOW = Child Development Knowledge*

Table 2

TPB (ATT = Attitudes, SN = Subjective Norm, PBC = Perceived Behavioral Control, INT = Intentions) and Child Development Knowledge (KNOW) Pre and Post-test scores for the Experimental and Control Group

| | Experimental Group | | Control Group | | | |
	Mean	*SD*	Mean	*SD*	*t*	*p*
Pre:						
ATT Total	47.58	4.72	45.90	4.25	.871	.39
SN Total	34.25	3.84	36.00	7.02	-.742	.47
PBC Total	46.50	4.19	47.50	5.36	-.492	.63
INT Total	46.92	5.73	46.20	5.63	.294	.77
KNOW Total	3.33	1.16	3.10	1.20	.464	.65
Post:						
ATT Total	48.00	5.51	45.70	5.33		
SN Total	36.25	4.54	36.20	5.01		
PBC Total	42.92	2.54	42.20	3.23		
INT Total	47.25	2.63	45.00	7.26		
KNOW Total	4.00	1.13	2.90	1.10		

Table 3

ANCOVA Summary for Post-test Attitude Scores for the Experimental and Control Group

Source	SS	df	F	p
Pre-test Attitudes	226.17	1	11.81	.003
Group	5.76	1	0.30	.590
Error	363.94	19	19.15	

Note: $R^2 = .41$, Adjusted $R^2 = .35$
Dependent Variable: Post-test Attitude Scores

Table 4

ANCOVA Results for Post-test Subjective Norm Scores

Source	SS	df	F	p
Pre-test Subjective Norm	215.26	1	215.26	.001
Group	6.34	1	6.34	.484
Error	236.59	19	12.45	

Note: $R^2 = .48$, Adjusted $R^2 = .42$
    Dependent Variable: Post-test Subjective Norm Scores

Table 5

ANCOVA Summary for Post-test Perceived Behavioral Scores (PBC)

Source	SS	df	F	*p*
Pre-test PBC	0.29	1	0.03	.856
Group	2.97	1	0.34	.565
Error	164.22	19	8.64	

Note: $R^2 = .02$, Adjusted $R^2 = -.09$
        Dependent Variable: Post-test PBC Scores

Table 6

ANCOVA Summary for Post-test Intention Scores

Source	SS	df	F	*p*
Pre-test Intentions	210.89	1	11.81	.003
Group	18.40	1	1.03	.323
Error	339.36	19	17.86	

Note: $R^2 = .41$, Adjusted $R^2 = .35$
  Dependent Variable: Post-test Intention Scores

Table 7

ANCOVA Summary for Post-test Child Development Knowledge Scores

Source	SS	df	F	*p*
Pre-test KNOW	8.27	1	9.45	.006
Group	5.10	1	5.83	.026
Error	16.63	19	0.88	

Note: $R^2 = .47$, Adjusted $R^2 = .42$
        Dependent Variable: Post-test KNOW Scores

Table 8

Correlation matrix of the regression analysis

Variables	1	2	3	4	5	6	7	8	9	10
1. Pre-test Attitudes	--									
2. Pre-test Subjective Norm	.25	--								
3. Pre-test Perceived Behavioral Control	.48*	.23	--							
4. Pre-test Intentions	.71**	.48*	.39	--						
5. Pre-test Child Development Knowledge	.29	.03	.37	.22	--					
6. Post-test Attitudes	.64**	.51*	.37	.64**	.09	--				
7. Post-test Subjective Norm	.30	.68**	.17	.47*	.15	.52*	--			
8. Post-test Perceived Behavioral Control	.39	.32	.03	.18	.05	.34	.09	--		
9. Post-test Intentions	.23	.59**	-.04	.62**	-.06	.35	.67**	-.08	--	
10. Post-test Child Development Knowledge	.47*	.19	.11	.346	.56**	.28	.20	.34	.32	--

Note. *. Correlation is significant at the 0.05 level (2-tailed).
   **. Correlation is significant at the 0.01 level (2-tailed).

Table 9

Summary of Hierarchical Regression Analysis Predicting Post-test Intentions

	Model 1			Model 2		
Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*
Pre-test ATT	-.25*	.27	-.22	--	--	--
Pre-test SN	.35	.17	.37	--	--	--
Pre-test PBC	-.32	.21	-.28	--	--	--
Pre-test INT	.68*	.23	.71	--	--	--
Pre-test KNOW	-.26	.76	-.06	--	--	--
Pre-test ATT	--	--	--	-.20	.25	-.17
Pre-test SN	--	--	--	.21	.18	.22
Pre-test PBC	--	--	--	-.17	.16	-.16
Pre-test INT	--	--	--	.56*	.18	.59
Pre-test KNOW	--	--	--	-1.66*	.68	-.36
Post-test ATT	--	--	--	-.16	.16	-.17
Post-test SN	--	--	--	.46*	.19	.40
Post-test PBC	--	--	--	-.56*	.26	-.30
Post-test KNOW	--	--	--	1.91*	.67	.45

Note: Dependent Variable: Post-test INT
ATT = Attitudes, SN = Subjective Norm, PBC = Perceived Behavioral Control, INT = Intentions, KNOW = Child Development Knowledge

Appendix A

Study Flyer

ATTENTION PARENTS!

PARENT/GUARDIAN VOLUNTEERS NEEDED FOR RESEARCH STUDY

Are you the <u>parent</u> of a child or adolescent?

If so, we need you for a research study!

Information about Study:

➢ Some participants will be completing a virtual child-rearing program. **Participants will be able to complete the program at home on their personal computer**.

➢ Participants will be asked to complete a few online questionnaires over the course of the study.

Eligibility:

➢ Must be a parent of at least one child

➢ Must have access to a computer with Internet access

$$ You will get paid for participating! $$

Space is limited! If you would like more information about the study or if you are interested in taking part in this study, please email Athena Christou at athenac@usca.edu or Dr. Meredith Elzy at MeredithE@usca.edu

Appendix B

Study Information

UNIVERSITY OF SOUTH CAROLINA AIKEN

INFORMATION FOR RESEARCH SUBJECTS

Virtual Child-Rearing: An examination of positive parenting practices through the Theory of Planned Behavior

KEY INFORMATION ABOUT THIS RESEARCH STUDY:
You are invited to volunteer for a research study conducted by Athena Christou. I am a graduate student in the Department of Psychology at the University of South Carolina Aiken. The University of South Carolina Aiken, Department of Psychology is sponsoring this research study. The purpose of this study is to examine parenting attitudes, practices and understanding of child development during the completion of a virtual simulation program in which you will raise a virtual child. You are being asked to participate in this study because you are a parent over the age of 18 years. This study is being done online on your own computer at a location of your choosing and will involve approximately 30 volunteers.

This form explains what you will be asked to do, if you decide to participate in this study. Please read it carefully and feel free to ask questions before you make a decision about participating.

PROCEDURES:
1. Be assigned to a research group by chance. You do not have a choice over which group you will be assigned.
2. Complete an online questionnaire packet at the start of the study regarding you parenting attitudes and beliefs, your intentions to engage in particular parenting behaviors, as well as your knowledge of child development terms.
3. Depending on which group you are placed in, you may have to complete a virtual child-rearing program in which you raise a virtual child from birth to adolescence. The virtual child-rearing program can be completed on your own computer over a two-week period; the participants who complete the program will be asked to raise their virtual child to a certain age each week and will then answer questionnaires regarding their impression of the program and will complete a short questionnaire about that will ask you to reflect on your parenting practices and child development knowledge.
4. All participants will be asked to complete a final packet of online questionnaires at the conclusion of the study regarding attitudes and beliefs towards parenting, likelihood to engage in particular parenting behaviors and knowledge of child development terms.

DURATION:
Participants assigned in Group 1 will raise a virtual child up to a certain age each week which

is estimated to take approximately 2-3 hours. Participants in Group 2 will complete the final questionnaire packet 2 weeks following completion of the first questionnaire packet. All questionnaire packets are estimated to take approximately 10-15 minutes to complete.

RISKS/DISCOMFORTS:
Loss of Confidentiality: There is the risk of a breach of confidentiality, despite the steps that will be taken to protect your identity. Specific safeguards to protect confidentiality are described in a separate section of this document.

BENEFITS:
Taking part in this study is not likely to benefit you personally. However, this research may help researchers understand how increased understanding of child development may influence positive parenting practices.

COSTS:
There will be no costs to you for participating in this study other than possible costs related to transportation to and from the research site.

PAYMENT TO PARTICIPANTS:
Payment will depend on the group that you are randomly assigned in. Participants in Group 1 will receive a total of $40 at the completion of the study, while participants in Group 2 will receive a total of $10 at the completion of the study. Participants in both groups will receive $5 for the first questionnaire packet completed, while participants in Group 1 will receive $5 at the end of week 1 after raising their virtual child up to the age 6 and completing the week 1 questionnaire and $30 for raising their virtual child up to the age of 18 and completing the final questionnaire packet. Participants in Group 2 will receive $5 for completing the final questionnaire packet.

STUDENT PARTICIPATION:
Participation in this study is voluntary. You are free not to participate, or to stop participating at any time, for any reason without negative consequences. Your participation, non-participation, and/or withdrawal will not affect your grades or your relationship with your professors, college(s), or the University of South Carolina Aiken.

If research credit is required for successful course completion, other alternative means for obtaining credit is available and you may discuss these options with your course instructor.

CONFIDENTIALITY OF RECORDS:
Confidentiality loss is a possible risk of this study. However, steps will be taken to ensure that your information is kept as confidential as possible and your name will not be used in any publication that may result from this study. Study information will be kept in locked files, and electronic information will be stored in password protected computer files at the University of South Carolina Aiken. The USC Office of Research Compliance may request access to this form to ensure procedures designed to protect research participants are being properly followed. Your data may also be shared with other researchers around the world or with a publicly available data archive. In such cases, every reasonable effort will be made to

remove identifiers from the data that would indicate any connection to you. At no time will your name be asked for on the questionnaires used in this study; instead, a randomly assigned participant number will be used. Your information will not be released or disclosed without your further consent, except as specifically required by law.

VOLUNTARY PARTICIPATION:
Participation in this research study is voluntary. You are free not to participate, or to stop participating at any time, for any reason without negative consequences. In the event that you do withdraw from this study, the information you have already provided will be kept in a confidential manner. If you wish to withdraw from the study, please call or email the principal investigator listed on this form.

Questions about your rights as a research subject are to be directed to, Lisa Johnson, Assistant Director, Office of Research Compliance, University of South Carolina, 1600 Hampton Street, Suite 414D, Columbia, SC 29208, phone: (803) 777-7095 or email: LisaJ@mailbox.sc.edu.

Appendix C

Demographic Questionnaire

- Your age in years: _____

- Gender: _____

- Which racial group best describes you?

  ☐ Black/African American   ☐ Asian/Asian American
  ☐ White/Caucasian   ☐ Indian/Native American/Alaska Native
  ☐ Hispanic/Latino(a)   ☐ Native Hawaiian/Other Pacific Islander
  ☐ Other: _____

- What is your current marital status?

  ☐ Single   ☐ Engaged
  ☐ In a relationship   ☐ Divorced
  ☐ Married   ☐ Widowed

- Do you have any children?

  ☐ Yes

  ☐ No

  If yes, how many children do you have? _____

  How many of your children are currently under your care? _____

  How old are your children? _____

- (If applicable) What type of child or adolescent courses have you taken?

  ☐ Education courses. Specify: _____

  ☐ Psychology courses (e.g. Infant and Child Psychology, Developmental

     Psychology, etc.). Specify: _____

□ Sociology courses (e.g. Sociology of the Family, Sociology of Delinquent Youth

Behavior, etc.). Specify: _____

□ Other. Specify: _____

□ None

- Have you taken any parenting classes?

□ Yes. Specify: _____

□ No

- Have you ever used the 'My Virtual Child' program?

□ Yes

□ No

Appendix D

TPB Questionnaire

It is important to me that my child freely expresses him/herself even if I disagree.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

My family and friends support the use of corporal punishment.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

My child's behavior depends completely on his/her choices.

1	2	3	4	5	6	7
Very False	False	Somewhat False	Neutral	Somewhat True	True	Very True

In the future, I will use time-outs with my child when he/she misbehaves.

1	2	3	4	5	6	7
Highly Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Highly Likely

The use of corporal punishment is the best way to teach children appropriate behavior.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

My family and friends think it is important for me to discuss limit setting with my child.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

I am capable of changing a behavior that is negatively affecting my child.

1	2	3	4	5	6	7
Very False	False	Somewhat False	Neutral	Somewhat True	True	Very True

I plan to explain my expectations of behavior to my child.

1	2	3	4	5	6	7
Highly Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Highly Likely

When my child tells me that he/she wants something, I will discuss it with him/her before making a decision.

1	2	3	4	5	6	7
Highly Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Highly Likely

I am confident in my ability to listen to my child's perspective on rules.

1	2	3	4	5	6	7
Very False	False	Somewhat False	Neutral	Somewhat True	True	Very True

Other parents I know think it is important to consider children's perspectives while setting limits.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

Before a parent sets limits, it is important to explain why these are being set.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

My family believes that if I praise my child often, then he/she will become spoiled.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

When my child is misbehaving, I need someone else to handle it.

1	2	3	4	5	6	7
Very False	False	Somewhat False	Neutral	Somewhat True	True	Very True

Next time I become angry at my child, I will take the time to discuss with him/her what made me angry.

1	2	3	4	5	6	7
Highly Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Highly Likely

It is important that parents respond to their children's needs consistently.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

I am able to follow through with my parenting decisions even when my child complains.

1	2	3	4	5	6	7
Very False	False	Somewhat False	Neutral	Somewhat True	True	Very True

My parenting practices do not differ from those of other parents I know.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

Providing praise or reward following good behavior is effective in encouraging it.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

If I see that my child is behaving appropriately, I will reward that behavior.

1	2	3	4	5	6	7
Highly Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Highly Likely

It is important to me that my child discloses information to me even if it makes me (or him/her) uncomfortable.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

Most parents I know allow their children to express themselves even if they may not approve of what they are saying.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

I am confident in my ability to set appropriate limits.

1	2	3	4	5	6	7
Very False	False	Somewhat False	Neutral	Somewhat True	True	Very True

I plan to talk with my child about the consequences of his/her actions to make him/her understand the impact of his/her behavior.

1	2	3	4	5	6	7
Highly Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Highly Likely

In the future, I will ask for my child's input while constructing family rules.

1	2	3	4	5	6	7
Highly Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Highly Likely

I am capable of talking with my child about uncomfortable things.

1	2	3	4	5	6	7
Very False	False	Somewhat False	Neutral	Somewhat True	True	Very True

Other parents around me explain the reason for punishment to their child.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

A good parent protects and shelters a child from all of life's difficulties.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

Other parents I know believe it is important to constantly supervise their children.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

When my child is dissatisfied with something I did, I will listen to what he/she has to say.

1	2	3	4	5	6	7
Highly Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Highly Likely

I believe that instilling guilt is a good way of changing your child's behavior.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

I can effectively explain rules to my child.

1	2	3	4	5	6	7
Very False	False	Somewhat False	Neutral	Somewhat True	True	Very True

Appendix E

Child Development Knowledge Questionnaire

1. At what age does object permanence typically emerge in children?
   a. 1-4 months
   b. 18 months–2 years
   c. 8-12 months
   d. 2-3 years
2. What does temperament mean?
   a. Emotional reactions and behavior patterns that appear early in life and are fairly stable over time
   b. Children's attention patterns in the early years of life
   c. The emotional bond between a baby and another person
   d. Children's anger levels
3. What is meant by the concept of goodness-of-fit?
   a. Parents' tendency to adapt their behavior to their child's temperament
   b. The way parents evaluate whether the child's school was the correct choice
   c. A child's mental abilities in connection to their performance in school
   d. A child's social acceptability
4. A child is uncooperative, is shy in new situations and becomes overly emotional during times of stress. This is an example of which personality type in childhood?
   a. Overcontrolled
   b. Undercontrolled
   c. Resilient
   d. None of these
5. During which developmental stage does abstract thinking typically begin?
   a. Toddler years (1-2 years)
   b. Early childhood (3-4 years)
   c. Middle childhood (6-11 years)
   d. Adolescence (12-18 years)
6. All of the following occur at the time of puberty except:
   a. Body hair growth
   b. Sex hormone production
   c. Delinquent behavior
   d. Increase in growth hormone production rate