POSITIVE PSYCHOLOGICAL GROWTH IN MOTHERS OF CHILDREN WITH A DEVELOPMENTAL DISABILITY AND ITS CORRELATES WITH CHILD AND MATERNAL CHARACTERISTICS

By

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CHAPTER I

INTRODUCTION

The addition of a new child is a major life event for any mother. Inevitably, expectant mothers will give some thought into how her life will be changed by the presence of a new baby. While some of these expectations may be met, it is virtually impossible to envision how one's life will look after the addition of a child. In the case of having a child with a developmental disability such as autism or an intellectual disability, it is likely that one's life will be radically different than one's previous expectations about motherhood.

Since the mid 20th century, psychologists have tried to make sense of how a parent adapts to having a child with a developmental disability. Most research has stemmed from two points of view. The first wave of research conducted on parent's reactions to their child, which came from the Freudian perspective, theorized that the child represented a failure on the part of the parents (primarily the mother). Eventually, a new perspective began to take hold, which viewed the child as a stressor, just like any other stressor, to which a family must adapt. These two perspectives led to two very different ways of understanding how a mother is changed by the addition of a child with a developmental disability. However, one commonality of these two models is the lack of investigation into the possibility of benefits or positive change in mothers as the result of their experience. The current study seeks broaden the lens of potential changes in mothers following the addition of a child with a developmental disability. Specifically, the study's aim is to identify positive changes in mothers as a result of their experiences related to caring for their child.

The introduction that follows will begin with a brief overview of the Freudian model of maternal adjustment, followed by a more detailed review of the research on maternal adjustment from the perspective of a stress and coping model. After identifying the limitations of current research, a potential alternative view of maternal changes will be considered. Lastly, a description of the current study and hypotheses are presented.

Psychoanalytic Theory of a Mother's Psychological Change

Beginning in the 1950's, physicians and psychologists began to formally investigate the impact on mothers of giving birth to a child with a developmental disability (DD). The first attempts to understand the impact on mothers used the Freudian perspective, which was the reigning theoretical framework of the day. The predominant theory was that of Solnit and Stark (1961). They believed that the birth of a "defective" child would result in a pathological response to what was a narcissistic injury. The resulting pathological reactions occurred on a continuum ranging from guilt to denial, with most individuals falling somewhere between the two extremes. A mother's reaction to her child could be explained by a combination of defense mechanisms triggered to protect the parent from feelings of guilt and denial.

Solnit and Stark's theory limited the interpretation of parent's behaviors to a range of negative responses. It was not until the beginning of the 1980s that researchers as a whole began to question this assumption that exclusively negative reactions occurred in parents. A new theoretical framework was proposed that shifted from a model of pathology to a model of stress and coping. This shift allowed for the interpretation of having a child with a DD as a stressor that affects the family system, just as any other stressor may require adjustment on the part of the family. The stress and coping model was an improvement from the theory developed within a Freudian framework in that the new studies did not assume that the occurrence of a pathological response in a mother would inevitably occur as a result of having a child with a DD.

Stress and Coping Theory of a Mother’s Psychological Change

Theory of Child as a Stressor.

In 1983, Crnic, Friedrich and Greenberg broke from the past focus on parent pathology and proposed the need for a new theory. The need was explained in the following excerpt from their article:

> No succinct model presently exists through which one can develop an empirical understanding of families of retarded children. Rather, investigators have seemed to rally around the concept of anticipated pathology in these families. Pathological reactions are generally assumed to be a function of the stress associated with the presence of a retarded child…. Clinical experience with families of retarded children would suggest, however, that pathological reactions within these families are not uniform. A truly comprehensive model must encompass the range of possible positive and negative adaptations as well as the factors that serve as determinants of adaptation. (p. 126)

The above quote succinctly illustrates the very different perspective that Crnic, Friedrich and Greenberg adopted as compared to the viewpoint of Solnit and Stark. The differences in the two viewpoints were many. The use of the words “empirical understanding” suggested that these researchers saw the scientific method as the appropriate tool for investigating any model they might propose. Such a method of investigation was dramatically different than the reliance on anecdotal impressions gathered from professionals used by Solnit and Stark. A new model would also need to avoid truncating the range of possible reactions and rather allow for both positive and negative reactions to be recorded. In addition, a model would need to take a more active focus on individual differences that would "serve as determinants of adaptation" (Crnic, Friedrich and Greenberg, 1893, 126). In the authors' critique of previous work on the subject, they also noted that there had been little consideration of the "child-specific characteristics" (p. 133) that were also likely to be a factor influencing outcome.

Crnic, Freidrich and Greenburg proposed an alternative model based upon research from three different areas: stress, individual coping and ecological systems. The synthesis of research from these areas led to what was termed the "adaptational model" (p. 133). The adaptation model viewed "the presence of the retarded child.. [as] a significant ongoing stressor within the family, precipitating numerous minor and major crises. Subsequent familial response to such stress will involve the various coping resources available both to the individual and the family as a whole" (p. 133).

In the adaptational model, the stressor is the presence of the child with mental retardation. It should be noted that the term "stressor" was defined from the research of the day, with the authors defining the term operationally as "self-reported life changes" (p. 133). This view of the child was radically different from the work of Solnit and Stark in that the presence of the child was not viewed as invariably leading to narcissistic injury and psychopathology on a predetermined continuum. Rather, the child was a stressor on the family in the same way that any other stressor might put strain on the family system.

Drawing upon emerging research on stress (Pearlin, Menaghan, Lieberman, and Mullan, 1981), the authors thought that a new theory would need to investigate variables that moderated the effects of the stress and thus helped discriminate between families who responded well to the stress of having a child with intellectual disabilities as opposed to those who responded poorly. The concept of coping resources put forth by Folkman et. al (1979) was employed by Crnic et al. (1983) to understand the coping response and varied family outcomes.

Folkman et al. (1979) proposed five types of coping resources for individuals in general. Each type was assumed to mitigate the negative effects of the stressor. The first type was "parental health/energy/moral," (p. 134) or the "emotional well being" of the person both before and during the stressor. The second resource was cognitive strengths that would allow an individual to problem solve and generate solutions to challenges presented by the stressor. The third was social support networks. The fourth type of resource was material and social capital, reflected by variables such as SES and income. The fifth and final resource involved "general and specific beliefs" including belief in a higher power as well as feelings of personal control over the situation. These five categories of resources provided a useful starting point for Crnic and other researchers in specifying potential variables that could mediate stress in families affected by an intellectual disability.

Crnic, Freidrich and Greenburg viewed these five coping resources as occurring in conjunction with the "ecological contexts" (p. 134) of the individual. This third piece of the adaptational model was built upon the work of Bronfenbrenner (1977), which proposed an ecological model of human development that was influenced by four factors ranging from personal interactions with others in settings such as at home or work, to larger cultural influences such as the structure of the society's government and cultural norms. Crnic et al. (1983) believed that the ecological contexts of families with a child with an intellectual disability would differ from families with only typical children. Such differences included enhanced interactions of parents in areas such as at school and with professional services, as well as decreased opportunities for familial interactions in societal contexts. In addition, families would have to deal with the social stigma of having a child with a disabling condition. Based upon these premises, the authors felt that any comprehensive model of the effect of having a child with intellectual disability on parents would need to consider the ecological context along with stress and coping. Although the assumption had not yet been comprehensively evaluated at the time Crnic, et. al published their paper, the few preliminary studies that had been published suggested that the ecological context may influence family functioning in certain, limited domains (Ferara, 1979; Friedrich and Friedrich, 1981; Nihira et al., 1980), which strengthened the premise that a theory should take ecological context into account.

The adaptational model put forth by Crnic, Friedrich and Greenberg did not completely invalidate the work which began with Solnit and Stark (1961) as both theories began with viewing the presence of the child as a negative stressor on the parent or family. However, the adaptational model essentially offered a new way to view the affects of that stressor. The authors viewed the presence of a child with mental retardation as any other stressor on the family system. The severity of the stressor was determined by the perceived stress of the family member. The stressor could then be mediated by available coping mechanisms while these coping mechanisms, in turn, were influenced by the many ecological systems in which the family was placed.

From Theory to Model: The Double ABCX Model.

Taking Crnic et al's (1983) work steps further, Minnes (1988) proposed a model of adaptation for families of children with disabilities that was derived from the Double ABCX model, which was already in existence in the broader family stress research literature (McCubbin and Patterson, 1983). The Double ABCX model, in turn, was adapted from the ABCX model (Hill, 1958), which was created from a family systems perspective to investigate the disruptions caused within families when a father left and returned from war. The "double" was added to the model by McCubbin and Patterson to account for changes in A, B, and C over time and this change in the model was indicated by referring to the factors as aA, bB, and cC. McCubbin and Patterson viewed a family's attempt to cope with the stressor as dependent upon three factors: (aA) the stressor event (i.e., the child), (bB) the family's resources and (cC) the family's perception of the stressor event.

When applying the Double ABCX model to the stress caused in a family by the presence of a child with an intellectual disability, the X is the way the family experiences the event of having the child, which is determined by the factors A, B and C. The A factor is the specific characteristics of the child. These characteristics can vary between children, type of diagnosis, and stages of life. The A factor acknowledges that individual differences of the children are an important component of how the family will react to their situation.

The B factor is the existing resources of the family, encompassing both external and internal resources. External resources include SES, family structure (e.g., one or two parent family), marital satisfaction and social support systems such as friends, relatives, social service agencies and support groups. Internal resources of the family include such variables as open communication, mutual assistance, optimism, problem solving, autonomy, flexibility and an internal locus of control and coping style. For example, studies have found that mothers with an active coping style are much better at handling the stress of taking care of their child than mothers with a more emotional coping style (Essex, Seltzer and Krauss, 1999). The difference between these two groups of mothers would be accounted for in the B factor of the model.

The C factor is the perception of the child by the family members. Perceptions can potentially encompass many things, such as what explanation the family has for the child's disability, and what can be done to ameliorate associated stressors. The C factor may include a reframing or shift in how the child is viewed by the family, perhaps leading to such thoughts as the presence of the child is a challenge that can be met with the right resources, or that the child's fate is in the hands of others (e.g., a higher being, professionals), and that "things will work out" without extraordinary efforts.

As mentioned above, "double" accounts for the fact that A, B, and C will change over time. The A factor can change in that the child may have been cute and cuddly as infant but as they mature they may begin to present more behavior challenges such as tantruming and stubbornness. A pile-up of child related stressors can also occur, as more and more child related characteristics require an adjustment on the part of the family. The B factor can change in that internal resources may evolve or shift in response to the experience of raising the child. External resources may also change, such as possible economic immobility of the parent as she or he must prioritize taking care of the child over getting ahead in a career. Finally, the C factor can also change as the hopes, dreams and expectations for the child adjust as the child matures. New questions will also arise, such as, “What will happen to the child after the parents are no longer able to be the primary caregivers?”

Minnes’s (1988) adaptation of the Double ABCX model incorporates key theories and ideas about stress and coping put forth by Crnic, Friedrich and Greenburg (1983), and it also addresses the limitations inherent in the model proposed by Solnit and Stark. Solnit and Stark made the assumption that the child with mental retardation is “defective.” Within the Double ABCX model the child is never considered “defective.” The child is instead viewed as a potential cause of stress within the family system, while making no claims on the value of the child.

Solnit and Stark also assumed that the interpretation of the presence of the “defective” child would necessarily be negative. In contrast, Minnes (1988) allows for the interpretation of the presence of the child to be determined entirely by the family members, leaving open the possibility that the family may not interpret the event as a stressor at all.

Solnit and Stark made the further assumption that all reactions to the child must be pathological. In contrast, the Double ABCX model does not assume that the child will be viewed as a negative stressor by the parents. It is the parent’s interpretation of events that determines the degree of stress introduced by the presence of the child.

A final critical difference between the two theories is that the Double ABCX model explicitly identifies several variables that may vary between individuals, such as child factors, internal resources, perceptions, and other stressors; these, in turn, may affect differential outcomes between persons and families. Such a framework shifts the focus from a pathological view of parents of children with mental retardation to a more constructive framework of each parent being an individual that brings a set of strengths and weaknesses to the potential challenge before them.

Use of the Double ABCX in Contemporary Research.

The Double ABCX model continues to guide methodology used to investigate parental adjustment to a child with an ID (Saloviita, Italinna, and Leinonen, 2007; Shin and Crittenden, 2003: Xu, 2007). In addition to the studies that explicitly cite the model, many other current studies use one or a combination of the Double ABCX factors as independent variables in studies on parental stress or well-being (Abbeduto, Seltzer, Shattuck, Krauss, Orsmond, and Murphy, 2004; Orsmond, Seltzer, Krauss and Hong, 2003; Kim, Greenberg, Seltzer and Krauss, 2003; Mak and Ho, 2007; Plant and Sanders, 2007).

Table 1 (located at end the of this document due to its length) summarizes the findings of these most current studies based upon the Double ABCX model, with findings broken down by the three factors of aA, bB and cC. Combined studies suggest that all three factors play a significant role in parental outcome. A robust finding across studies is that externalizing behavior problems in offspring predicts maternal stress, above and beyond the effects of age, IQ, or even the adaptive competencies of the child. As well, mothers of children with Down syndrome routinely fare better than mothers of children with autism, or other types of disabilities (Abbeduto, Seltzer, Shattuck, Krauss, Orsmond and Murphy, 2004; Hodapp, Ricci, Ly, Fidler, 2003). Reasons for the so-called “Down syndrome advantage” are complex, and touch on factors such as maternal age and resources, and the increased smiles and positive personality features of children with this syndrome. In contrast, mothers of children with other conditions do not fare as well, including mothers of children with autism spectrum disorders, Williams syndrome, and other genetic disorders (see Hodapp, Ly, Fidler, Ricci, 2001 for review).

Age is now receiving increased research attention as a predictor of parental outcome, in part because of the increased longevity of adults with DD. Age has also been examined in younger mothers. Mothers of infants and young children with disabilities often report high stress, distress and depression that may lessen in the school-age years (Glidden and Schoolcraft, 2003).

While there has been extensive work on many predictors that fall in the Factor aA, there are still many more potential predictors that have yet to be investigated. As more is learned of the health and care giving demands that can vary by child diagnosis it leads to the question of how these variables affect parent outcome. Researchers have yet to assess how factors such as the acute or chronic health needs of children with disabilities impact maternal outcome. The physical and time demands are also a prominent feature in caring for some children with a DD, yet the impact of these responsibilities also has yet to be examined.

Both problem-focused coping and emotion-focused coping were found to be significantly related to outcome measures. Studies generally find that mothers with higher problem-focused than emotion-focused coping generally fare better. Increased social support was also found to have a significant relationship with more desirable responses on outcomes measures. Social support and coping style were found to have a moderating effect on the negative impact of child challenging behaviors on parent outcome. Perception of the situation was also found to be significantly related to outcome, with negative perceptions correlated with increased stress.

Reviewing the study findings in Table 1 reveals that the Double ABCX model remains a viable model of variables related to parental stress following having a child with a DD. What remains less understood is how the factors aA, bB and cC relate to positive psychological outcomes.

Positive Outcome Measures of the Double ABCX Model.

While the area of positive psychological growth remains less well understood than negative reactions to coping with the birth of a child with a DD, there are signs that researchers are beginning to shift their thinking in such a direction. Many recent studies now include an outcome measure of “well-being” along with, or in place of, the more traditional outcome measure of parental stress or depressive symptoms. However, while researchers seem to be expanding their conceptual definitions of outcome there remains a lag in the use of measures that have been created specifically to measure positive outcome. Instead, many studies use techniques such as interpreting the inverse of scores on measures of negative outcome, such as depressive symptoms, in order to create a “well-being” variable (Duvdevany and Abboud, 2003; Kim, Greenberg, Seltzer and Krauss, 2003; Orsmond, Seltzer, Krauss, and Hong 2003; Shin and Crittenden, 2003).

In order to learn more about potential positive psychological changes that may occur for parents following the birth of a child with a DD, it would be beneficial to have a direct measure of positive psychological change.

Posttraumatic Growth

The potential positive psychological effects of having a child with an ID, or more generally a DD, have not been widely investigated. Nevertheless, there is reason to believe that it is a worthwhile area of research. Anecdotally, virtually every professional who works with families impacted by a child with an DD are sure to have heard a parent mention how lucky they believe they are to have their child, what a blessing she has been, or how they have learned so much from their son.

In research studies, a movement towards directly assessing the positive aspects of raising a child with a DD is also emerging. As mentioned above, many of the studies that seek to learn about benefits attempt to measure positive change by measuring “well-being” as an absence of negative outcomes.

For example, Kim, Greenberg, Seltzer and Krauss (2003) investigated how mothers cope with caring for a child with an intellectual disability and how the coping style, in turn, affects maternal well-being. Hodapp, Ricci, Ly and Fidler (2001) reviewed the many studies on the effects of perceived positive personality characteristics of children with Down syndrome on mother’s maternal stress. Scorgie and Sobsey (2000) more directly investigated positive psychological changes in parents of children with disabilities by interviewing the parents and qualitatively analyzing the narrative for themes. With a nod towards positive psychology, Dykens (2006) acknowledges these studies and calls for more researchers to broader their perspective on families to assess the full range of potential outcomes.

Positive Growth Following a “Negative” Event

There is a long history of recognizing that positive psychological changes occur in some individuals after experiencing a life changing and potentially traumatic event. Such themes can be seen throughout many cultures, religions, stories and philosophical writings. In the past twenty five years there has been a tremendous growth of formal scientific studies investigating this psychological phenomenon. The terms used to describe the changes include “positive psychological changes” (Yalom and Lieberman, 1991) “stress-related growth” (Park, Cohen and Murch, 1996) and even “positive illusions” (Taylor and Brown, 1988). Tedeschi and Calhoun (1996) synthesized the findings from these similar lines of research with the goal of creating a single inventory to capture the various areas of psychological growth reported in the literature. The term they identified describe to experiences they were investigating was posttraumatic growth (PTG).

Tedeschi and Calhoun’s (1996) first attempt to quantify the experience of PTG using a questionnaire or survey prompted a new and quickly expanding field of research. In fact, a PsychInfo literature search in August 2007 identified 174 peer-reviewed articles or chapters on the subject, while the landmark 1996 article has now been cited in 183 publications. The PTGI has also been translated into other languages including Spanish (Weiss and Berger, 2006), Dutch (Jaarsma, Pool, Sanderman and Ranchor, 2006) and Chinese (Chan, Lai, and Wong, 2006).

Much of the initial research has focused on understanding the conceptual, definitional aspects of posttraumatic growth, as well as identifying populations in which PTG has occurred. Although considerable work remains, the field is maturing, with a large array of studies in diverse populations, and some attempts to link PTG to neurological functioning. Such recent efforts include a study of the neural correlates of posttraumatic growth following a severe motor vehicle accident (Rabe, Zollner, Maercker and Karl, 2006), and using a PTG assessment tool to identify relations among daily cortisol slopes, and positive and negative emotions in mothers who were the primary caregivers in the home (Moskowitz and Epel, 2006).

Although an emerging area of study, researchers generally agree on several, key aspects of PTG, including: the definition of PTG; a hypothesized model of how PTG occurs; a standardized and validated inventory for identifying PTG within individuals; and five domains of PTG. Even with the inevitable gaps in knowledge seen in new theories or concepts, PTG already holds considerable potential as useful framework for investigating how parents of a child with a DD may be positively impacted by the birth and caretaking of their child.

Definition of Posttraumatic Growth

PTG begins with an individual's attempt to cope with a traumatic event. PTG is "both a process and an outcome" (Tedeschi, Park, and Calhoun, 1998, p. 1) of this attempt to manage a traumatic occurrence. PTG can be interpreted as an outcome in that it is the result of an individual's attempt to cope with a stressful event. Yet the growth is also an active process of positively reinterpreting the narrative of a life event. PTG can occur as the result of any experience that is interpreted as traumatic by an individual. For example, it has been identified and measured in individuals who have experienced a wide range of traumatic experiences including breast cancer (Cordova, Cunningham, Carlson and Andrykowski, 2001), sexual assault (Frazier, Conlon, and Glaser, 2001), refugee experiences (Berger and Weiss, 2006) and combat experiences (Aldwin, Levenson, and

Spiro, 1994). Posttraumatic growth has also been explored in narrative form in mothers of children with an acquired disability (Konrad, 2006). While these events differ in many ways, including the type and duration of trauma, and physical outcomes, similarities exist among all these events that are conducive to PTG.

The common ingredient in all of these traumatic events is that the event itself is traumatic enough that it violates some core assumptions held by the individual. Tedeschi et. al (1998) use the metaphor of an earthquake shaking the foundations of a house so violently that the building crumbles:

> In the face of these losses and the confusion they cause, some people rebuild a way of life that they experience as superior to their old one in important ways. For them, the devastation of loss provides an opportunity to build a new, superior life structure almost from scratch. They establish new psychological constructs that incorporate the possibility of such traumas, and better ways to cope with them. [and] They appreciate their newly found strength…" (Tedeschi, et. al, 1998, p. 2)

More formally stated, there are three criteria that must be met in order to say that PTG has occurred. First, an individual must experience a trauma that violates a core assumption about how the world works. Second, this violation of a core assumption must result in some experience of distress. Third, an individual's response to the distress must result in growth, defined as a person exceeding their pre-trauma level of functioning in at least one area.

While the intention of research on PTG is to identify positive change, it is important to emphasize that this line of work does not try to state that individuals do not find traumatic events extremely difficult and distressing. Indeed, distress is a necessary component for the occurrence of PTG. As noted by Tedeschi and Kilmer (2005), learning to recognize and incorporate both the negative and positive aspects of a trauma into one's "life narrative" may be much more beneficial than try to "tackle the virtually impossible task of trying to forget" the undesirable event (p. 235). They offer the following example of a father speaking about the loss of his son to clarify this point. "I am a more sensitive person, a more effective pastor, a more sympathetic counselor because of Aaron's life and death than I would ever have been without it. And I would give up all of those gains in a second if I could have my son back" (Viorst, 1986, p. 295).

Measurement of Posttraumatic Growth

In a first attempt to identify and measure the occurrence of PTG in a standardized format, Tedeschi and Calhoun (1996) conducted a comprehensive literature review of all related concepts that had been studied up to that time (e.g., positive psychological changes; Yalom & Lieberman, 1991; stress-related growth, Park et al, 1996). Based on their review, they created 34 items for a Posttraumatic Growth Inventory (PTGI), and their subsequent analyses identified 5 key domains of PTG. Further research using the PTGI has generally found these five domains are operating in other populations as well.

The 34 items on the PTGI were scored on a 6 point Likert scale with responses ranging from "I did not experience this as a result of my crisis" to "I experienced this change to a very great degree as a result of my crisis." The six options for degree of change experienced were (0) no change, (1) very small, (2) small, (3) moderate, (4) great, and (5) extreme. The 34-item survey was initially administered to a total of 604 undergraduate students who reported that they had experienced a "significant negative life event during the past 5 years" (p. 459). The crises events included bereavement (36%), accidents resulting in injury (16%), separated or divorced parents (8%), end of a relationship (7%), victim of a crime (5%), academic troubles (4%), unwanted pregnancy (2%), and other (22%).

A principal components analysis with varimax rotation was performed on the items. The analysis yielded six factors, with five of the six factors being easily identified as a recognizable and cohesive domain of potential growth. Twenty-one of the items loaded on these five factors, which were then subjected to a second principal components analysis with varimax rotation. Again, the same easily identifiable five factors emerged and accounted for 62% of the common variance. As discussed in more detail below, the factors were labeled *Personal Strength* ($\alpha = .72$), *New Possibilities* ($\alpha = .84$), *Relating to Others* ($\alpha = .85$), *Appreciation of Life* ($\alpha = .67$) and *Spiritual Change* ($\alpha = .85$). Internal consistency of the entire 21 item survey was $\alpha = .90$. Deletion of each item did not drop the alpha below .89, indicating that all items contribute relatively equally to the consistency of the scale.

A separate and independent study conducted by Jaarsma, Pool, Sanderman, and Ranchor (2006) supports the findings of the original Tedeschi and Calhoun (1996). In their study a translated version of the PTGI was administered to a sample of 236 Dutch cancer survivors. In support of the construct validity of the measure, the total common variance accounted for by a principal components analysis was 70.8%. Also, the α-levels for each of the five factors was high (.84 or higher), except for "spiritual change" with an α of .65.

Test-retest reliability was assessed by Tedeschi and Calhoun (1996) using a 28 person sample with a two-month gap between administrations of the inventory. The test-retest reliability was found to be acceptable at $r = .71$. Test-retest reliability for the individual scales was reported a $r = .37$ for Personal Strength, $r = .47$ for Appreciation of

Life, and the other three scales ranging from $r = .65$ to $r = .74$, suggesting that Personal Strength and Appreciation of Life may not be as stable of constructs as the other three domains.

In order to address issues of construct validity the inventory was administered to a newly recruited sample of undergraduates, who were divided into the categories of either experiencing a trauma or not. Fifty-four (54) undergraduates (23 men, 31 women) reported experiencing at least one major trauma of great severity in the previous year, while 63 undergraduates (32 men, 31 women) reported no trauma. A 2 x 2 (gender by trauma group) ANOVA using total PTGI scores revealed that students who reported experiencing a trauma also reported significantly more growth than those who did not experience a trauma. A gender effect was also found, with women reporting more growth than men. The gender x trauma severity interaction was not significant. A gender x trauma MANOVA using the five PTGI factors as dependent variables revealed similar findings for each domain. Again, the gender x trauma interaction was not significant. (See Table 2 for details). It is unclear at this time why women might be more likely than men to experience PTG, and this finding has not always been replicated in other studies.

Table 2

Means for PTGI total and Each Domain for Individuals Reporting a Severe Trauma in the Past 12 Months versus Reporting No Trauma (standard deviations were not provided)

	Women		Men		Gender†		Trauma††	
PTGI Factor	No Trauma (n = 31)	Trauma (n = 31)	No Trauma (n = 32)	Trauma (n = 23)	*F*	*p*	*F*	*p*
Total PTGI	73.49	90.26	66.13	73.61	10.69	***	12.33	***
New possibilities	18.26	20.94	15.19	18.35	6.15	*	6.54	*
Relating to others	23.94	29.68	22.16	23.30	6.93	**	4.95	*
Personal strength	14.65	17.90	13.63	15.30	4.96	*	9.23	**
Spiritual change	6.48	8.29	5.56	4.96	14.09	***	N.S.	
Appreciation of life	10.16	13.45	9.59	11.70	N.S.		17.58	***

† women scored higher than men in all significant findings, †† trauma scored higher than no trauma in all significant findings
* $p < .05$, ** $p < .01$, ***$p < .001$

Importantly, even though participants with severe traumas reported higher levels of change, findings suggest that most persons, even those without a potentially traumatic event in their past, will also report “small” or “modest” degrees of growth. Thus, while a traumatic event is needed to experience “extreme” change in the five domains of PTG, some amount of growth in these five domains may simply be cast as part of one’s life experience. These data suggest that the PTGI is not a useful screening tool for identifying persons who have or have not experienced a trauma, as all individuals are likely to show at least a small degree of change, and not all those who experience severe trauma may show substantial growth. Even so, the PTGI holds considerable clinical and research relevance.

The PTGI has now been used with results generally in the expected directions by several independent research groups including a community based sample of American women (Weinrib et al., 2006, p. 853), breast cancer survivors (Cordova et al., 2001), husbands of breast cancer survivors (Weiss, 2004), caretakers for individuals with HIV/AIDS (Cadell, 2003) and adult survivors of childhood sexual abuse (Gall, Basque, Damasceno-Scott and Vardy, 2007). Table 3 (located at end of the document) presents a summary of 30 articles which have used the PTGI as an outcome measure in a study. The articles were selected by reviewing the first 100 articles which were returned by Googlescholar.com with the search of “PTGI.” From those 100 articles, approximately half used the PTG inventory (the remaining articles were primarily in the field of biology, where “PTGI” has a different meaning). An attempt was made to collect all relevant articles, which were then sorted included in the table if the PTGI had been used as an outcome or descriptive measure for a sample.

A description of each of the five domains identified in the PTGI will now be presented.

Changed Perception of Self: Strength and New Possibilities. Calhoun and Tedeschi (2006) link two of the five PTGI factors, personal strength and new possibilities, as both belonging to a changed perception of self. The authors summarize this domain as "vulnerable yet stronger" or "I am more vulnerable than I thought, but much stronger than I ever imagined" (p. 5). It seems that the traumatic event can result in a person learning that they have much less control over their world than they thought and yet they have more inner strength to deal with the challenges of life than they knew. Included in this domain is a person's wish to explore more of themselves after learning that there had more resources in them than they previously knew. This exploration may include taking up new hobbies, interests or even starting out on a new life path such as a change in career.

Relating to Others. In the course of dealing with a trauma and exposing one's self, a person will likely experience a change in some of their significant relationships. While not all of the changes may be positive, many relationships may strengthen and deepen as a result of the reaction to a trauma. Persons who experience a traumatic event may, for example, find themselves revealing more about who they are and what they are experiencing than they previously have felt comfortable doing, including perhaps even revealing socially undesirable truths. This greater revealing of one's self can have a large impact on how others react to them. The change in relating to others may also occur at a more general level than a change in personal relationships. Many people report that they feel a "greater connection to other people in general, particularly an increased sense of compassion for other persons who suffer" (Calhoun and Tedeschi, 2006, p. 5).

Changed Philosophy of Life: Appreciation of Life, and Spirituality. The two remaining factors relate to changed philosophy of life (Calhoun and Tedeschi, 2006). Many who experience a trauma find that they have a new appreciation for previously under examined aspects of their life. An example of this change can be read in the words of geology professor Sally Walker, who survived an airline crash that killed 83 people. Reflecting on her experience she reported "when I got home, the sky was brighter, I paid attention to the texture of sidewalks. It was like being in a movie… everything is a gift [now]" (Shearer, 2001, p. 64).

Part of a changed appreciation of experiences includes a change in priorities as a person re-evaluates what is most important in life. For example, after surviving a life-threatening event, working hard to make more money may not be as important as having extra time to spend with your children.

The fifth area of growth occurs within one's experience of their spirituality or existential being (the authors state that there need not be an affinity for a religion in order to experience such growth), which include gaining "a greater sense of purpose and meaning in life, greater satisfaction, and perhaps clarity with the answers given to the fundamental existential questions" (Calhoun and Tedeschi, 2006, p. 6).

Necessary Conditions for Posttraumatic Growth to Occur

Tedeschi and Calhoun premise their model of PTG on the assumption that individuals "rely on a general set of beliefs and assumptions about the world, that guide their actions, that help them to understand the causes and reasons for what happens, and that can provide them with a general sense of meaning and purpose" (Tedeschi and

Calhoun, 2005, p. 5). This view is based upon the work of others including Epstein, 1991, Parkes, 1971 and in particular, Janoff-Bulman, 1992. Janoff-Bulman argues that we each build "general, abstract schemas" (Janoff-Bulman, 2006, p. 83) that guide us in our understanding of the world and ourselves. These schemas begin to take form from our earliest non-verbal interactions and by adulthood are so ingrained that they are virtually unnoticed and unquestioned. Janoff-Bulman summarizes her investigations: into the core assumptions held by individuals as follows:

> It appears that at the core of our inner world are fundamental assumptions that provide us with a sense of safety and security. At the deepest levels of our psyche, we believe that we are protected from misfortune. This is not derived from some sense of magical protection, but more likely a set of assumptions about meaning, benevolence, and self-worth that together operate to yield a sense of relative invulnerability (Janoff-Bulman, 1985, 1989, 1992). (Janoff-Bulman, 2006, p. 84)

Janoff-Bulman compares our core assumptions to grand scientific theories. Just as grand scientific theories generally remain unchanged by the everyday working of scientists, so too are core assumptions rarely threatened by our day to day experiences. However, there are times in science, as well as in our own lives, that the data are too unpredictable or out of step with our existing theories that they can no longer be ignored. In science, these paradigm clashes are often the harbinger of scientific revolutions (Kuhn, 1962). In humans, these experiences are moments of crisis where we can no longer ignore the fallibility of our assumptions. These extreme violations of core assumptions are Janoff-Bulman's definition of trauma.

A traumatic event presents a violation of the core assumptions of a benevolent world, and it is this violation that requires a response and reorganization on the part of the individual. It is therefore not the traumatic event itself that causes distress and begins the process which may eventually result in PTG. It is the interpretation of the traumatic event by the individual as a violation of a previously held assumption that causes distress and triggers a response.

Janoff-Bulman argues that when a trauma occurs (i.e., an event is experienced as a trauma), an individual is vastly unprepared to cope. She is concurrently shocked at how naïve her previously held assumptions were and suddenly enveloped by a sense of danger and vulnerability. The experience presents an assault on two fronts: one, she realizes just how dangerous the world is and, two, she realizes that she is psychologically unprepared to deal with the threatening world around her. Janoff-Bulman explains:

> Trauma is about confronting the terror of our fragile existence, a task for which we are dramatically unprepared psychologically. It is not primarily about actual intense losses in the external world… but rather about profound psychological losses – of illusions associated with safety and security, of an effective, coherent inner world; of a comfortable and comforting worldview. (p. 86)

Faced with a suddenly scary world and ineffective inner defenses, an individual must rebuild assumptions which now need to be able to simultaneously account for the reality of the traumatic experience while still creating a world that is “not wholly defined by anxiety and vulnerability” (p. 86). Janoff-Bulman postulates that some individuals are unable to recreate a comfortable conceptualization of the world, which is what leads to the experience of post-traumatic stress disorder (PTSD). Yet while many survivors of trauma initially experience acute stress, and may experience symptomology consistent with a diagnosis of PTSD (although do not meet diagnostic criteria due to the duration of the symptoms) (Bonanno, 2004), the majority of survivors are able to adapt to their new situation through what Tedeschi and Calhoun propose is a predictable course of rebuilding core assumptions. It is through this path of rebuilding that PTG may emerge.

Proposed Model of Posttraumatic Growth

Tedeschi and Calhoun have devised a model of how PTG occurs, with the most recently updated version put forth in 2006. The model was based upon their "empirical work in the area and on… [their] experiences as practicing psychologists" (Tedeschi and Calhoun, 2004, p. 7). A reproduction of the 2006 model can be seen in Figure 1. Although the model is intended to be comprehensive, Tedeschi and Calhoun are the first to acknowledge that it is far from validated. In fact, Tedeschi and Calhoun are eager to have other researchers lend their expertise from a variety of areas in order to validate and/or revise the model of how PTG occurs. Summarizing their model in 2004, Tedeschi and Calhoun note:

> The overall picture of posttraumatic growth has been sketched. Describing the details of cognitive processing and narrative development will be much more difficult, and will demand from researchers an intimate knowledge of many literatures related to posttraumatic growth, and of qualitative and quantitative analytic procedures applied to long-term processes at the micro and macro levels.

While this model is far from validated or complete, it provides a clear framework and starting point for any investigation into how PTG occurs. A large part of what remains unknown and largely uninvestigated in the model is how characteristics of the traumatic event influence the emergence of PTG. It is unclear, for example, if different

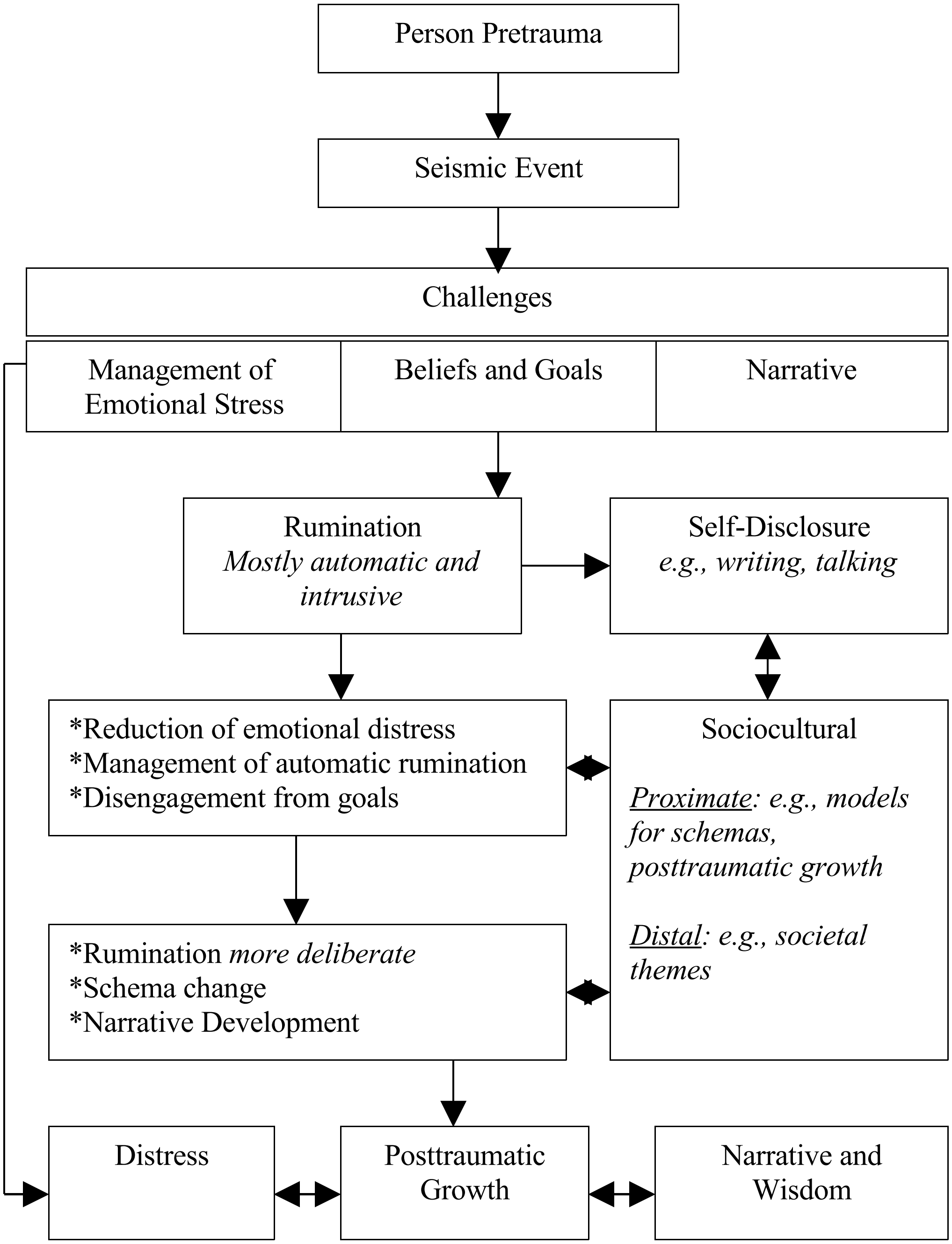

Figure 1: Reproduction of Tedeschi and Calhoun’s model of PTG (2006)

types of traumas lead to growth in different ways. For example, it might be that a person who survives a plane crash may score higher than a comparison sample on Appreciation for Life as it was so quickly almost lost. In contrast, a person who survives cancer may score higher than a comparison sample on Relating to Others after gaining an appreciation for the friends and family in her life whom were there to support her during her illness.

Relationship between Posttraumatic Growth and Coping Styles

While posttraumatic growth may occur as a result of a person experiencing a trauma, the growth is far from immediate. As illustrated in Calhoun and Tedeschi's hypothesized model of posttraumatic growth, an individual must first manage the immediate stressors of the trauma by employing various coping mechanisms. The coping model most commonly used in both the research on PTG and on parental adjustment to having a child with a DD is the model put forth by Lazarus and Folkman (1984).

This theory states that coping mechanisms can be divided into two categories: problem-focused coping and emotion focused coping. Problem focused coping describes those actions taken to change or manage the stressful event. Emotion focused coping encompasses strategies that are used to reduce or manage the distressing emotions that are being experienced. Individual differences in responding to a stressful situation based on problem or emotion focused coping have already been documented in the population of parents of a child with a DD. Differences in coping style have been significantly related to variables such as pessimism scores, depressive symptoms, quality of relationship with adult child, and levels of positive parenting perceptions (Abbeduto, Seltzer, Shattuck, Krauss, Orsmond, and Murphy, 2004; Kim, Greenburg, Seltzer and Krauss, 2003: Mak and Ho, 2007; see Table 1 for findings). In general, those who use more problem-focused coping than emotion-focused coping fare better.

The few studies that have looked at the relationship between coping style and PTG have yielded mixed results. For example, Widows, Jacobsen, Booth-Jones and Fields (2005) found that those with a tendency to engage in more problem-solving coping before a bone marrow transplant showed higher scores on the PTGI as compared to those who reported engaging in more emotion-focused coping. In contrast, Low, Stanton, Thompson, Kwan and Ganz (2006) found that measures of problem-focused coping and emotional coping styles were both significantly related to the PTGI total score. It may be that a certain coping style is more likely to be correlated with a certain subscale of the PTGI. However, studies have yet to be done that look at the relationship between coping and PTG in such detail.

Distinction between Posttraumatic Growth and Resiliency

Further, work remains to be done that relates PTG to other salient theories of how people vary in their abilities to cope with a highly stressful event. Perhaps the concept most likely to be confused with PTG is resilience. In this vein, Tedeschi and Calhoun (2004) are careful to note theoretical distinctions between PTG and resilience. People are described as resilient if they are able to thrive despite being immersed in highly stressful situations, such as poverty or abuse. Resilience has often been investigated in populations of high- risk children growing up in adverse environments, with resilient children showing less detrimental developmental effects than others (Werner, 1989).

Resiliency has been studied in adults as well. Harvey (1996) made the distinction between resiliency and recovery from trauma. Recovery occurs when a person is initially thrown off balance by a trauma but is eventually able to return to their pre-trauma levels of functioning. Resilience occurs when an individual is essentially unscathed by a trauma and can use their resources to cope with the stressful event. Resiliency thus differs from PTG in two important ways. First, a facet of resiliency is that a person maintains their initial level of functioning after the trauma has ended. In contrast, the core definition of PTG is that an individual exceeds their level of pre-trauma functioning in at least one area. Second, when an individual is resilient they are able to weather adversity without significant levels of distress, while experiencing distress is central to the occurrence of PTG. Distress and the crumbling of a person's core assumptions are necessary in order for a person to build new and stronger foundations.

These two concepts, while different, are also likely related in some way. While a resilient person would be unlikely to experience significant PTG, a person who experiences PTG may be more likely to show resiliency when faced with future seismic events. This increased likelihood to demonstrate resiliency after PTG lies in the premise that PTG occurs as a result of a person rebuilding their core assumptions in order to accommodate a world that is more threatening or unpredictable than it was once assumed to be. As the core assumptions are rebuilt to incorporate the possibility of a seismic events occurring, the "foundations" that are built are stronger than before and therefore more likely to be able to weather a future seismic event without too much undue stress, which would be the experience of resiliency.

In brief, then, many key questions remain about *how* PTG occurs, including the role of individual differences, self-disclosure, supports, counseling, the nature of the trauma, and the proposed relationships between PTG and resilience. Even so, a growing literature on the measurement of PTG has identified five domains of growth that can occur.

Critique of Post Traumatic Growth Inventory

While the development of the PTGI offers a very promising tool for assessing posttraumatic growth, there are some limitations of the Tedeschi and Calhoun (1996) study that need to be considered. First, the PTGI offers a quick and informative tool for assessing the growth an individual has experienced. However, as mentioned above, most individuals are likely to show at least some growth and so the PTGI should not be used to try and sort those who have and have not experienced growth following a trauma. Second, the authors tested and validated their inventory on undergraduates. It is not clear from this study alone that the five factors identified in this population would also be found in other populations of trauma survivors. Third, the authors may have overlooked potential areas of growth when compiling the original items despite their exhaustive efforts to incorporate questions that would related to all areas of growth that had been mentioned in previous literature.

Despite the limitations of the PTGI, it is still a useful tool for evaluating potential positive changes that have occurred in individuals who have experienced a traumatic event for several reasons. First, as not all people experience such growth, learning about the characteristics of the individuals and environments where PTG occurs may lead to the creation of clinical tools to help people learn how they can benefit from what is a distressing experience. Second, individuals who do experience PTG can in turn be guided to incorporate this growth into their interpretation of the trauma that has occurred. And third, as demonstrated in Table 3, the PTGI offers a standardized tool and theoretical framework for assessing psychological growth across a range of populations.

Although PTG has been studied in many populations, there remains a dearth of studies designed specifically to examine the relationship between features of a traumatic event and the five domains of the PTGI. One reason for this under investigated area may come from the relatively homogeneous samples used in the PTG studies. These studies tended to look for PTG in a group of survivors compared to a control group (e.g., breast cancer survivors versus healthy controls) or investigate PTG in a group of survivors who differed in intensity or time passage since the trauma. Such homogeneity within samples limits research on factors within a traumatic situation that impede or facilitate PTG.

An Alternative View of Maternal Outcomes: Positive Growth

PTG as a Model of Change in Mothers

The field of PTG offers a promising conceptual and methodological approach for identifying potential positive psychological changes that may occur in parents as a response to having a child with a DD. However, before PTG can be considered as a useful model for understanding this population, the question must be asked: does having a child with a DD quality as an experience that could lead to PTG?   As reflected in the label, there are two necessary conditions for PTG to occur: a traumatic experience, and a “post”-trauma time in which the growth may emerge.

The population in question meets the first condition of experiencing a traumatic event. In the definition of a traumatic event put forth by Janoff-Bulman, an event is considered traumatic if it presents a violation of a core assumption held by an individual about how the world operates. Considering the case of having a child with a DD, it is extremely unlikely that a parent expects to have a child that is not typically developing. Once the child has been diagnosed with a DD the parent must face the realization that the expectations the parent had for the child are no longer realistic. If the discrepancy between the expectation of having a typically developing child and the reality of the situation are a violation of a core assumption held by the parent (i.e., the assumption that the parent can expect to give birth to a typically developing child), then the experience can be categorized as a trauma. Once a traumatic experience has occurred, the stage has been set for the possibility of PTG. Given this line of thinking, it seems entirely appropriate to use the concept of PTG to explore psychological growth within this population.

The second necessary condition for PTG is a “post” period of time following the trauma, during which the individual can ruminate about the trauma. This requirement is not sufficiently met in population under consideration because the stressor is ongoing, as the birth of the child is just the beginning of a new chapter full of challenges in the parents’ lives. It is therefore not appropriate to term the experience of psychological growth after having a child with a DD as “post-traumatic” growth because the traumatic event is not a discrete event with a clear end point. However, the experience of an ongoing stressor is very similar to a discrete traumatic event in that Janoff-Bulman’s model of violated assumptions still applies. It is also likely that parents’ experiences would be similar to those who experience a discrete stressor in terms of ruminating about the event, with a crucial difference being that the stressor is still ongoing.

It is not appropriate to use the term “post-traumatic growth” to label changes that may occur in parents of a child with a DD because there is no “post” for this population. Therefore, “psychological growth” is a more appropriate term for the positive changes that may occur in parents of a child with a DD.

Using the Double ABCX model and the PTGI to Inform Each Other

Bringing the PTGI and the Double ABCX model together allows a novel opportunity to advance the literature on both topics. Measuring psychological growth in parents of a child with a DD has generally been approximated by measuring an absence of depressive symptoms or stress. The PTGI provides a more direct method of assessing positive psychological states in these parents. Combining the Double ABCX model with the PTGI provides an opportunity to identify specific child or family factors that significantly influence psychological growth in parents of a child with a DD. At the same time, the Double ABCX model provides a framework for investigating which characteristics of an ongoing stressor influences each domain of psychological growth.

Current Study

The current study investigated relationships between factors identified in the Double ABCX model and psychological growth as measured with the PTGI. The research hypotheses aimed to contribute to the understanding of positive outcomes in parents of children with a DD. In addition, the study aimed to further understanding of how the PTG may or may not be the same in individuals experiencing a chronic stressor. A decision was made to focus on variables related to Factor aA and bB in order to allow for an investigation into how features of a stressor and features of the individual experiencing the stressor relate to positive growth.

In order to increase variance of data collected on child characteristics, parents of children with many different types of DD were sampled. Parents had a child with a diagnosis of either Angelman syndrome, autism, Down syndrome, Prader-Willi syndrome, or Williams syndrome. These five diagnoses were selected because they are well-described medically and behaviorally, and have varied profiles of cognitive and behavioral strengths and weaknesses. Samples from these five populations, when combined, were hypothesized to generate a full range of responses for a number of key of child characteristics that were chosen to be investigated in this study.

The specific hypotheses were as follows:

(1) The PTGI data will yield five independent factors of psychological growth, which will be a replication of the findings by Tedeschi and Calhoun (1996).

(2) Variables within the categories of Factor aA and Factor bB will be significantly correlated with the PTGI total score (a detailed explanation of each variable is included in the Methods section below). This hypothesis is based upon a review of studies using the Double ABCX model, which demonstrated a significant relationship between child variables and measures of psychological well-being in parents when well-being is measured as an absence of a negative variable such as depressive symptoms.

Factor aA variables that were evaluated included features of the child's psychological profile, health concerns, and caregiving demands placed upon the mother.

Non-directional hypotheses were made for Factor aA variables because it was difficult to draw conclusions about exactly how each characteristic of the child will affect the mother's experience of psychological growth due to limited research at this time on how features of a stressor affect PTG. Factor bB variables that were evaluated included both external and internal resources of the parent. Directional hypotheses were made when appropriate based upon previous research of correlates with PTG, as indicated in the results section.

(3) Each Factor aA variable and Factor bB will predict outcome scores in at least one domain of psychological growth. This hypothesis is premised upon past research on the domains of the PTGI, which has found significant relationships between domains of the PTGI and features of the person or, to a lesser extent, features of the stressor (see Table 3). If the five domains for PTG are not replicated in this sample, this hypothesis will be tested using the identified PTGI domains from the current factor analysis.

CHAPTER II

METHOD

Participants

The study aimed to include adequate representation of different etiologies of disabilities as a means of ensuring diversity and variance in child characteristics. We sought to recruit diagnostic groups that could serve as proxies for key child variables that we hypothesized could impact positive maternal growth, including functional level of the child, challenging behaviors, positive features, and chronic and acute health related concerns. Participants were recruited for the on-line survey through five national parent organizations, the ARC, StudyFinder, and numerous state and city chapter of parent organization. Recruitment occurred either by email or phone, which was followed up with a flyer describing the study for potential participants. In an effort to increase interest and confidence in the study methodology, individuals who represented the parent agencies and organizations were encouraged to take a look at the online survey and follow up with any questions they may have before they alerted their members to the research opportunity. Feedback from organization was overwhelmingly positive. Organizations made their members aware of the study opportunity through various means including posting information on their website, sending out an email, posting on listservs and support group chat rooms, and inserting a recruitment blurb in newsletters.

To this aim, the final sample included 211 mothers of children between the ages of seven and twenty-five with: Angelman syndrome (n = 30), Autism Spectrum Disorder

(ASD) including autism, PDD-NOS and Asperger's syndrome (n = 67), Down syndrome (n = 78), Prader-Willi syndrome (n = 30) and Other (n = 6). The 211 study participants were taken from a total of 323 individuals who viewed the survey. Of these "views," some respondents were fathers (less than 20) and many more were likely individuals from organizations who were looking at the study before they shared the information with their members. The study software counts all unique views of the study as a responder and so it is not possible to know the true total of incomplete surveys.

For the 211 participants who were included in this study, over 80% of each questionnaire was completed. Mean imputation was used to estimate missing items on individual questions for all items except those relating to child behaviors. Given the anticipated group differences on child behaviors by diagnosis, mean imputation by diagnostic group was used to estimate missing items on variables relating to the child.

Measures

Measures that were used in the current study fell into four categories: demographic information, Factor aA variables, Factor bB variables, and the outcome measure. The study utilized questionnaires that were already tested and validated in other samples whenever possible. A summary of the measures used is summarized in Table 5, while the measures are explained in more detail below.

Demographic Information

Demographic information was collected using a form generated by the Dykens lab. Questions included information on number of hours the mother worked, number of children in home, estimate of family income, religiousness, and a list of services that the child may be receiving.

Measurement of Child Characteristics (Factor aA)

Measurement of the child characteristics was assessed using eleven variables:

(1) diagnosis, (2) age, (3) age at diagnosis, (4) gender, (5) positive behaviors, (6) challenging behaviors, (7) functional independence, (8) time demands, (9) physical demands, (10) chronic health issues, and (11) intermittent acute health issues.

Of these variables, most have emerged across various studies as a significant predictor of maternal outcome. Four variables, however, (time demands, physical demands, chronic health issues, intermittent acute health issues) were selected because clinical experience suggests that these are significant features of caretaking for some mothers. Even so, scant data exist on the impact of these variables on maternal outcome, and as such, we elected to include them in an exploratory manner in the present study.

It was the intention of the study to assess Externalizing behaviors with the Child Behavior Checklist (Achenbach, 2001). However, due to difficulties in implementation encountered in a pilot project it was not feasible to use this measure. In its place a 27 item measure of Child Attributes and Behaviors (CAB) was created for the current study, which yielded a variable of positive behaviors and challenging behaviors. Psychometric properties of the CAB will be assessed in the study results section.

As there is no standardized measure of the time demands and physical demands of mothers, each participant was asked the following questions: (1) “What percentage of your waking day would you estimate is directed towards caring for your child? This would include would include direct time such as during feeding, bathing, driving, keeping a close eye on your child during play activities and planning activities such as planning dietary needs.” and (2) “Please rate how physically demanding it is to care for your child, on a scale of one to seven with seven being the most demanding?”

Chronic health issues were assessed by asking mothers to check all health concerns that apply from a list provided of the most common health concerns seen in children with the diagnoses being sampled (e.g., seizure, obesity, diabetes, allergies). For each concern, mothers rated the health concern on a four point scale as follows: 1 = “Not a Concern,” 2 = “ Was a concern in the past but not now,” 3 = Currently a health issue but manageable,” and 4 = “Currently a health issue that is not under control.” A Chronic Health Issues total was created from a sum of their item scores. There was also an opportunity for participants to write in chronic health concerns. Acute health concerns were assessed by asking mothers to report all dates and reasons for any surgeries or hospitalizations. An Acute Health Issues total was calculated by summing the number of operations and other hospitalizations reported.

Functional independence was assessed using the 15 item Activities of Daily Living Scale – Revised (DLS- R, Seltzer and Krauss,1989). Each item asks the mother to rate on a five point Likert scale how well her child can perform the activities, with activities increasing in difficulty (e.g., walking, speaking, eating, personal hygiene, performing basic financial tasks, maintaining friendships). The score for functional independence was the number of tasks the individual performed independently (ranging from 0 to 20).

Measurement of Family Resources (Factor bB)

Nine variables relating to resources were collected. These variables were selected based upon previous research demonstrating a significant relationship between the variable and an outcome measure in previous studies on parents of a child with a DD. These nine were also selected because of their demonstrated or hypothesized relationship with the PTGI. The variables are: (1) spousal/family support, (2) social support, (3) professional support, (4) education, (5) income, (6) Primary Control Engagement Coping, (7) Secondary Control Engagement Coping, (8) Disengagement Coping, and (9) depressive symptoms.

The three variables of spousal support, social support and professional support were assessed with the same methodology used by Plant and Sanders (2007). For each form of support, participants were asked to rate how much support they receive in eight areas of care-giving tasks on a seven point Likert scale. These eight areas were selected based upon the work of Shearn and Todd (1997) and are (1) direct care such as bathing, feeding, toileting, etc, (2) in-home therapy including carrying out recommended activities from therapists/professionals, (3) attendance at medical appointments, therapy sessions, etc., (4) supervision of the child's whereabouts and activities, (5) involvement in recreational activities, (6) education and information about the child's disability, (7) advocating for services, and (8) managing the child's behaviors. For each form of support, ratings were summed for a total score. Internal consistency for each scale was found to be acceptable in the study conducted by Plant and Sanders (2007) (r = 0.93 partner support, r = 0.88 friend support, r = 0.85 professional support).

Three subscales of the Response to Stress Questionnaire (RSQ: Carver et. al, 2000) was used to assess participants' coping styles. The Primary Control Engagement Coping scale encompasses strategies that are used to directly modify the stressor, such as problem solving, emotional regulation and emotional expression. Secondary Control Engagement Coping encompasses strategies that have the effect of modifying the perception of the stressor, such as positive thinking, cognitive restructuring, and acceptance. Disengagement Coping encompasses strategies that have the effect of not physically or mentally engaging with the stressor, such as avoidance, denial, wishful thinking and distraction. The score obtained reflects the proportion of that individual's responses that fall within that scale. In the study by Carver et. al on the psychometric properties of the RSQ, internal consistency for these three scales was reported to have a Cronbach's alpha ranging from .73 to .88. Test-retest reliability for each scales produced a Cronbach's alpha ranging from .69 to .81.

Mothers also completed the Center for Epidemiologic Studies Depression Scale which is a well standardized and widely used measures of symptoms of depression in non-psychiatric samples. The measure is comprised of 20 questions with each item to be answered on a four point Likert scale. The measure is reported to have good internal consistency, with Cronbach's alpha coefficients of .84 - .85 in community samples.

Outcome Measures

Positive psychological growth in participants was assessed with the Post Traumatic Growth Inventory (Tedeschi and Calhoun, 1995). This 21-item measure is scored on a six point Likert scale, yielding a score in each of the five domains that have been identified in PTG: Relating to Others, New Possibilities, Personal Strength, Spiritual Change and Appreciation of Life.

CHAPTER III

RESULTS

Descriptive Statistics and Preliminary Analyses

Measure of Child Characteristics (Factor aA)

A total of eleven variables were collected: (1) diagnosis, (2) age, (3) age at diagnosis, (4) gender, (5) positive behaviors, (6) challenging behaviors, (7) functional independence, (8) time demands, (9) physical demands, (10) chronic health issues, and (11) intermittent acute health issues.

Assessment of *Child Attributes and Behaviors Questionnaire.* Child behaviors were measured using a questionnaire about the child's attributes and behaviors (CAB). The CAB consisted of 27 items that tapped positive and challenging behaviors, as well as level of functional independence. Each item was a phrase that would complete the sentence "My child…" The possible sentence completions probed for a range of constructs including challenging behaviors ("Has temper tantrums"), emotional lability ("Has rapid changes in mood"), daily functioning questions ("Can be left alone, without supervision, for at least 20 minutes"), and positive behaviors ("Likes to be hugged or enjoys physical contact with others"). All items were endorsed on a scale of 1 to 5, with 1 = "Does not describe my child at all" to 5 = "Almost perfectly describes my child." A factor analysis was performed on the behaviors questionnaire in order to determine if any theoretically sound variables could be extracted for use in further data analysis.

A principal components analysis was performed on the items with a varimax rotation in order to maximize differences between factors. The full scale yielded a high internal consistency of items ($\alpha = .84$). The analysis produced six factors with eigenvalues greater than one. The first three factors were easily interpretable. The factors were labeled Challenging Behaviors (23.0% of variance), Positive Behaviors (11.9% of variance), and Functional Ability (10.1% of variance). Of these factors, the first two were used to create child variables. Items were included in the variables if they loaded above 0.5 of the factor and less than 0.4 on all other factors. The third factor was not used to create a variable as a standardized measure of functional ability was already part of the survey battery. Challenging Behaviors is comprised of seven items ($\alpha = .84$), while Positive Behaviors is comprised of six items ($\alpha = .82$). Table 4 shows the items that were used to create the factors, along with the factor loadings for each variable.

Assessment of Variability of Child Characteristics within Sample. The variables assessing child characteristics encompassed child behaviors, level of functioning, demands upon the parent and health issues. Means and standard deviations for the total sample and by diagnosis are presented in Table 4. It was theorized that the average score for these variables would differ significantly across diagnostic groups, thus increasing variability for the sample as a whole. A series of ANOVAs was conducted, which confirmed that the diagnostic groups did indeed differ as expected and contribute to increased variability in child variables (see Table 4). Follow up t-tests were

Table 4
<u>Two Variables Extracted from Child Attributes and Behaviors Questionnaire by Factor Analysis</u>

	Factor Loadings
Factor I: Challenging Behaviors (23% of Variance)	
Gets easily upset	.72
Fixates	.55
Has temper tantrums	.81
Hurts self (including head banging, skin picking, etc.)	.73
Hurts others (including biting, hitting, etc.)	.63
Has rapid changes in mood	.74
Needs help in transitioning between tasks	.55
Factor II: Positive Behaviors (13% of Variance)	
Enjoys the company of others	.72
Smiles while looking at me	.81
Has a good sense of humor	.68
Can make me feel better when I am having a bad day	.66
Likes to be hugged, or enjoys physical contact from others	.73
Is often in a good mood	.63

Items were selected that had a factor loading of .50 or above on the factor in question and a factor loading of below .40 on all other factors. Loadings and proportion of variance are reported from a principal factor analysis with a varimax rotation.

Table 4

Child Characteristics (Factor aA)

	Total (n = 211)	Angelman (n=30)	ASD (n=67)	Down (n=78)	Prader-Willi (n=30)	Group Differences *F*-Value	 *p*-Value
Child age	13.82 (5.11)	15.27 (5.53)	13.81 (5.08)	13.58 (5.09)	13.27 (4.98)	0.94	0.45
Age at diagnosis	2.44 (3.38)	5.03 (2.94)	4.53 (3.63)	0 (0)#	1.93 (3.2)	28.15	<0.001*
Positive behaviors (Higher is more positive)	25.25 (4.61)	27.90 (2.86)	21.34 (4.72)	27.25 (3.03)	26.10 (3.58)	23.05	<0.001*
Challenging behaviors (Higher is more chal.)	15.44 (6.34)	17.25 (6.49)	17.46 (5.51)	11.54 (4.58)	18.03 (6.94)	12.66	<0.001*
Functional independence (Higher is more Func.)	40.00 (10.21)	28.57 (5.45)	40.12 (9.52)	43.36 (9.29)	43.43 (8.79)	13.50	<0.001*
Time demands in hours	46.87 (36.17)	59.88 (29.69)	44.50 (35.82)	43.42 (42)	44.67 (44.48)	1.95	0.08*
Physical demands (1-7, 7 = most demands)	3.85 (1.75)	5.40 (1.07)	3.91 (1.85)	3.17 (1.40)	3.87 (1.88)	8.43	<0.001*
Chronic health issues (Higher = more issues)	24.64 (6.22)	24.27 (6.15)	23.33 (6.57)	26.21 (5.70)	23.33 (5.89)	2.60	0.03*
Acute health concerns (Higher = more issues)	4.30 (3.87)	4.53 (3.72)	2.41 (2.89)	5.41 (4.12)	4.76 (3.41)	6.31	<0.001*
Sex							
Male	133	13	53	45	17		
Female	78	17	14	33	13		

#Parents were instructed to enter “0” if child was under 1 year of age at time of diagnosis conducted as appropriate to determine specific sources of between-syndrome differences.

T-tests revealed that children with ASD exhibited significantly less positive behaviors than children in all other groups (ASD and Angelman syndrome: $t_{(1,95)} = 7.03$, $p < 0.001$; ASD and Down syndrome: $t_{(1,143)} = 9.08$, $p < 0.001$; ASD and Prader-Willi syndrome: $t_{(1,95)} = 4.91$, $p < 0.001$). In addition, children in the Angelman syndrome group had the highest mean positive behaviors score, which was significantly different from the mean score for the Prader-Willi group ($t_{(1,58)} = 2.15$, $p = 0.03$).

T-tests between groups on the variable of challenging behaviors revealed that children in the Down syndrome group exhibited less challenging behaviors than all other groups (Down syndrome and Angelman syndrome: $t_{(1,106)} = 5.10$, $p < 0.001$; Down syndrome and ASD: $t_{(1,143)} = 7.06$, $p < 0.001$; Down syndrome and Prader-Willi syndrome: $t_{(1,106)} = 5.60$, $p < 0.001$).

The groups also differed in their functional independence, with children in the Angelman syndrome group exhibiting less functional independence than all other groups (Angelman syndrome and ASD: $t_{(1,95)} = 6.19$, $p < 0.001$; Angelman syndrome and Down syndrome: $t_{(1,106)} = 8.17$, $p < 0.001$; Angelman syndrome and Prader-Willi syndrome: $t_{(1,58)} = 7.86$, $p < 0.001$). Similarly, children in the Angelman group required more caregiver time to care for them than children in the ASD or Down syndrome groups (Angelman syndrome and ASD: $t_{(1,95)} = 2.05$, $p = 0.04$; Angelman syndrome and Down syndrome: $t_{(1,106)} = 2.38$, $p = 0.02$).

T-tests between groups on the variable of physical demands revealed that mean physical demands experienced by mothers in the Angelman syndrome group was significantly higher than all other groups (Angelman syndrome and ASD: $t_{(1,95)} = 4.09$, $p <$

0.001; Angelman syndrome and Down syndrome: $t_{(1,106)} = 7.89$, $p < 0.001$; Angelman syndrome and Prader-Willi syndrome: $t_{(1,58)} = 3.86$, $p < 0.001$). In contrast, the mean physical demands reported by mothers in the Down syndrome groups was significantly less than all other groups (Down syndrome and ASD: $t_{(1,143)} = 2.74$, $p < 0.01$; Down syndrome and Prader-Willi syndrome: $t_{(1,106)} = 2.10$, $p = 0.03$).

Finally, children in the ASD group exhibited less acute health concerns than all other groups (ASD and Angelman syndrome: $t_{(1,95)} = 3.03$, $p < 0.01$; ASD and Down syndrome: $t_{(1,143)} = 4.97$, $p < 0.001$; ASD and Prader-Willi syndrome: $t_{(1,95)} = 3.49$, $p = 0.001$).

Potential difference by gender on all child characteristics was investigated by t-tests. No significant differences were found by gender for any child characteristic variables.

Between-syndrome findings thus confirmed that diagnostic groups varied in expected and predictable ways, and ensured that the child sample was diverse in their associated positive and negative behaviors, level of functioning, time demands, and health concerns.

Measure of Parent Resources (Factor bB)

Nine variables were assessed for parent resources. External resources included three types of social support (spousal/family support, social support and professional support), as well as parent income and education. Internal resources were conceptualized as depressive symptoms and coping style. Coping style was assessed using the Response to Stress Questionnaire (RSQ: Connor-Smith et al., 2000). Three forms of response to stress were assessed with the RSQ: primary response coping, secondary response coping and disengagement. Primary response coping strategies involve those strategies that are used in the service of directly changing the stressor or one's emotional response to the stressor. Secondary coping strategies are used in the service of changing one's perception of the stressor. Finally, disengagement encompasses behaviors that prohibit an individual from interacting with the stressor, both on the level of direct engagement or managing a perception of the stressor. Table 6 presents the data for each of these nine variables, both as a total and by diagnostic groups.

Data on parent resources were collected to allow for investigation of potential moderating influences by parent resources on the relationship between child characteristics and posttraumatic growth. Using the Double ABCX paradigm, variables included in Factor bB should be generally unrelated to child characteristics (although it is reasonable to expect that there may be some influence of child characteristics on parent factors. For example, a child that requires more direct care may inhibit opportunities for career growth in caregivers). A review of the data presented in Table 6 supports the prediction that parent factors are generally unrelated to child characteristics. ANOVAs were conducted for each parametric variable, and a significant difference between groups was found for only one variable, Primary Response Coping. Follow up t-tests revealed that mothers of children with Down syndrome had a mean ratio score for Primary Response Coping than mothers of children with Angelman syndrome or ASD. Mothers of children with Down syndrome thus used Primary Response Coping more frequently than other types of responses to stress relative to these other two groups (Down syndrome

Table 6

Parent Resources (Factor bB)

	Total (n = 211)	Angelman (n=30)	ASD (n=67)	Down (n=78)	Prader-Willi (n=30)	Group Differences	
						F-Value	*p*-Value
Family Income	7.36 (2.74)	7.21 (2.08)	6.95 (3.05)	8.06 (2.43)	6.78 (3.02)	1.72	0.26
Parent Education	5.31 (1.53)	5.13 (1.57)	5.27 (1.48)	5.56 (1.42)	4.87 (1.79)	1.29	0.13
Family Support	23.48 (14.49)	26.07 (12.94)	22.05 (15.56)	23.75 (14.23)	23.89 (15.41)	0.38	0.86
Social Support	8.13 (9.66)	6.67 (10.14)	7.58 (9.4)	8.79 (8.56)	9.42 (12.54)	0.48	0.78
Professional Support	14.08 (11.90)	15.80 (13.70)	14.48 (10.84)	12.19 (11.33)	16.82 (13.93)	0.84	0.51
Primary Response Coping	0.21 (0.03)	0.20 (0.02)	0.21 (0.04)	0.22 (0.03)	0.21 (0.04)	2.66	0.02*
Secondary Response Coping	0.27 (0.04)	0.28 (0.46)	0.26 (0.04)	0.27 (0.04)	0.28 (0.06)	0.88	0.49
Disengagement	0.12 (0.02)	0.12 (0.02)	0.12 (0.02)	0.12 (0.02)	0.12 (0.03)	0.88	0.49
Depressive Symptoms	32.27 (10.7)	32.93 (9.5)	34.80 (11.61)	30.04 (9.49)	32.52 (12.21)	0.53	0.74
PTGI Total Score	66.97 (20.59)	64.20 (19.92)	67.79 (20.24)	67.27 (21.40)	64.97 (21.15)	0.29	0.82

and Angelman Syndrome: $t_{(1,106)} = 2.84$, $p < 0.01$; Down syndrome and ASD: $t_{(1,143)} = 2.24$, $p = 0.02$).

Overall, a preliminary review of the data demonstrated that the variables are functioning as anticipated by the study design. For child characteristics, the inclusion of different diagnostic categories contributed to variability in the data. In contrast, parent factors were generally not found to vary significantly by diagnostic group.

Hypothesis 1

The first hypothesis posited that PTGI responses would have similar psychometric properties to those reported by Tedeschi and Calhoun (1996) in the original article on this inventory. This hypothesis was tested by performing a principal components factor analysis with a varimax rotation, the same approach used by Tedeschi and Calhoun. Factor analyses do not support the hypothesis that the PTGI operates similarly in the current and original Tedeschi and Calhoun sample. The full scale yielded a very high internal consistency of items ($\alpha = .92$), which is similar to the original study ($\alpha = .94$). However, the factor loadings differed greatly between the current and previous studies (see Table 7). As can be viewed in the table, in the present study, only 15 of the 21 items loaded on a single factor (meaning above.50 on one factor and less than .40 on all other factors). These fifteen items showed some rough approximation to the original five factors, but only one of the five factors, Spiritual Growth, retained its original items, and no other factors loaded in the same manner. The current analysis produced five components with eigenvalues greater than one. These five components accounted for 64% of the total variance. Although this finding is similar to the 62% of variance

Table 7

Comparison of PTGI Factor Analyses

		Factors Loadings				
	Original Study	Current Study				
PTGI Items ordered by Original Factors		I	II	III	IV	V
Factor I: Relating to Others	(17%)*	(40%)	(7%)	(6%)	(5%)	(5%)
Knowing that I can count on people in times of trouble	.67**	.17	-.03	.73	.19	.11
A sense of closeness with others	.81	.39	.34	.62	.16	.16
A willingness to express my emotions	.63	.26	.52	.28	.33	.15
Having compassion for others	.70	.11	.70	.07	.24	.06
Putting effort into relationships	.61	.25	.70	.32	.04	.15
I learned a great deal about how wonderful people are	.62	.04	.35	.68	.24	.13
I accept needing others	.67	-.08	.43	.51	.34	.11
Factor II: New Possibilities	(16%)					
I developed new interests	.76	.69	.08	.15	.07	.05
I established a new path for my life	.80	.73	.14	.01	.10	.07
I am able to do better things with my life	.76	.64	.25	.24	.32	.16
New opportunities are available which wouldn't have been otherwise	.76	.44	.36	.45	-.25	.28
I'm more likely to try to change things which need changing	.63	.18	.70	.16	.12	.07
Factor III: Personal Strength	(11%)					
A feeling of self reliance	.62	.50	.18	.17	.51	.25
Knowing I can handle difficulties	.79	.32	.27	.21	.67	.09
Being able to accept the way things work out	.54	.34	.20	.43	.44	.20
I discovered that I'm stronger than I thought I was	.71	.08	.16	.21	.72	.14
Factor IV: Spiritual Change	(9%)					
A better understanding of spiritual matters	.84	.27	.10	.18	.16	.84
I have a stronger religious faith	.83	.03	.14	.13	.15	.90
Factor V: Appreciation of Life	(9%)					
My priorities about what is important in life	.50	.42	.51	-.35	.23	.07
An appreciation for the value of my own life	.85	.53	.31	.05	.44	.12
Appreciating each day	.59	.44	.40	.33	.20	.30

*Percentages are of variance accounted for by the factor. On the left going down the table, percentages refer to the original data from Tedeschi and Calhoun (1996). On the right going across the page, percentages refer to the factor loadings from the current study

**Shading indicates a factor loading which is above .50 on that factor and less than .40 on all other factors accounted for by the factor analysis conducted by Tedeschi and Calhoun, the breakdown of percentage variance accounted for by each component differs greatly. The first component in the current study had an eigenvalue 8.57 and accounted for 40.8% of the variance. The following four components had eigenvalues between 1.57 and 1.03 and accounted for 7.5%, 6.1%, 5.1% and 4.9% of the variance. These values stand in marked contrast to the more evenly distributed variance accounted for by the factors from Tedeschi and Calhoun: 17%, 16%, 11%, 9%, 9%. Viewing the current eigenvalues on a Scree plot reveals a "break" after the first component. Best practices suggest that this Scree plot should be interpreted as signifying that there is at most one factor derived from the current data. However, the items which load onto the first factor are not conceptually related, based upon the work of Tedeschi and Calhoun, so there is no evidence to support the identification of any factors within the PTGI in the current study.

Given that the current factor analysis failed to yield any independent factors, and that the internal consistency of the full 21 items was found to be very high, it was concluded that the PTGI data derived from the present study is best interpreted as a single construct measured by a single score of the total responses to the items. Results from our sample of mothers of children with disabilities thus do not support the hypothesis that the PTGI operates in a similar manner as persons experiencing other, more acute types of stress. An interpretation of these findings will follow in the Discussion section below.

Hypothesis 2

Child Characteristics. A review of relevant literature did not permit directional hypotheses for Factor aA variables, resulting in a bi-directional hypothesis that sets the significance level at $p < .025$. Table 8 presents correlational data between the ten child variables and the Posttraumatic Growth Inventory (PTGI) total score. Analyses revealed a significant positive relationship between the PTGI total and the variables Physical Demands and Chronic Health Issues. Thus, caring for a child that required more physical demands or who had more chronic health issues was associated with higher scores on the

Table 8

Correlations between Child Characteristics and PTGI Total Score

	Correlation with PTGI	
	r-Value	*p*-Value
Child age	-0.01	0.411
Positive behaviors	0.12	0.035
Challenging behaviors	0.11	0.054
Functional independence	0.04	0.276
Time demands	0.13	0.030
Physical demands	0.15	0.013*
Chronic health concerns	0.15	0.016*
Acute health concerns	0.09	0.082

*Bi-directional hypothesis, thus significance level set at p < 0.025

PTGI. There was also a trend for a relationship between PTGI total score and Positive Behaviors and Time Demands, with a significance for each variable below $p = 0.05$ (although this p value is not significant due to the bi-directional nature of the hypothesis).

Parent Characteristics. All nine Factor bB variables were predicted to have a significant relationship with PTG. In contrast to the child variables, directional hypotheses were made for some of these items, as noted in Table 9. Directional hypotheses were made for variables if a review of Table 3 revealed a significant correlation or correlations in the same direction across studies. This review yielded a hypothesis to be made that education and disengagement coping would be negatively correlated with the PTGI total score, while Primary and Secondary Engagement coping would be positively correlated with the PTGI total score. A p value of 0.05 or less will be interpreted as statistically significant for directional hypotheses, while a p value of 0.025 or less will be interpreted as statistically significant for non-directional hypotheses.

Table 9 presents correlational data between the nine parent variables and the Posttraumatic Growth Inventory (PTGI) total score. Analyses reveal a significant positive relationship between the PTGI total and the variables Community Support, Professional Support, Primary Response Coping and Secondary Response Coping. These data reveal that more support from members of the community or a professional was associated with increased posttraumatic growth. Engagement in both Primary Response Coping and Secondary Response Coping was associated with posttraumatic growth. In contrast, use of Disengagement as a coping style was associated with lower reports of posttraumatic growth. Finally, those who had either less income or less education were more likely to report increased levels of PTG.

Post-hoc analyses were conducted to explore the relationship between education and PTG. It was theorized that individuals with less education would be more likely to endorse the following four items that comprise the Personal Strength scale in the original

Table 9

Correlations between Parent Characteristics and PTGI Total Score

	Correlation with PTGI	
	r-Value	*p*-Value
Education#	-0.19	0.002*
Income##	-0.20	0.002*
Family Support##	-0.03	0.331
Community Support##	0.17	0.008*
Professional Support##	0.21	0.002*
Primary Response Coping#	0.15	0.013*
Secondary Response Coping#	0.17	0.009*
Disengagement Coping#	-0.32	<0.001*
Depressive Symptoms##	-0.02	.369

#Uni-directional hypothesis, thus significance level set at $p < 0.05$
##Bi-directional hypothesis, thus significance level set at $p < 0.025$
*Significant *p* value

study of the PTGI: "I have a greater feeling of self-reliance," "I know better that I can handle difficulties," "I am better able to accept the way things work out," and "I discovered that I'm stronger than I thought I was." With a Bonferroni correction of 0.0125, three of the four items came out as significant and the fourth item showed a trend towards significance with a p-value of less than 0.05 (Reliance: $r = -0.17$, $p = -0.006$; Difficulties: $r = -0.14$, $p = 0.020$; Acceptance: $r = -0.17$, $p = 0.007$; Stronger: $r = -0.24$, $p < 0.001$). All significant correlations were in the predicted direction, with mothers who reported having less education also reporting more growth on these items. An interpretation of these findings will be presented in the Discussion section.

Hypothesis 3

The third hypothesis was that the domains identified in the PTGI would be significantly related to variables of Factor aA and bB. Examination of the PTGI from hypothesis 1 data does not warrant an investigation of this full hypothesis, because no independent factors were identified for the PTGI in the current sample of mothers of children with developmental disabilities.

Exploratory Analysis

A total of nine variables across Factors aA and bB were found to have a significant relationship with the PTGI total score. Of these nine variables, two were from Factor aA (Physical Demands and Chronic Health Issues) and seven were from Factor bB (Four External Resources: Education, Income, Community Support, Professional Support; Three Internal Resources: Primary Response Coping, Secondary Response Coping and

Disengagement Coping). A series of analyses were conducted to learn how these seven maternal resources influenced the relationship between the two child characteristics and PTG. For these analyses, parent resources were viewed as moderators of the relationship between child characteristics and PTG.

Viewing the influence of Parent variables as moderators was based upon the work of Baron and Kenny (1986) and Holmbeck (1997). Moderating variables are those that influence the relationship between an independent and dependent variable, but they are not expected to be correlated with both the independent and dependent variable. Moderators are typically stable variables such as demographic or trait-like features of an individual. In contrast, mediating variables are expected to change in relation to both the independent and dependent variable. Conceptually, mediators function as a conduit through which the independent variable is mediated (at least in part) before it influences the dependent variable.

While deciding whether to treat some variables as moderators or mediators is often far from clear, in the present study the most conceptually sound interpretation of the study design was to view child and parent characteristics as independent of each other. The correlations shown in Table 10 generally support this view, as most parent factors are not correlated with child characteristics and those that are correlated do not share a strong or even moderate relationship with each other. Therefore, in the present study the independent variables are child characteristics that have a demonstrated significant relationship with the dependent variable of PTG. The moderators are parent factors that have a demonstrated significant relationship with the dependent variable of PTG.

The moderating effect of each Parent variable on each of the two Child variables was tested by conducting a hierarchical regression with three steps for each test of a moderating effect (thus, fourteen hierarchical regressions total). The first step entered was the Child variable (e.g., Physical Demands or Chronic Health Issues). The second step entered was the Parent variable. The third step entered was the interaction term (created by making a variable which was the cross product of the first two variables). A total of fourteen hierarchical regressions were conducted (see Table 11). As these tests were all post-hoc, a Bonferroni corrected significance level of $p < 0.003$ will be used. Results indicated that the addition of the third step, the interaction variable, did not significantly account for more variance on any of the fourteen hierarchical regressions. However, a trend was observed for Community Support and Professional Support when tested as a moderating variable for Chronic Health.

These trends suggest that support from the community and professionals may influence mothers' experience of PTG differently depending upon how many chronic health issues are present in her child. The trend for a moderating effect of community support on chronic health was explored graphically in Figure 2. The purpose of the graph was to allow for a preliminary investigation of the direction of the moderator with the understanding that the results are not at the level of significance. To create the graph, each participant was coded as low or high on community support and low or high on chronic health (with high indicating more health issues). As can be seen in the graph, the trend for an interaction leads to very slight differences between groups of high and low support.

Table 10

Correlations between Variables with a Significant Correlation to the PTGI

	PTGI	Phy.	Health	Educ.	Inc.	Comm.	Prof.	Pr. Cope	Sc. Cope	Diseng.
PTGI Total	--									
Physical Demands	.15*	--								
Chronic Health Issues	.14*	.21***	--							
Parent Education	-.20**	-.13*	-.10	--						
Household Income	-.20**	-.26***	-.13*	.35***	--					
Community Support	.17**	-.06	.02	-.09	.03	--				
Professional Support	.21**	.10	-.02	-.07	-.01	.50***	--			
Primary Coping	.15*	-.23***	-.08	.05	.17**	.22***	.21***	--		
Secondary Coping	.16**	-.14*	-.18**	-.12*	.02	.20**	.09	.27***	--	
Disengagement Coping	-.32***	-.03	.01	.03	-.05	-.25***	-.23***	-.54***	-.38***	--

*$p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 11

Hierarchical Regression Analyses to Test for Moderating Effects of Parent Variables

	Step 1		Step 2				Step 3					
	Child		Child		Parent		Child		Parent		Interaction	
	β	(*p*)	β	*p*	β	*p*	β	*p*	β	*p*	β	*p*
Physical Demands												
Parent Education	.15	(.03)	.13	(.05)	-.18	(.01)	.15	(.50)	-.16	(.33)	-.03	(.89)
Income	.15	(.03)	.11	(.12)	-.17	(.01)	.28	(.20)	-.02	(.90)	-.20	(.41)
Community Support	.15	(.03)	.16	(.02)	.17	(.01)	.16	(.08)	.17	(.34)	.01	(.94)
Professional Support	.15	(.03)	.13	(.06)	.19	(.01)	.22	(.03)	.40	(.03)	-.24	(.22)
Primary Response Coping	.15	(.03)	.20	(.004)	.20	(<.001)	.24	(.53)	.21	(.17)	-.04	(.90)
Secondary Response Coping	.15	(.03)	.18	(.01)	.19	(.01)	.57	(.16)	.34	(.04)	-.40	(.33)
Disengagement Coping	.15	(.03)	.14	(.03)	-.31	(<.001)	.08	(.80)	-.33	(.03)	.07	(.84)
Chronic Health												
Parent Education	.15	(.03)	.12	(.06)	-.18	(.006)	.04	(.83)	-.29	(.26)	.13	(.67)
Income	.15	(.03)	.12	(.07)	-.17	(.007)	.27	(.15)	.05	(.85)	-.27	(.39)
Community Support	.15	(.03)	.15	(.04)	.16	(.02)	.25	(.004)	.61	(.01)	-.48	(.047)
Professional Support	.15	(.03)	.15	(.03)	.21	(.002)	.29	(.003)	.70	(.009)	-.52	(.056)
Primary Response Coping	.15	(.03)	.16	(.02)	.16	(.02)	-.01	(.98)	.04	(.86)	.20	(.65)
Secondary Response Coping	.15	(.03)	.18	(.008)	.20	(.004)	-.19	(.65)	-.04	(.86)	.41	(.37)
Disengagement Coping	.15	(.03)	.15	(.02)	-.32	(<.001)	-.34	(.28)	-.69	(.005)	.62	(.11)

A contributing factor to the lack of significant moderating relationships may be the weak correlations that were found between each of the nine variables with the PTGI total. A weak relationship means that these variables only account for a very small portion of the variance in the reports of PTG. An investigation into moderating effects of variables may be more fruitful in future studies after other variables are identified that have a stronger relationship to reports of PTG.

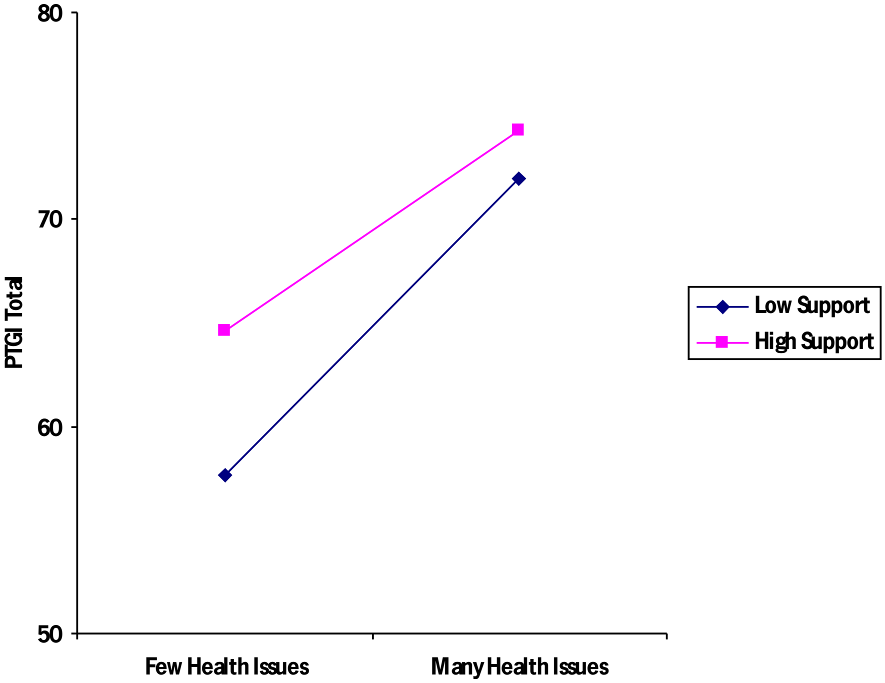

Figure 2

Graph of Trend for Effect of Community Support on Relationship between Chronic Health Issues and PTG

CHAPTER IV

DISCUSSION

The Double ABCX model has been widely used in research on the adaption of families to the stress of having a child with a developmental disability. The Double ABCX model views a family's attempt to cope with the stressor (X) as dependent upon three factors: (aA) the stressor event (i.e., the child), (bB) the family's resources and (cC) the family's perception of the stressor event, with "Double" referring to the changes that can occur in each factor over time.

A near constant across all previous studies has been the definition of "X" in the model as a negative outcome, such as depressive symptoms in mothers. In the past few years, however, there has been an increasing awareness by practitioners and researchers that some mothers seem to do well and even thrive in their new role. A few studies have investigated such positive outcomes either by using a qualitative research design (Konrad, 2006) or by investigating "well-being", with well-being defined as the absence of depressive symptoms (Duvdevany and Abboud, 2003; Kim, Greenberg, Seltzer and Krauss, 2003; Orsmond, Seltzer, Krauss, and Hong 2003; Shin and Crittenden, 2003), However, there remains a dearth of quantitative studies on the topic of true positive changes in mothers following the birth of a child with a developmental disability. The purpose of the current study was to use the Double ABCX model to address two research questions: (1) identify positive outcomes in mothers, and (2) identify potential variables from Factors A and B that are related to positive outcomes in mothers. Positive outcomes were measured via maternal self-reports of their posttraumatic growth using the Posttraumatic Growth Inventory (PTGI).

Selection of the PTGI to investigate growth in the current sample was based upon the widespread use of the measure in numerous, disparate populations of individuals who have experienced a trauma including survivors of cancer, sexual abuse, or community violence or following the death of a loved one. A similarity across almost all studies of PTG thus far has been that the population in question has experienced a trauma which was an acute stressor (e.g., a stressor with a clear end point). In contrast, this study examined responses to a chronic stressor. Investigating PTG in mothers of children with developmental disabilities provides a unique opportunity to identify how PTG differs in populations that experience an ongoing rather than an acute stressor.

By combining methodology used to learn about parents of a child with a developmental disability with methodology used to investigate posttraumatic growth, the current study contributes to both fields of research. The study contributes uniquely to research on maternal adaption to raising a child with a developmental disability by documenting positive growth in these mothers. Furthermore, this study identified features of caring for the child, and types of maternal internal and external resources, that are associated with increased growth. Findings have implications for how to best support mothers as they adapt to the demands of their child in order to maximize the potential for growth.

This study is also the first to assess the psychometric properties of the PTGI in individuals who are adapting to the demands of an ongoing, long-term stressor. Findings revealed that the PTGI does not function in the current population as it did in the original study, and that the PTGI may need to be adapted or interpreted differently depending on the type of stressor involved. A more detailed discussion of the findings follows, with consideration given for each hypothesis along with a discussion of the study limitations and possible directions for future research.

Hypothesis 1

The first hypothesis was that the PTGI in mothers of children with developmental disabilities would have similar psychometric properties to those found in the original study on the measure (Tedeschi and Calhoun, 1996). This hypothesis was tested by conducting a factor analysis, and comparing the results to the previous study findings. A comparison of the two data sets did not support the hypothesis. While both PTGI studies found high internal consistency ($\alpha \geq 0.90$ for both studies), factor analyses yielded different findings. In the original study on the PTGI, a factor analysis on the 21 items yielded five independent and easily interpretable factors: Relating to Others, New Possibilities, Personal Strength, Spiritual Change and Appreciation of Life. In contrast, a factor analysis using the same statistical approach in the present study did not yield similar independent, easily interpretable factors. Instead, the PTGI in the current study was best interpreted as a single score and overall index of growth.

An explanation for the differences found between the two studies may be found in other attempts to validate the five factors of PTG. Reviewing other studies of the psychometric properties of the PTGI, most work has focused on how the factor structures fare cross-culturally, when the PTGI is translated into German (Maercker and Langner, 2001), Chinese (Ivy, Lai and Wong, 2006), Bosnian (Powell, Rosner, Butollo, Tedeschi and Calhoun, 2003) and Spanish (Weiss, 2006). Participants in these studies were primarily survivors of acute stressors, and not all of these studies confirmed the five factor model of PTG (also, not all studies are published in English). However, it is difficult to interpret these findings as cultural differences cannot be ruled out as an explanation for the differences in factor structures (see Powell et. al, 2003 for a discussion of the difficulties in cross cultural comparisons).

One study, however, aimed to confirm the original PTGI factor structure in a separate English speaking population (Morris, Shakespeare-Finch, Rieck and Newbery (2005). Participants were 219 undergraduates from an Australian university who reported having experienced a traumatic event. A slight modification was made to the inventory. Three additional items were added to the Spirituality factor in order to follow best practices of having at least three items per factor. As with the current study, Morris et. al (2005) employed the same factor analytic approach used in the original PTGI study. This sample of Australian students yielded almost identical factor loadings as compared to the original study. A modest exception was that two items ("I have more compassion for others," "I put more effort into my relationships") which originally loaded on the Relating to Others scale loaded with the Appreciation of Life items. Morris et.al's (2005) near replication of the factor analysis conducted by Tedeschi and Calhoun in 1995 supports the view that different types of stressors likely play a role in differences across studies in factor structures. This premise would be strengthened by future studies of PTG in individuals experiencing a chronic stressor other than care giving for a child.

If mothers in this study did not replicate the well-established PTGI factors, is there evidence that they did they indeed experience positive growth? Unlike a measure of a diagnostic category such as depression, cut-off scores have not yet been developed for the PTGI to use as guidelines for answering this question, or for identifying those with “high” or “low” growth. In lieu of such guidelines, it may be helpful to compare overall mean PTGI scores derived from mothers in the current study to other samples that have used the PTGI. Data from twenty three studies that reported the overall mean PTGI scores, including the current study, are presented in Table 12 (included at end of this document due to length of table). Of the twenty three studies reviewed, mothers of a child with a developmental disability came in as reporting the fifth highest average total score on the PTGI. This ranking is remarkable in that it is the first study that is known by the author to document any true positive changes (as opposed to an absence of negative symptoms) in mothers as a result of having a child with a developmental disability.

Relative to others, then, mothers thus reported very high mean levels of psychological growth, despite differences across studies in samples or stressors. Such strong supporting evidence for the existence of growth in mothers of children with developmental disabilities should serve as a red flag for researchers, signaling a greatly under-investigated area of maternal outcome. Indeed, mothers, and potentially other family members as well, may benefit from the addition of a child with a developmental disability. Responses to raising a child with a developmental disability may span the entire range from a predominantly negative experience to a wholly positive experience, but thus far only half the story has been well-documented.

The investigation of positive growth in parents of a child with a developmental disability is much more important than an intellectual exercise for researchers. Documentation of positive growth could have tremendous clinical benefit for parents of children, especially those who are newly diagnosed. Many parents report not knowing what to expect when they are first given the diagnosis for their child, and thus rely greatly on the professionals around them to tell them what to expect. Professionals who are not well informed and retain only stereotyped ideas and fears about what it means to have a child with a developmental disability risk passing on those same fears and stereotypes to new parents. Documentation of positive changes in mothers can serve both professionals and new parents in deciphering between the reality and stereotypes of having a child with a developmental disability.

Parents who participated in this study had the opportunity to share their experience of receiving the diagnosis in an open-ended question. Although these anecdotes were not formally reviewed for the current study, some of the stories that were shared provided stark examples of how ignorance on the part of professionals can have a huge impact on parents at such a vulnerable time. Two examples will be shared here.

Mother of a 15 year old son with Prader-Willi syndrome:

> I remember that the consultant was so matter of fact and as though it was not a big deal. He painted the blackest picture of my son's future it made me feel very low and could not see a future for any of us. I was left to cope with these feelings and after a time my son proved him wrong. Yes life is difficult but not as black as I was lead to believe with respect to my son having some quality of life. This consultant had no compassion or bedside manner. I took his attitude for a year or so then asked to be transferred to another consultant that had been recommended by other parents and have been with him ever since. My concern now is that soon we will have to be transferred to adult services but I guess we'll cross that bridge when we get to it. Through talking to others I would say the majority of parents seem to go through a similar experience at first diagnosis of doom and gloom.

Mother of a 23 year old son with Down syndrome:

> The pediatrician was obviously very upset when my son's chromosome study came back and he had Trisomy 21. He was in the ICU and they had been doing a variety of tests until they came up with this diagnosis… The geneticist at the hospital had me meet with a team and they told me that they had arranged a

> placement for my son. They kept saying that he would be "a total vegetable" and as a single parent it would be too much to handle. I told them that I was a vegetarian and I'd take my "vegetable" to go. Luckily I was aware of the Disability Rights Movement and had also grown up with a friend on my block that had Down Syndrome. The medical presentation was so negative and inappropriate. The right approach would be to provide accurate, updated information with the best and worst case scenarios.

These stories demonstrate the misinformation that is retained by many professionals about having a child with a developmental disability. The findings of this study can serve as a step forward in documenting the full range experiences that mothers may have when a child with a developmental disability enters their life, which in turn can be used to educating professionals on how to best educate new parents about the road before them.

Hypothesis 2

The second hypothesis of the study was that each variable of Factor aA (Child Characteristics) and Factor bB (Parent Resources) would be significantly related to the PTGI total. The selection of both child and parent variables was made based upon the Double ABCX model, which views both categories of variables to be related to parental outcomes. Based on the author's clinical experiences, several child variables were added to the present study that tapped key but under-studied aspects of raising children with disabilities, including Physical Demands, Time Demands, Acute Health Concerns and Chronic Health Concerns. These variables complement and extend the traditional research focus on child psychological or behavioral functioning.

The direction of each hypothesis was determined by research on PTG. Data presented in previous research on PTG allowed for unidirectional hypothesis for some of the parent resources variables. In contrast, a bidirectional hypothesis was made for each of the child characteristics. The hypotheses for child variables were bidirectional as there was a general lack of research on how features of a stressor (e.g., the child) affect PTG, thus prohibiting an expectation of direction for the findings. Consideration will be given to the findings of child factors and parent factors independently, followed by a discussion of how patterns found across both factors might be interpreted.

Child Factors

Mixed support was found for the hypothesis that there would be a significant relationship between child factors and maternal PTG. A significant relationship was found for two variables: Physical Demands and Chronic Health, such that increased chronic demands or chronic health issues was associated with increased reports of PTG. Even so, these variables had relatively weak correlations with the outcome, with both variables having a Pearson's r value of 0.15. Two other variables, Time Demands and Positive Behaviors, demonstrated a trend at the $p < .05$ level such that increases reports for these variables were associated with increased reports of PTG.

Most studies of the Double ABCX model in developmental disabilities that look at child features focus on variables such as child traits, level of functioning, and negative behaviors. In the current study, four variables were included to encompass other features of caring for a child with a developmental disability. It is notable that three of these four variables were associated with PTGI scores (p-values of less than 0.05), and thus show promise for future research on the Double ABCX model. A review of the fifteen studies on Factor aA variables included in Table 1 demonstrates the more narrow view that is usually taken on potential variables of Factor aA. Almost all variables of interest for child characteristics were either a “negative” feature (e.g., severity of disability, problem behaviors, less communication) or a descriptive feature (e.g., diagnosis, age). Two exceptions were the inclusion of “completing caregiving tasks” (Plant and Sanders 2007), and reinforcing personality or cheerfulness (Hodapp et. al, 2003). The pattern of significant findings and trends associated with child variables in the current study suggest that researchers may want to broader their conceptualization of child variables that affect parental outcomes in future studies.

Parent Factors

The hypothesis that there would be a significant relationship between parent factors and PTG was generally confirmed. Seven of the nine parent variables demonstrated significant correlations with the higher scores on the PTGI. All three of the variables for which a unidirectional hypothesis was made were found to have a significant relationship with PTG in the predicted direction. An increase in income, education or disengagement coping for a parent was related to decreased reports of PTG, while an increase in community support, professional support, primary response coping and secondary response coping was related to increased reports of PTG. The absolute value of r for the significant correlations ranged from 0.15 – 0.32, which are interpreted as weak correlations.

Education. A negative relationship between education level and PTGI total scores have been found in a few previous studies (as summarized in Table 12). Weiss (2004b), for example, found the same negative relationship between education and PTG in his study on breast cancer survivors. In his discussion he notes that this negative relationship is consistent with other studies on survivors of breast cancer and goes on to speculate that “negative associations between education and PTG might reflect differences in use of religious or spiritual coping, which has been found to be negatively correlated with education and positively related to PTG” (p. 744). No other writings were found on this topic.

While differences related to spirituality may also apply to the current sample, the clinical experiences of the author suggest an alternative explanation for this inverse relationship. A mother who has more education may carry a self-concept that is partly defined by the academic achievements and career goals she has accomplished. The addition of a child with a developmental disability may lead to variable outcomes: it may not affect her career, may lead to a lateral change in careers, or it may require a compromise in career goals in order to accommodate the demands of raising a child with a disability. In contrast, a mother with lower educational levels may not have had as many opportunities to find a challenge for which she was well-suited to succeed in and to feel a sense of mastery. The addition of a child with a developmental disability may allow for new ways to feel success in accomplishing challenging goals. Support for this theory may be found in the pattern of responses to specific questions on the PTGI that reflect an increase in perception of personal strength. The finding that three of the four items labeled as “Personal Strength” items in the original PTGI are significantly and inversely related to education provide some support for the theory that less education is related to higher reports of PTG. Further research is needed to explore the hypothesis that mothers with less education find that having a child with a developmental disability provides a path for experiencing mastery of difficult goals.

Support from others. The current study investigated the role of support in three ways, support from family members, the community (e.g., support groups, church, etc.), and professionals (e.g., teachers, therapists, etc.). A significant relationship was found between community and professional supports and increased maternal reports of PTG, while support was not found for a relationship between family support and PTG. It is unclear why support was not found for a significant relationship between all three forms of support and PTG in the current study. Previous studies based upon the Double ABCX model have found that all three forms of support have a moderating effect on the stress of care giving (Plant and Sanders, 2007). In addition, support was found for a relationship between partner support and PTG in a study on PTG in partners (both husband and wife) when a wife has breast cancer (Weiss, 2004a&b). Future studies are needed to examine the ways in which support is related to PTG.

Coping style. A relationship between coping style and maternal outcome is one of the most frequently identified and robust findings documented across studies reviewed in both the literature on the Double ABCX model and PTG (see Table 1 and Table 12). Among mothers in the present study, an increase in Primary Response Coping and Secondary Response Coping was associated with increased reports of PTG., while increased reliance on Disengagement Coping was associated with decreased levels of PTG. Primary Response Coping encompasses strategies such as problem solving, emotion regulation, and emotional expression. Previous research on families of children with developmental disabilities has typically viewed maternal coping as either problem-solving or emotion-oriented. Both of these strategies are encompassed in Primary Response Coping. Primary Response Coping encompasses strategies that require direct engagement with the stressor, either by managing the stressor or engaging with the stressor at the level of thinking about it. In contrast, Disengagement Coping is characterized by distancing one's self from the stressor, either at the level of physical disengagement (e.g., avoidance) or mental disengagement (e.g., distraction, wishful thinking).

Findings related to coping styles allow for some insight into why increased reports of Physical Demands and Chronic Health Issues are associated with increased reports of PTG. Both of these child features demand engagement from the parent at some level. Disengagement would be more difficult to achieve when the child needs sustained, direct, maternal physical contact to accomplish his or her daily routine (as opposed to disengagement from a less tangible stressor, such as breast cancer). The pattern of significant findings across coping styles and child features suggest that a mother's increased engagement with her child make her more likely to experience PTG. Engagement with the stressor may be a mediator of this relationship, in that the more a mother is involved with her child, the more she is actively engaged with the thoughts associated with her stressor. Future studies are needed to address the mediating role of contact with the stressor in this population.

Secondary Response Coping encompasses strategies such as positive thinking, cognitive restructuring and acceptance. The possible path between Secondary Response Coping and PTG is potentially more direct. PTG is, at its core, a reinterpretation of events in a positive light using cognitive restructuring to see the benefits of what was at first a distressing occurrence. By looking for the positive in situations, growth is more likely in the face of managing a stressor such as caring for a child with a developmental disability.

Patterns of correlations across Factor Aa and Bb variables

Support was found for a significant association between features of the stressor and PTG, as well as for features of the mother's status (both in terms of psychological functioning and external resources) and PTG. These results suggest that future research on PTG needs to consider both the stressor and the person experiencing the stressor in order to best understand how PTG occurs.

While many significant correlations were identified across child and maternal variables, almost all associations were relatively weak (r = 0.15 to 0.21), with the one exception of a moderate correlation that was identified for Disengagement Coping (r = -0.32). A review of the bivariate correlations in Table 12 reveals that the majority of significant relationships between child or parent variables and the PTGI total fall in the weak or moderate range. In addition, an attempt to identify moderating effects of parent resources on child characteristics led to no significant findings. The aggregate of these findings suggest that the field of research on PTGI has a long way to go before the path to PTG is fully understood.

Limitations

While this study had many strengths, there are also limitations that should be considered as they relate to future research. A major limitation of this study was its recruitment methodology. Recruitment for an internet based survey allowed for a large number of participants, as well as increased ability to reach potential participants representing low-incident disorders such as Angelman or Prader-Willi syndromes. The methodology also yielded a geographically diverse sample, with participants from all over the U.S., representing at least 38 states including California, Colorado, Maine, South Dakota, Wyoming and Alaska. However, internet recruitment processes may not generate a good distribution of participants from diverse SES backgrounds, including income and education. As both income and education were found to be significantly related to the experience of PTG, it is of particular importance that future studies collect data from a more diverse sample on these variables.

The recruitment process may have also led to a biased sample in regards to questions on community support. Relying heavily on the assistance of support groups may have oversampled participants who find more benefits from community support than the population in general. Future research may need to include families recruited via schools or clinics.

Another limitation was that most participants learned of this study through advertisements or flyers with the heading "Positive Growth in Parents." The goal of using this specific language was to increase the likelihood of participation from parents who might want to share their experiences, and had thus far not had an opportunity to do so. Comments made by many parents suggest that they indeed felt a lack of interest from the research community regarding the positive aspects of raising children with developmental disabilities, and these parents were eager to share their stories. A trade-off in targeting parents who were more likely to be interested in participation was a possible oversampling of participants who found the experience of raising a child with a developmental disability to be rewarding. As this was the first study of to formally investigate positive changes in parents, any documentation of positive growth is important. However, these findings may not be representative of the broader population, and future studies are needed to investigate how common the experience of PTG may be, and factors that facilitate such growth in some families and not others.

A final critique of the current study was the sole inclusion of mothers who are raising children with developmental disabilities. It remains unknown if mothers in this study experience more or less growth than mothers of typically developing children, or if features of the experience of raising a child relates to growth differently between the two groups of mothers. Future studies should include a group of mothers of typically developing children so that comparisons between the two groups can be made.

Directions for Future Research

The many findings from this study have led to even more questions. Future studies could have the potential to contribute to our understanding of positive growth in mothers of a child with a developmental disability and, more generally, to differences in PTG between people who experience an acute versus a chronic stressor.

A primary finding in the current study was that the PTGI functioned differently in a sample undergoing chronic as opposed to acute stress. However, evidence was found to support the notion that mothers experience growth as a result of their experience. As the PTGI was developed based upon literature on survivors of an acute stressor, it may thus be the case that the PTGI identifies only a subset of the growth that some mothers experience following the addition of a child with a developmental disability. Future studies should investigate other potential areas of growth that are associated with surviving an ongoing rather than acute stressor. Such a line of inquiry might begin with drawing upon the experiences of mothers in narrative form, including content analyses of themes that appear repeatedly across narratives.

Although this study was among the first to examine psychological growth in mothers, a limitation was that that fathers were not included. Just as the PTGI operated differently in this sample, it may also operate differently in fathers who experience the stressors of parenting children with developmental disabilities. In general, studies on PTG have found that males report less growth than females (see Table 3 for examples). It should be noted that the focus of research on mothers only is a limitation that needs to be addressed more broadly in all research on parental adjustment to a child.

Another line of inquiry for future studies is how Factor cC (perception of the stressor) might be related to PTG. Past studies of parenting perceptions have found that combined Factor cC variables account for up to 29% of stress in mothers and 37% in fathers (Saloviita et. al, 2004). The weak correlations that were found the current study may be better understood in the context of a path model with parental perceptions as a mediator. Perceptions could be examined using the same measure as was used by Saloviita et. al., which was a definition scale developed by Bristol and DeVellis (1987), which includes three scales: Meaning/Purpose, Self-Blame, and Catastrophe/Burden.

Results of this study also provide a framework for intervention studies. Two lines of possible intervention studies could be undertaken. First, intervention could be tested at the level of providing education for professionals who often have first contact with new families or by providing education for new parents. An intervention study aimed at educating professionals may only require a one time meeting, where they are introduced to the literature on PTG and provided with supporting case studies to illustrate how growth may occur. An intervention study aimed at parents might be more intensive, with psycho-education provided over several sessions. If appropriate, exercises might even be involved to promote the fostering of PTG.

A second type of intervention study may focus on helping parents and professionals critically examine why our cultural carries beliefs that the birth of a child with a developmental disability is an overwhelmingly negative event. It is striking to consider how pervasive a negative perspective is in this culture, as indicated by the near exclusive focus of research on the negative impact of the event, beginning with the work of Solnit and Stark.

Taking a cognitive behavioral perspective, one could construct an intervention by evaluating what “shoulds” a parent carries about the expectations for their child (e.g., “my child should go to college,” or “my child should be like the other children I see.”) A framework for creating such an intervention study could be taken from the work of Jean Baker Miller (1976), who had identified many beliefs in our culture that are barriers to personal growth. For example, our culture carries the beliefs that independence is a measure of growth, and differences in individuals are deficiencies rather than as a way to embrace diversity. New parents of a child with a developmental disability may very well carry these predominating cultural beliefs. The work in cognitive behavioral therapy suggests that parents would benefit from identifying the expectations that they carry, as well as the core beliefs that generate the expectations. Once parents have identified expectations that they have, they could evaluate why they have such expectations and if such beliefs are appropriate in the face of the experiences before them. Such an intervention study could evaluate if parents are more likely to experience positive growth after they learn to label and critically evaluate the beliefs that their culture has created in them.

Table 1

Summary of recent articles examining factors of Double ABCX model as predictors of parent outcome

Factor	Study	Sample	Study findings
aA	Abbudeto, Seltzer, Shattuck, Krauss, Orsmond and Murphy (2004)	Mothers: autism (174), DS (39), fragile X (22)	Age of child was positively correlated with increased pessimism.
aA	Abbeduto (2004)	Mothers: autism (174), DS (39), fragile X (22)	Behavioral challenges were positively correlated with number of depressive symptoms.
aA	Abbeduto et al (2004)	Mothers: autism (174), DS (39), fragile X (22)	Mothers of a child with Down syndrome (DS) had less depressive symptoms than mothers of a child with autism or Fragile X.
aA	Abbeduto et al (2004)	Mothers: autism (174), DS (39), fragile X (22)	Behavioral challenges were positively correlated with increased pessimism
aA	Hastings (2003)	Parents (18 couples): autism	Stronger association between increase in child behavioral challenges and increase in mother's stress than father's stress.
aA	Hodapp, Ricci, Ly, and Fidler (2003)	Mothers: DS (27), heterogenious ID (15)	Mothers of children with DS reported their child as being more acceptable and reinforcing for the parent than did the mothers with children with a mixed eitiology DD
aA	Hodapp et. al (2003)	Mothers: DS (37)	Mothers who reported their children as more cheerful and outgoing also found their children more acceptable and reinforcing.

Table 1, cont.

Summary of recent articles examining factors of Double ABCX model as predictors of parent outcome

Factor	Study	Sample	Study findings
aA	Hodapp et. al (2003)	Mothers: DS (37)	More behavioral challenges and less communication correlated with higher score on PSI Child Stress.
aA	Mak and Ho (2007)	Chinese mothers: heterogenious ID (212)	Mothers of children with autism had less positive parenting perceptions than mixed ideology.
aA	Orsmond, Seltzer, Krauss, and Hong (2003)	Mothers: heterogenious ID (193)	Behavioral challenges of adult child contributed to and were increased by maternal pessimism (discussed as "well-being").
aA	Plant and Sanders (2007)	Mothers: heterogenious DD (105)	Increased difficulty in completing caregiving tasks, problem behaviors, and severity of disability were all significant predictors of increased stress.
aA	Ricci and Hodapp (2003)	Father: DS (20) and other DD (20)	Fathers of DS reported less stress than comparison sample of father.
aA	Ricci and Hodapp (2003)	Fathers: DS (30) and other DD (20)	Personality, increased age and increased maladaptive behaviors related to increases in stress.
aA	Saloviita, Italinna and Leinonen (2004)	Finnish mothers (118) and fathers (125): heterogenious ID	Factor aA accounted for 2% (mothers) and 8% (fathers) of total stress

Table 1, cont.

Summary of recent articles examining factors of Double ABCX model as predictors of parent outcome

Factor	Study	Sample	Study findings
aA	Saloviita et. al (2004)	Finnish mothers (118) and fathers (125): heterogenious ID	Increased behavioral challenges correlated with viewing situation more as a catastrophe.
bB	Abbeduto et al (2004)	Mothers: autism (174), DS (39), fragile X (22)	Lower levels of problem focused coping and higher levels of emotion focused coping predicted higher pessimism scores than mothers with inverse coping profile
bB	Abbeduto et al (2004)	Mothers: autism (174), DS (39), fragile X (22)	Higher maternal education correlated with less pessimism.
bB	Abbeduto et al (2004)	Mothers: autism (174), DS (39), fragile X (22)	Lower income correlated with increased depressive symptoms.
bB	Abbeduto et al (2004)	Mothers: autism (174), DS (39), fragile X (22)	Mothers with more than one child with a DD had greater number of depressive symptoms than those with one child with an DD.
bB	Duvdevany and Abboud (2003)	Arab Israeli: heterogenious ID (100)	More informal support correlated with lower marital and economic stress.
bB	Duvdevany and Abboud (2003)	Arab Israeli: heterogenious ID (100)	Broader social support (with both groups having low formal supports) correlated with higher well-being.
bB	Hastings (2003)	Parents (18 couples): autism	Maternal stress correlated with paternal anxiety and depression.

Table 1, cont.

Summary of recent articles examining factors of Double ABCX model as predictors of parent outcome

Factor	Study	Sample	Study findings
bB	Kim, Greenburg, Seltzer, Krauss (2003)	Mothers (246): heterogenious ID	Increase in emotion-focused coping vs problem-focus coping led to decrease in "well-being" (more depressive symptoms).
bB	Kim et. al 2003	Mothers (246): heterogenious ID	Increase in problem-focused coping led to reduction of distress and increase in quality of relationship with adult child.
bB	Mak and Ho (2007)	Chinese mothers: heterogenious ID (212)	Greater social support correlated with fewer negative perceptions.
bB	Mak and Ho (2007)	Chinese mothers: heterogenious ID (212)	Higher emotion-focused coping than problem-focused coping correlated with greater level of negative perceptions.
bB	Mak and Ho (2007)	Chinese mothers: heterogenious ID (212)	Higher family income correlated with higher levels of positive parenting perceptions.
bB	Mak and Ho (2007)	Chinese mothers: heterogenious ID (212)	Problem-focused coping and relationship-focused coping correlated with higher levels of positive parenting perceptions.
bB	Plant and Sanders (2007)	Mothers: heterogenious DD (105)	Partner support had moderating effect on severity of disability leading to stress.

Table 1, cont.

Summary of recent articles examining factors of Double ABCX model as predictors of parent outcome

Factor	Study	Sample	Study findings
bB	Plant and Sanders (2007)	Mothers: heterogenious DD (105)	Friend support had moderating effect on impact of difficult behaviors during caregiving tasks that led to stress.
bB	Plant and Sanders (2007)	Mothers: heterogenious DD (105)	Professional support had moderating effect on impact of total challenging behaviors during caregiving tasks that led to stress.
bB	Shin (2002)	heterogenious ID, American and Korean	American mothers had more informal and professional supports while Korean mothers had more stress.
bB	Saloviita et. al (2004)	Finnish mothers (118) and fathers (125): heterogenious ID	Factor bB accounted for 42% (mothers) and 33% (fathers) total stress.
bB	Saloviita et. al (2004)	Finnish mothers (118) and fathers (125): heterogenious ID	Increased family resources correlated with less stress.
bB	Saloviita et. al (2004)	Finnish mothers (118) and fathers (125): heterogenious ID	More negative coping strategies correlated with less stress.

Table 1, cont.

Summary of recent articles examining factors of Double ABCX model as predictors of parent outcome

Factor	Study	Sample	Study findings
cC	Mak and Ho (2007)	Chinese mothers: heterogenious ID (212)	Negative parenting perceptions correlated with increased stress.
cC	Plant and Sanders (2007)	Mothers: heterogenious DD (105)	cognitive appraisal of caregiving responsibilities had a mediating effect on relationship between severity of disability and stress
cC	Saloviita et. al (2004)	Finnish mothers (118) and fathers (125): heterogenious ID	Factor cC accounted for 29% (mothers) and 37% (fathers) total stress.
cC	Saloviita et. al (2004)	Finnish mothers (118) and fathers (125): heterogenious ID	Negative definition of situation was most important predictor of parental stress.
cC	Saloviita et. al (2004)	Finnish mothers (118) and fathers (125): heterogenious ID	Increased percieved social acceptance correlated with less likely to view situation as a catastrophe.

Table 3

Summary of selected articles using the Posttraumatic Growth Inventory (PTGI)

Year	Authors	Purpose	Sample	Sample size	Summary of relevant findings
2000	Calhoun, Cann, Tedeschi, and MacMillan	Examine the relationship between event related rumination, a quest orientation to religion and religious invovlement as related to PTG	Young adults prescreened for experience of a traumatic event	54	Degree of rumination just after event and degree of openness to religious change were sig. related to PTG
2001	Cordova, Cunningham, Carlson, and Andrykowski	Investigation into (1) differences in PTG between breast cancer survivors and healthy controls and (2) correlates with PTG	Two matched samples: breast cancer survivors (<5 years post-diagnosis, >2 months post-treatment) and healthy women	breast cancer survivors, n = 70; healthy women, n = 70	Groups did not differ in depression or well-being but breast cancer group showed sig. greater PTG, esp. in relating to others, appreciation of life and spiritual change. PTG for breast cancer group was unrelated to distress or well-being and sig. positively associated with perceived life threat, prior talking about BC, income and time since dx.
2001	Frazier, Conlon, and Glaser	Longitudinal study to investigate positive and negative psychological changes following sexual assault	Female sexual assault survivors assessed at 2 weeks, 2 months, 6 months and 1 year following the assault. Not all participants participated in all assessments.	171	Positive changes as measured on the PTGI were evident as soon as 2 wks following the assault, although largest increase in PTG seen between 2 wks and 2 mo. Some domains of PTG appeared more suddenly (empathy) while others took more time to emerge (recognizing strengths, sense of purpose). Those with least distress 12 mo. later are those who report higher than average levels of positive change at 2 wks

Table 3, cont.
Summary of selected articles using the Posttraumatic Growth Inventory (PTGI)

Year	Authors	Purpose	Sample	Sample size	Summary of relevant findings
2003	Cadell	Explore positive and negative psychological effects of providing care to an individual with HIV/AIDS	Canadian HIV/AIDS carers, 51.7% male, 46% female, 2.3% transgender. 44% of carers were themselves HIV positive.	167	No sig. diff. in scores between men and women. While 86.4% of sample exhibited symptoms of PTSD, 81.8% still indicated experiencing PTG.
2003	Lechner, Zakowski, Antoni, Greenhawt, Block, and Block	Explore relationship between sociodemographic and disease-related variables and PTG	Men and women with cancer, with all four stages of the disease represented	83	Younger age associated with greater PTG scores. PTG had curvilinear relationship with stages of cancer with Stage II having sig. higher PTG than Stage I or IV. Time since dx and treatment status were not sig. related to PTG.
2003	Lieberman, Golant, Glese-Davis, Winzlenberg, Benjamin, Humphreys, Krononwetter, Russo and, Spiegel	Examine impact of breast cancer electronic support group on clinical trial outcomes	Women with breast cancer	32	The data trended towards a sig. increase in two areas of PTG: new possiblities and spirituality
2003	Linley, Joseph, Cooper, Harris and Meyer	Examine the postive and negative psychological effects of vicarious exposure to the events of Sept. 11.	British citizens	108	Negative psychological changes were positively correlated with PTG. Those who viewed the terrorist attacks as an attack on their own beliefs were more likely to report PTG

Table 3, cont.

Summary of selected articles using the Posttraumatic Growth Inventory (PTGI)

Year	Authors	Purpose	Sample	Sample size	Summary of relevant findings
2003	Tashiro and Frazier	Investigate the prevalence and correlates of PTG and distress following the break up of a romatic relationship	Undergraduates who had experienced a break up in the past nine months	92	Those who attributed the break up to environmental factors reported more PTG. Time since break up unrelated to PTG.
2004	Manne, Babb, Pinover, Horwitz, and Ebbert	Investigate the effects of a 6-week psychoeducational intervention for wives of men with prostate cancer focusing on distress, copoing, personal growth, and marital communication	Two matched samples: wives of men with prostate cancer were randomly assigned to either an intervention group or control group	intervention, n = 29; control, n = 31	Wives in the intervention group scored higher in all five domains, with differences being sig. for all factors but New Possibilities (*p=.06)*
2004	Manne, Ostroff, Winkel, Goldstein, Fox, and Grana	Evaluate PTG among breast cancer survivors and their partners over 1.5 year time span after diagnosis to examine cognitive and emotional processes in PTG	Women with breast cancer and their partners	162 couples	PTG increased for both partners over time of study. Patient PTG predicted by younger age, contemplating reasons for cancer and more emotional expression at time 1. Partner PTG predicted by younger age, more intrusive thoughts, and greater use of positive reappraisal and emotional processing at time 1.
2004	Oh, Heflin, Meyerowitz, Desmond, Rowland and, Ganz	Investigate quality of life issues in breast cancer survivors after a recurrence	Two matched samples: women who have experienced a recurrence of breast cancer and women who have been treated for breast cancer and have remained cancer free	recurrance, n = 54; cancer free, n = 54	No sig. diff. in total PTGI scores between groups

Table 3, cont.
Summary of selected articles using the Posttraumatic Growth Inventory (PTGI)

Year	Authors	Purpose	Sample	Sample size	Summary of relevant findings
2004	Sheikh	Investigate role of personality, social support and coping in relation to PTG	Individuals in a cardiac rehabilitation program or cardiac support group	110	Extroversion most sig. predictor of PTG, with evidence that problem-focused coping partially mediated this relationship.
2004a	Weiss	Identify social context and event related correlates to PTG in husbands of breast cancer survivors	Husbands of breast cancer survivors	72	PTG was positively associated with general social support, greater marital support and depth of commitment, greater PTG in wife, shorter time since diagnosis and event meeting DSM-IV criteria as a traumatic stressor
2004 b	Weiss	Identify social context variables associated with personal growth among married breast cancer survivors	Early stage survivors of breast cancer	72	Perception of husband as supportive positively related to PTG. Women who reported contact with a breast cancer survivor reported more PTG. Level of education and time since diagnosis were inversely associated with PTG.
2005	Andrykowski, Bishop, Hahn, Cella, Beaumont, Brady, Horowitz, Sobocinski, Rizzo and, Wingard	Examine health related quality of life and growth, and spritual well being in adult survivors of a stem cell transplant for a malignant disease	Two matched samples: adult survivors of a stem cell transplant and healthy adults	transplant, n = 662; controls, n = 158	The survivor group reported sig. more growth on the PTGI than the comparison group

Table 3, cont.
Summary of selected articles using the Posttraumatic Growth Inventory (PTGI)

Year	Authors	Purpose	Sample	Sample size	Summary of relevant findings
2005	Bower, Meyerowitz, Desmond, Bernaards, Rowland and Ganz	Evaluate long term functioning of breast cancer survivors	Breast cancer survivors assessed longitudinally at 1-5 and 5-10 years postdiagnosis.	763	PTGI strongly associated with Positive Meaning Scale (*r* = .71), which was interpreted as a validation of use of PMS to measure of positive change
2005	Michael and Snyder	Examine the relationship between hope, bereavement-related rumination and finding meaning after the death of a loved one	College students who experienced the death of a loved one in the latter half of their life	158	Hope was not sig. related to PTGI
2005	Morris, Shakespeare-Finch, Rieck, and Newbery	Explore the multidimentionality of PTG in australian undergradautes	Australian undergraduates	219	Confirmed five factors for PTG. Trauma severity predicted PTG and positive correlation between PTG and negative post-trauma effects.
2005	Pargament, Magyar, Benore, and Mahoney	Examine the possibility that life events that are percieved to be sacred losses have sig. implications for health and well being	Adults randomly selected from community	117	Participants who reported experiencing a sacred loss predicted higher scores on the PTGI

Table 3, cont.
Summary of selected articles using the Posttraumatic Growth Inventory (PTGI)

Year	Authors	Purpose	Sample	Sample size	Summary of relevant findings
2005	Stanton, Ganz, Kwan, Meyerowitz, Bower, Krupnick, Rowland, Leedham, and Belin	Investigate the effectiveness of a psychoeducational program to help recent survivors of breast cancer adjust to their new post-cancer phase of life	Breast cancer patients 6-weeks post surgery randomly assigned to three conditions: (1) standard print material, (2) print material and peer modeling video, or (3) above materials plus two sessions with cancer educator and workbook	(1), n = 134; (2), n = 135; (3), n = 130	No sig. effects for intervention or perceived preparedness emerged on the PTGI at 6 or 12 mo.
2005	Thornton and Perez	Examine PTG in prostate cancer suvivors and their wives 12 mo. after surgury	Husbands who were 12 mo. post-surgery for prostate cancer and their wives	husbands, n = 82; wives, n = 67	One year after surgery, higher levels of PTG was associated, for survivors, with higher negative affect pre-surgery, using reframing as a coping strategy and emotional support were associated with higher levels of PTG 1 year after surgery. In spouses, associations were seen with marriage to an employed husband, less education and higher cancer-specific avoidance symptoms of stress pre-surgery and positive reframing.
2005	Updegraff and Marshall	Examine longitudinal predictors of percieved growth in survivors of community violence	Adults who experience physical injury as the result of community violence	258	PTG positively associated with situation-specific optimism, dispositional optimism, and initial symptoms of trauma related distress

Table 3, cont.
Summary of selected articles using the Posttraumatic Growth Inventory (PTGI)

Year	Authors	Purpose	Sample	Sample size	Summary of relevant findings
2005	Widows, Jacobsen, Booth-Jones, and Fields	Longitudinal study to investigate predictors of PTG among cancer patients undergoing bone marrow transplants	Patients undergoing bone marrow transplatation for cancer	72	Greater PTG was sig. related to younger age, less education, greater use of positive reinterpretation, problem solving and seeking alternative rewards as coping strategies in the pretransplant period, more stressful appraisal of aspects of the transplant experience and more negatively biased recall of pretransplant levels of distress.
2006	Chan, Lai, and Wong	Investigate the role of personal resilience on outcome measures in an 8-week rehabilitation program for coronary heart disease patients	Chinese coronary heart disease patients	67	Personal resilience was a sig. predictor of PTG.
2006	Low, Stanton, Thompson, Kwan, and Ganz	Examine role of life stress and coping strategies as predictors of adjustment to surviving breast cancer	Women who had recently completed treatment for breast cancer and were part of a psychoeducational intervention trial to ease transition to survivorship	time 1, n = 558; time 2, n = 417; time 3, n = 397	Contextual life stress not sig. correlated with change in adjustment in first year after breast cancer. Emotional approach coping, positive reframing, religious coping and problem focused coping all sig. related to higher PTGI scores.
2006	McGrath and Linley	Examine development of nature and degree of PTG in people with traumatic brain injury	Two matched samples: early post-brain injury (M=7 mo) and later post-brain injury (M=10 years)	early injury, n = 10; later injury, n = 11	Groups sig. diff. in degree of PTG, with later post-injury reporting more growth. Anxiety sig. associated with PTG.

Table 3, cont.
Summary of selected articles using the Posttraumatic Growth Inventory (PTGI)

Year	Authors	Purpose	Sample	Sample size	Summary of relevant findings
2006	Moskowitz and Epel	Explore associations among benefit finding (measured with the PTGI), daily positive and negative emotion and daily cortisol slope	Maternal caregivers	71	Cortisol slope not sig. associated with any of the PTGI subscales, positive or negative emotion. However, interactions of daily positve emotion and subscales of Personal Strength, Appreciation of Life and Spiritual Change were sig. in that higher scores on subscales predicted a steeper daily cortisol slope for women who also had higher positive emotion.
2006	Rabe, Zollner, Maerker, and Karl	Examine the relationship between frontal brain asymmetry and perception of PTG after a severe motor vehicle accident	Survivors of a motor vehicle accident	82	Increased relative left frontal activation was sig. related to increased PTG, even when controlling for dispositional positive affect.
2007	Dunigan, Carr, and Steel	Examine the relationship between PTG, immunity and survival in patients with hepatocellular carcinoma (HCC)	Patients with HCC	41	Participants who scored above the sample median for PTGI total survived an average of 186 days longer than those who scored below the median PTGI total. Patients with above median PTGI total scores also had higher peripheral blood leukocytes.
2007	Gall, Basque, Damasceno-Scott, and Vardy	Investigate the role of spirituality in current adjustment of adult survivors of childhood sexual abuse (CAS)	Survivors of CAS	101	A combination of demographics, abuse characteristics, person factors, and relationship with their God sig. predicts PTGI total score.

Table 12

Review of PTGI studies including sample means and bivariate correlations

Year	Authors	PTGI Mean (SD)	Description of Sample	Alpha	Bivariate Correlations
1996	Tedeschi and Calhoun	90.26 (NR): females, trauma reported 73.49 (NR): females, no trauma reported 73.61 (NR): males, trauma reported 66.13 (NR): males, no trauma reported	All participants were college undergraduates: 31 = females reporting 1 or more traumas in past year 31 = females reporting no trauma 23 = males reporting 1 or more traumas in past year 32 = males reporting no trauma (All score taken from construct validity study, which was a separate sample from original data used to create five factors.)	NR	NR
2000	Calhoun, et. al	76.5 (22.0)	54 = Young adults reporting on a trauma	NR	0.32 = ruminations after trauma 0.22 = openness to religion
2003	Lechner, et. al	75.33 (27.1)	83 = persons with cancer (all four stages)	0.95	-0.27** = age

Table 12, cont.

Review of PTGI studies including sample means and bivariate correlations

Year	Authors	PTGI Mean (SD)	Description of Sample	Alpha	Bivariate Correlations
1996	Tedeschi and Calhoun	75.18 (21.24): females 67.77 (22.07): males	*The five factors of PTG were identified with this sample.* All participants were undergraduates reporting a significant negative life event in the past 5 years: 405 = famales 199 = males	0.9	0.23** = optimism 0.25** = religious participation 0.29 ** = NEO extroversion 0.21** = NEO openness 0.18** = NEO agreeableness 0.16** = NEO conscientiousness
Current study	Ulman	66.97 (20.59)	211 = mothers of a child with a developmental disability	0.94	--
2005	Andrykowski, et. al	66.3 (21.1): transplant 57.5 (21.1): healthy controls	662 = stem cell transplant survivors 158 = healthy controls	NR	NR

Table 12, cont.
Review of PTGI studies including sample means and bivariate correlations

Year	Authors	PTGI Mean (SD)	Description of Sample	Alpha	Bivariate Correlations
2005	Widows et. al	64.67 (21.30)	72 = patients undergoing bone marrow transplantation for cancer	0.93	-0.23* = age -0.37*** = education 0.25* = coping - positive reappraisal 0.24* = coping - problem solving 0.23* = coping - seeking alternative rewards (used Coping Response Inventory: Moos, 1993)
2001	Cordova et. al	64.1 (24.8): BC survivors 56.3 (26.3): healthy controls	70 = Breast Cancer 70 = Healthy Controls	N	0.25 = talking about BC 0.27 = income 0.38 = perception of BC as a stressor 0.24 = time since diagnosis
2003	Cadell	61.46 (24.62)	167 = Canadian HIV/AIDS caregivers, exposed to multiple deaths	NR	NR
2006	Moskowitz and Epel	60.04 (20.66): mothers of "chronically ill" children 62.76 (26.83): mothers of healthy children	45 = mothers of "chronically ill" children including autism, GI difficulties and cerebral palsy 26 = mothers of healthy children	0.93	NR

Table 12, cont.
Review of PTGI studies including sample means and bivariate correlations

Year	Authors	PTGI Mean (SD)	Description of Sample	Alpha	Bivariate Correlations
2005	Thorton and Perez	59.67 (26.40): wives, no college education 43.27 (28.75): wives, college education 57.06 (28.02): wives of employed husbands 40.58 (26.94): wives of retired husbands 46.60 (25.56): husbands	82 = husbands, 12mo post surgery for prostate cancer 67 = wives of cancer survivors	0.90-0.96	-0.22* = husbands, emotional well being at presurgery -0.24* = wives, physical functioning -0.24* = wives, general health
2004a & b	Weiss	57.9 (24.5): married BC survivors 47.0 (22.9): husbands]	72 couples = women with breast cancer and husbands	0.95	0.24* = wives, marital support - 0.26* = wives, education -0.29* = wives, time since diagnosis 0.38*** = husbands, marital depth 0.24*** = husbands, marital support -0.24* = husbands, time since wife's dx 0.26.** = husbands, rating of cancer stressfulness 0.20* = correlation between wives and husbands scores

Table 12, cont.

Review of PTGI studies including sample means and bivariate correlations

Year	Authors	PTGI Mean (SD)	Description of Sample	Alpha	Bivariate Correlations
2005	Shakespeare-Finch et. al	54.64 (21.28): female officers 47.74 (21.45): male officers (sig. diff between groups)	526 = emergency response officials	NR	0.22*** = extroversion 0.44*** = coping (CCRWI: McCammon et. al, 1988) 0.22*** = openness 0.14*** = conscientiousness 0.14*** = agreeableness
2005	Morris et. al	51.97 (21.40)	219 = australian undergraduates	0.93	0.15* = avoidance 0.44*** = intrusive thoughts 0.37*** = hyperarousal 0.30*** = subjective trauma (interpreted as trauma severity)
2005	Stanton et. al	50.5 (25.9): group 1 49.3 (25.2): group 2 49.9 (25.5): group 3	All BC patients, 3 groups of different support types 134 = group 1: standard print material 135 = group 2: above, plus peer modeling video 130= group 3: above, plus 2 session with cancer educator and workbook	NR	NR

Table 12, cont.
Review of PTGI studies including sample means and bivariate correlations

Year	Authors	PTGI Mean (SD)	Description of Sample	Alpha	Bivariate Correlations
2006	Low et. al	50.09 - 53.45 (25.19 - 25.46)	women post treatment for breast cancer at three time points 558 = T1 417 = T2 397 = T3	0.96	0.23* (T1), 0.23* (T2), 0.23* (T3) = coping - emotional approach 0.19* (T1), 0.22* (T2), 0.22* (T3) = coping - problem focused 0.35* (T1), 0.35* (T2), 0.35* (T3) = coping - positive reframing 0.28* (T1), 0.32* (T2), 0.28* (T3) = coping - religious coping (COPE: Conner-Smith et. al, 2000)
2004	Manne et. al	49.0 (25.7): T1, wives with BC 53.7 (24.0): T3, wives with BC 52.8 (25.5): T2, wives with BC 33.8 (22.3): T1, husbands 40.9 (26.9): T2, husbands 39.7 (25.9): T3, husbands	162 couples = women with breast cancer and husbands, 3 time points: 9 mo apart	0.91-0.97	NR

2004	Oh et. al	47.8 (27.1): cancer reocurrance	54 = women with breast cancer reoccurance	NR	NR
		42.9 (29.0): cancer free	54 = women with breast cancer, cancer free		

Table 12, cont.

Review of PTGI studies including sample means and bivariate correlations

Year	Authors	PTGI Mean (SD)	Description of Sample	Alpha	Bivariate Correlations
2006	Linley and Joseph	39.88 (27.79)	56 = Disaster workings, 2 time points: BL and 6 mo	0.96	0.43** = subjective appraisal (T1) 0.37* = subjective appraisal (T1) 0.41** = frequency of intrusions (T1) 0.55** = approach/acceptance of death (T2)
2006	Rabe et. al	37.88 (16.88)	82 = survivors of car accident, at least 6 mo. post trauma	0.92	0.29** = fronto-central asymmetry of cortex
2003	Pargament et. al	35.3 (19.66)	117 = randomly selected adults asked to reflect on most significant personal even in past 2 yrs.	NR	NR

2005	Updegraff and Marshall	33.70 (8.85)	258 = adult survivors of violence in community, assessed (T1), just after trauma and (T2), 3 mo. Post trauma. PTGI adm. at T2 only	0.86	0.16* = T1, trauma severity 0.34** = T1, situational optimism 0.21* = T1, dispositional optimism 0.28** = T1, PTSD symptoms 0.40** = T2, situational optimism 0.25** = T2, dispositional optimism 0.25** = T2, PTSD symptoms
2003	Linley et. al	11.93 (14.69)	108 = British citizens just following events of Sept. 11, 2001	0.95	NR

Table 12, cont.

Review of PTGI studies including sample means and bivariate correlations

Year	Authors	PTGI Mean (SD)	Description of Sample	Alpha	Bivariate Correlations
2003	Tashiro and Frazier	NR	92 = undergraduates experiencing recent break up	0.89	0.34*** = combined attributions 0.25* = extroversion
2005	Michael and Snyder	NR	158 = college students who experienced death of loved one	0.91	0.31*** = rumination

*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$

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