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| Abstract: | Autistic individuals and their families are at risk for poor outcomes in employment and mental health and may be vulnerable to long-term effects of broader societal conditions. The aim of the current longitudinal study was to understand the impact of the Great Recession of 2007-2009 on autistic individuals and their mothers (N=392). Hierarchical Linear Modeling (HLM) results indicated that problem behavior of autistic adults increased in the years following the Recession. The rate at which autistic individuals moved away and lived separately from their mothers also slowed during the Recession. Mothers had experienced significantly higher levels of depressive symptoms post-Recession, compared to pre-Recession. In many other respects, the autistic individuals and their mothers did not experience negative outcomes, suggesting resilience and a strong safety net. These included the physical health and vocational/employment status of the autistic adults and their mothers. Results point to specific areas of vulnerability of autistic individuals and their mothers during the economic downturn, as well as a broad pattern of resilience in these families. | | | | | |

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Abstract

Autistic individuals and their families are at risk for poor outcomes in employment and mental health and may be vulnerable to long-term effects of broader societal conditions. The aim of the current longitudinal study was to understand the impact of the Great Recession of 2007-2009 on autistic individuals and their mothers (N=392). Hierarchical Linear Modeling (HLM) results indicated that problem behavior of autistic adults increased in the years following the Recession. The rate at which autistic individuals moved away and lived separately from their mothers also slowed during the Recession. Mothers had experienced significantly higher levels of depressive symptoms post-Recession, compared to pre-Recession. In many other respects, the autistic individuals and their mothers did not experience negative outcomes, suggesting resilience and a strong safety net. These included the physical health and vocational/employment status of the autistic adults and their mothers. Results point to specific areas of vulnerability of autistic individuals and their mothers during the economic downturn, as well as a broad pattern of resilience in these families.

Key words: Autism Spectrum Disorder, mothers, problem behavior, depressive symptoms, residential status, Recession

Impact of The Great Recession on Autistic Adults and their Mothers

Introduction

People with developmental disabilities and their families face significant financial, physical, and mental health risks as they age. Autistic individuals (see Dwyer, 2022), in particular, have an increased risk of disengagement from educational/vocational activities (Bury et al., 2021; Lord et al., 2020; Scott et al., 2019) and mental health problems (Bishop-Fitzpatrick & Rubenstein, 2019; Taylor & Gotham, 2016). Importantly, studies have shown that individuals with a developmental disability are more likely to be unemployed than their peers without such conditions, especially in an unstable economy, which in turn, increases their family's financial responsibility (Mojtabai et al., 2015; Stabile & Allin, 2012). The aim of the present study was to understand the impact of the Great Recession of 2007-2009, a significant economic disruption, on autistic individuals and their mothers.

Research has established that parents whose son or daughter has a developmental disability have an elevated risk of mental health and chronic medical conditions compared with parents of children without such conditions (Scherer et al., 2019; Seltzer et al., 2009; Seltzer, Floyd, et al., 2011). Parents of autistic children, in particular, report increased levels of parenting stress (Estes et al., 2013; Hayes & Watson, 2013; Pisula & Porębowicz-Dörsmann, 2017; Valicenti-Mcdermott et al., 2015) and depressive symptoms (Cohrs & Leslie, 2017; Hartley et al., 2012; Ingersoll & Hambrick, 2011) compared to other parents of typically developing children and children with other types of neurodevelopmental disorders.

Parents of individuals with disabilities can experience unique challenges to their mental health and finances. For example, parents – especially mothers – who have a son or daughter with a disability often give up paid work, and/or work fewer hours in order to accommodate their

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child's needs (Cidav et al., 2012; Einam & Cuskelly, 2002; Hodgetts et al., 2013). Parents of autistic individuals may be particularly impacted. One study showed that 78% of mothers who had an autistic son or daughter indicated that the child's condition had an impact on their employment (Hodgetts et al., 2013).

The Great Recession spanned 22 months from December 2007 through September 2009 (Elmendorf, 2009; Fogg & Harrington, 2009). Individuals and families in the United States experienced substantial negative impacts following the Great Recession, which created massive payroll and employment losses, totaling 8.1 million jobs lost. By December 2009, the unemployment rate had risen to 10.0% (15 million U.S. residents), about twice the pre-Recession rate (Hipple, 2010). By the end of 2011, about a quarter of U.S. households had a negative net worth. Families lost assets, reduced their spending, and increased their debt (Hurd & Rohwedder, 2010). The impact of the Recession on family life extended beyond finances. Young adults, for example, were more likely to live with their parents during the Great Recession (Logan et al., 2012) and parental mental health consequently suffered; parents with a newly co-residing adult children (Caputo, 2019). Other studies also noted pervasive negative effects on mental and physical health and well-being during the Recession (Burgard & Kalousova, 2015; Glonti et al., 2015).

Yet little is known about how the Recession specifically impacted autistic individuals and their parents, who already show vulnerability and risk for negative outcomes in employment and mental health, and thus may be at increased risk for potential long-term effects of broader financial shifts. Studies have suggested that financial losses due to the Recession were risk factors for depression and health problems for adults without disabilities (Burgard & Kalousova, 2015; Pruchno et al., 2017; Wilkinson, 2016). For autistic individuals and their families, impacts from the Recession may further amplify pre-existing health and financial issues over time. Understanding the impact of the Recession on autistic individuals and their families may help to pinpoint areas of vulnerability and resilience in this population during other disruptive societal events.

The current study investigated the impacts of the Great Recession on autistic individuals and their mothers. Specifically, we determined whether the Recession impacted the physical health, problem behavior, vocational independence, and current residential status of a sample of autistic individuals, and the physical health, depressive symptoms, and employment status of their mothers. Using data from an ongoing longitudinal study, we leveraged four data collection points that were obtained prior to the Recession and four post-Recession data collection points in order to determine Recession-related impacts on autistic individuals and their mothers.

Method

Sample and Procedure

The current analysis was conducted using data from a larger longitudinal study of families of adolescents and autistic adults (N = 406; Seltzer et al., 2011). When the study began, participants lived in Wisconsin (n = 202) or Massachusetts (n = 204). Identical recruitment and data-collection methods were used at both sites. Data collection for the larger longitudinal study is ongoing; the current research project used all four pre-Recession data points, balanced with an equal number of data points (4) available after the Recession. The present analyses thus used eight waves of data collection (referred to in this report as Time 1 through Time 8 (1994-2014); see Table 2 for the timing of each wave). At each time point, data were collected from the primary caregiver, who was almost always the mother (96% at Time 1), via in-home interviews

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that typically lasted 2–3 hours, and via self-administered questionnaires. For the current analyses, we used data from mothers only (n=392). In cases where the mother was no longer able to provide data and thus there was a change in reporter to another person (i.e., another family member), we only used data from the time points when the mother was the reporter.

Inclusion criteria for the larger study were that the autistic individual was aged 10 or older (age range = 10–52 at the beginning of the study; 23-65 at the start of the Recession in 2007), had received an autism diagnosis (autistic disorder, Asperger disorder, or pervasive developmental disorder-not otherwise specified) from an educational or health professional, and had a researcher-administered Autism Diagnostic Interview-Revised (ADI-R; Lord et al., 1994) profile consistent with the diagnosis. Nearly all of the adolescents and adults in the sample (94.6%) met the ADI-R lifetime criteria for a diagnosis of autistic disorder. Based on a case-by-case review of the other 5.4%, the research team determined that all ADI-R profiles were consistent with the individual's autism diagnosis (i.e., meeting the cutoffs for reciprocal social interaction and repetitive behaviors for Asperger disorder, and for reciprocal social interaction and either impaired communication or repetitive behaviors for PDD-NOS; see Kring et al., 2008).

The autistic individuals averaged 21.9 years of age (SD = 9.4) at Time 1. Approximately three-fourths (73.2%) were male. Just over two-thirds (70.6%) had a co-occurring intellectual disability based on well-accepted IQ and adaptive behavior criteria (American Association on Intellectual and Developmental Disabilities, 2010).

At Time 1, mothers ranged in age from 32.3 to 81.9 years (M = 51.2, SD = 10.4) and 92.6% were White/Caucasian. Just over one-half (54.9%) of mothers in the sample did not have a post-secondary degree (Associate's or Bachelor's degree) at Time 1. Three-fourths were

married at Time 1 (75.9%). The median household income of the sample was between \$50,000 and \$60,000 at Time 1, with 11.5% of families having an annual household income below \$20,000 per year (the US Poverty Line for a family of four at that time [2000] was \$17,050 [U.S. Department of Health and Human Services, 2022], and 32.4% having annual household incomes of \$70,000 or above (in 1998 dollars).

Measures

Outcome Variables: Autistic Individuals

Physical Health. Mothers reported on their son or daughter's physical health by responding to the following question: "In general, would you say your son/daughter's physical health is excellent, good, fair, or poor?" at all eight times of measurement (1 = poor to 4 = excellent). Physical health ratings have been previously shown to be valid assessments of morbidity and predictive of mortality across a variety of populations (Idler & Benyamini, 1997; Mora et al., 2008), even after controlling for known risk factors such as sociodemographic characteristics, chronic health conditions, and health practices. Research has also shown that physical health ratings in autism populations are sensitive to change over time (Lounds et al., 2007).

Problem Behavior. Mothers completed the Behavior Problems subscale of the Scales of Independent Behaviors-Revised (SIB-R; Bruininks et al., 1996) at all eight times of measurement. This subscale measures problem behavior, grouped in three domains: internalized behaviors (hurtful to self, unusual or repetitive habits, withdrawal or inattentive behavior), externalized behaviors (hurtful to others, destructive to property, disruptive behavior), and asocial behaviors (socially offensive behavior, uncooperative behavior) (Bruininks et al., 1996). Mothers who indicated that their son or daughter displayed a given problem behavior during the past 6 months then rated the frequency (1 = less than once a month to 5 = 1 or more times/hour)and the severity (1 = not serious to 5 = extremely serious) of the behavior. Standardized algorithms (Bruininks et al., 1996) translate the frequency and severity ratings into normreferenced (normative mean of 100, SD = 15) subscale scores and an overall problem behavior score. The overall problem behavior score at each time point was used in the present analyses. Scores range from 0 to 170, with higher scores indicating more severe problem behavior (Bruininks et al., 1996). Reliability and validity of this measure have been established (Bruininks et al., 1996). This measure has also shown sensitivity to change (Smith et al., 2016; Woodman et al., 2015).

Vocational Independence. The Vocational Index (Taylor & Seltzer, 2012) was used to categorize the vocational and post-secondary educational activities of the autistic individuals at each of the eight time points of data collection. Index score coding was completed for time points after the individual had exited high school (i.e., individuals did not contribute vocational independence data to analyses prior to exiting high school). Interrater reliability on Vocational Index coding for the data presented in this paper was greater than or equal to .90 across time points. A full description of the development of the Vocational Index, including detailed coding rules, complete category descriptions, and information about reliability can be found in Taylor & Seltzer (2012). This index is composed of nine ordered, mutually-exclusive categories, ranked on a scale from 1 (no vocational/educational activities) to 9 (degree-seeking education program or employment in the community without supports greater than 10 hours a week). Ordering of categories reflects the independence necessary to achieve a vocational/educational activity, as well as whether the individual participated in activities for more than a minimal amount of time

(i.e., more than 10 hours a week). This measure has also been shown to be sensitive to change (Taylor & Mailick, 2014).

Current Residential Status. Mothers reported on the residential status of their son or daughter at each time point (0 = Co-residing with mother and $1 = Not \ co$ -residing).

Outcome Variables: Mother

Physical Health Rating. Mothers reported on their own physical health at each time point. Mothers' physical health was assessed by a single question asking, "In general, would you say your physical health is excellent, good, fair, or poor?" (1 = poor to 4 = excellent).

Depressive Symptoms. Mothers rated their depressive symptoms as measured by the Center for Epidemiological Studies–Depression Scale (CES-D; Radloff, 1977) at each time point. This measure has been used extensively in adult samples (Cosco et al., 2020; Gatz & Hurwicz, 1990) and has demonstrated sensitivity to change in samples of mothers of individuals with developmental disabilities (Namkung et al., 2018). For each of 20 depressive symptoms, mothers were asked to indicate how many days in the past week each symptom was experienced from 0 = never to 3 = 5 to 7 days. Scores range from 0 to 60, with higher scores indicating higher levels of depressive symptoms, and a score of 16 or higher indicating clinical levels of depressive symptoms (Weissman et al., 1977). The mean Cronbach's alpha across time points in the current sample was .81.

Employment Status. Mothers reported on their own employment at each time point (0 = *Not employed*, 1 = *Employed seasonally* or *part-time*, and 2 = *Employed full-time*).

Covariates

Age. The age of the autistic individual was calculated from date of birth to the date of data collection at each time point of data collection.

Intellectual disability. Intellectual disability status (0 = no intellectual disability, 1 = intellectual disability) was determined using a variety of sources. Individuals with standard scores of 70 or below on the Wide Range Intelligence Test (WRIT; Glutting et al., 2000) and the Vineland Screener (Sparrow et al., 1993) were classified as having intellectual disability, consistent with diagnostic guidelines (Luckasson et al., 2002). When the autistic individual scored above 70 on either measure or when either of the measures for the person was missing, a review of medical and psychological records by three psychologists, combined with a clinical consensus procedure, was used to determine intellectual disability.

Data Analysis

Multilevel modeling, using the Hierarchical Linear Modeling program (HLM; Raudenbush & Bryk, 2002), was used to examine change in outcomes over time. Multilevel modeling has the unique advantage of its ability to flexibly handle missing data. Using maximum likelihood estimation techniques, as long as one occasion of measurement is available, data from an individual can be used in the estimation of effects. Individuals who have more data points consequently yield more reliable estimates, and are weighted more heavily in the group mean estimates than those for individuals who have fewer time points (Bryk & Raudenbush, 1987; Francis et al., 1991). This method uses all available time points for participants and thereby reduces potential bias (Raudenbush & Bryk, 2002; Singer & Willett, 2003).

We considered the first four time points of data, collected between October 1998 and February 2005 the "pre-Recession" period, and the final four time points of data, collected between October 2007 and May 2014 the "post-Recession" period. In order to estimate the change at the time of Recession as well as change in slope from pre- to post-Recession, an unconditional discontinuous piecewise linear growth model was fit for each of the outcome variables. Due to the unequal spacing between time points, a Time variable was defined to conform to the elapsed amount of time (in years) within the pre- and post-Recession periods in relation to the onset of the Recession, which corresponded to the start of the fifth time interval (Time 1 = -8.83, Time 2 = -7.25, Time 3 = -5.54, Time 4 = -3.63, Time 5 = 0, Time 6 = 1.67, Time 7 = 3.83, Time 8 = 5.63). The models resulted in separate estimates of pre-Recession and post-Recession intercepts as well as separate pre-Recession and post-Recession slopes of the outcome variables; the difference between intercepts can be interpreted as the discontinuous change in outcome at the time of Recession, while the difference in slopes characterizes the difference in the rate of change per unit of time post-Recession versus pre-Recession. The models were also estimated controlling for subject-level covariates. Based on preliminary analysis, we included the covariates that were most likely to account for change in the outcomes, age of the autistic individual at Time 1 and intellectual disability status. We did not time vary age because it would confound with the Time variable. We also only accounted for the age of the autistic individual, not the mother, as those variables are highly correlated (r = .86, p < .001).

The current data analysis approach is desirable because it uses a within-person analysis which allows for measurement of individual differences in change. In other words, individuals served as their own controls for comparisons before versus after the Recession which implies a control of other within-person characteristics (Bliese & Lang, 2016). In addition, this analysis implicitly places more weight on Time 4 and Time 6 as the immediate pre-Recession and post-Recession time points, and as the most powerful indicators of discontinuous change (i.e., "jump"; Pennerstorfer, Reitzinger, & Schneider, 2020; Simonton, 1977), while simultaneously using the other time points to measure and account for the change that may have already been occurring up until the Recession (i.e., Time 1-4). This approach provides a better opportunity to

determine whether what was observed after the Recession was a change likely due to the Recession as opposed to a continuing trend from prior to the Recession (Bliese & Lang, 2016). This was done using expected means and slopes and comparing them to the actual data at post-Recession time points. For example, multiple studies suggest that problem behavior declines (i.e., improve) across adolescence and adulthood (e.g., Lord, Bishop, & Anderson, 2015; Shattuck et al., 2007). Accounting for pre-Recession and post-Recession trajectories will allow us to determine if any change we might observe in problem behavior from T4 to T6 is greater in magnitude than what we might expect given that person's general developmental trajectory.

Results

Table 1 displays the means and standard deviations for all outcomes of interest in the current analyses at each time point. As shown in Table 1, the level of the physical health status of the autistic individuals at Time 1 was between "good" (3) and "excellent" (4), whereas the level of the mother's physical health status was between "fair" (2) and "good" (3). Problem behavior (as measured on the SIB-R) of the autistic individuals averaged 115.63 at Time 1 (clinical cut-off = 110; Bruininks et al., 1996). Mothers' depressive symptoms (as measured by the CES-D) averaged 12.60 at Time 1 (clinical cut-off = 16; Weissman et al., 1977). The Vocational Index averaged 4.55, corresponding to vocational activities between "Agency-based vocational setting and volunteering in the community – total activities greater than 10 hours a week" (4) and "Agency-based vocational setting and supported community employment – total activities greater than 10 hours a week" (5) at Time 1 (Taylor & Seltzer, 2012). About 35% of the autistic individuals were residing at home and 66% of mothers were employed part- or full-time at Time 1.

Recession Impacts on Autistic Individuals

[Insert Table 1]

Results examining the discontinuous change of each outcome at the time of Recession, reflecting the average impact of the Recession on the physical health, problem behavior, vocational independence, and residential status of the autistic individual are presented in Table 2. Hypothesis testing within the growth models examined the discontinuous change in trajectories (the "jump"; Pennerstorfer, Reitzinger, & Schneider, 2020; Simonton, 1977) at the time of Recession for each outcome as well as the impact of the Recession on *slope trajectories* of each of these outcomes, comparing pre-Recession (Time 1-4) to post-Recession time period slopes (Time 5-8). The age of the autistic individual and their intellectual disability status at Time 1 of the study were added as covariate controls and are also included in the Table 2.

[Insert Table 2]

The problem behavior model revealed a significant change in the level of problem behavior of autistic individuals when comparing pre-Recession to post-Recession periods. Specifically, the average linear trajectory of problem behavior from baseline up until the Recession was significantly decreasing (i.e., becoming less severe; see Table 2). At the time of Recession, there was a significant discontinuous change in problem behavior (p = .044), after which the average trajectory following the Recession was no longer significantly changing. The pre- and post-Recession estimated means and slope lines for problem behavior over time are displayed in Figure 1.

[Insert Figure 1]

Taken together these findings indicate a significant increase in problem behavior at the time of the Recession as well as significant change in the direction and the magnitude of problem

behavior (i.e., "slope") in the years following the Recession such that problem behavior was no longer decreasing over time (p < .001).

Although there was no significant change in the residential status of the autistic individual (co-residing vs. not co-residing with mother) from pre- to post-Recession, there was a statistically significant difference in the rate of change (p = .030). Specifically, the average trajectory leading up to the Recession was significantly increasing (i.e., the number of adults not co-residing was increasing over time), but following the Recession the slope was no longer statistically significant (see Table 2), indicating that the proportion of autistic adults not coresiding with their mother remained stable over time post-Recession. Figure 2 illustrates the significant change in the slope.

[Insert Figure 2]

For the autistic individuals, there were no statistically significant changes in the level of physical health status or vocational independence from pre- to post-Recession. There were also no statistically significant changes in the slopes of the trajectories of physical health or vocational independence from before to after the Recession.

Recession Impacts on Mothers of Autistic Individuals

Results examining the change for mothers for each outcome (physical health, depressive symptoms, and employment status) from the pre- to post-Recession period are shown in Table 2. The average linear trajectory of depressive symptoms prior to the Recession (Time 1-4) was stable. At the time of Recession, there was a significant increase, on average, in mothers' depressive symptoms (p = .036). However, there was no statistically significant change in the slope trajectory of depressive symptoms from before to after the Recession. The pre- and post-

Recession estimated means and slopes over time for mothers' depressive symptoms are displayed in Figure 3.

[Insert Figure 3]

There were no statistically significant changes in the average pre- to post-Recession physical health status or employment status for mothers. There were also no statistically significant changes in the slope trajectories of maternal physical health, depressive symptoms, or employment status from before to after the Recession.

Discussion

The current study examined the impact of the 2007-2009 Great Recession on autistic individuals and their mothers. Results showed significant changes in problem behavior and residential status of the autistic individuals. The observed decreases in overall problem behavior in the years leading up to the Recession were in line with past research regarding overall trends across adulthood which consistently show declines in severity of problem behavior for autistic individuals, especially in adulthood (e.g., Woodman et al., 2015). However, there was a significant increase in problem behavior immediately following the Recession. In addition, in the years following the Recession, problem behavior stopped improving. This change in trajectory is particularly salient, considering that due to this change, the autistic adults did not drop below the threshold of sub-clinical levels of problem behavior, which would have been likely to occur if the pre-Recession trend had been maintained (see Figure 1). This finding has potential implications for service provision during major economic events, such as during the current COVID-19 pandemic. Previous research suggests that under stable conditions, problem behavior in adolescents and adults with disabilities such as autism tend to improve over time, but when there is instability - be it at a more micro level (e.g., leaving high school [Taylor & Seltzer,

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2010]) or more macro-level (e.g., Recession) – those trends in improvement are difficult to sustain. It is possible that autistic individuals may be similarly experiencing interruptions in progress they had been making leading up to the COVID-19 pandemic. Thus, it is important to provide and perhaps re-evaluate the needs of autistic individuals for behavioral supports during these challenging time periods and in the years that follow.

Previous research has documented that as autistic individuals age, they are more likely to live separately from their parents (Scheeren et al., 2022). Our data was in line with these previous findings in the years prior to the Recession, with the proportion of the sample *not* coresiding with mothers increasing over time. However, after the Recession, the trajectory significantly changed and suggested that the proportion of autistic adults not co-residing with their mother remained stable. In the general population, young adults were more likely to move back and live with their parents during the Great Recession (Logan et al., 2012), but this was not the trend in the present sample of autistic adults. Rather "launching" (i.e., moving out) was happening at a slower rate. This finding has important implications for supports for autistic individuals during national crises.

Results also showed that mothers experienced greater depressive symptoms following the Recession. This is consistent with previous Recession research in the general population, in which parental mental health suffered during the time period following the Recession. In a study in the general population, parents with a newly co-residing adult child following the Recession experienced more of an increase in depressive symptoms relative to their peers without co-residing adult children (Caputo, 2019). While results from the current sample may reflect slowed "launching" rather than newly co-residing adults, our results suggest similar impacts on parental

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depressive symptoms. This finding suggests that services should target the family system as well as autistic youth and adults.

On the other hand, we did not see significant effects on mothers' employment or the vocational independence of the autistic adults. Mothers who have a son or daughter with a disability often give up paid work to accommodate their child's needs or opt for positions that allow them to work fewer hours (Cidav et al., 2012; Einam & Cuskelly, 2002; Hodgetts et al., 2013), a process that may have preceded the Recession. In a study that compared Recession impacts on parents whose son or daughter had a mental health problem as compared to parents whose son or daughter had a developmental disability, there were differences in the impacts on each disability group. Specifically, job loss was more common among parents whose son or daughter had a mental health problem, as well as increase of credit card debt, and exhaustion of unemployment benefits, whereas missing a mortgage or rent payment, and moving in with family/friends to save money – *but not job loss* – were more prevalent among parents whose son or daughter had a developmental disability (Song et al., 2018). This important difference in specific Recession impacts are in line with the current findings that mother employment was not impacted by the Recession and should be explored further.

Unexpectedly, we did not see differences in vocational independence before compared to after the Recession for the autistic adults. Autistic individuals are more likely than their same-aged peers to be in agency-based work settings rather than competitive employment. Thus, it is possible that they were uniquely protected from the impacts of the Recession when it came to vocational attainment. These findings highlight potential areas of resilience for autistic adults and their mothers during times of societal change. It appears that the social safety net – at least in terms of vocational activities – performed its function. We also did not observe any statistically

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significant Recession-related changes in the physical health of autistic individuals or their mothers. Although research has found overall health impacts during and following the Recession in the general population (see Margerison-Zilko et al., 2016 for a review), many studies reported more consistent and pronounced impacts on *mental* health, in line with our finding on autistic adult problem behavior and maternal depressive symptom impacts. Additionally, health impacts were stronger among men and racial/ethnic minorities (Margerison-Zilko et al., 2016). As our sample was predominantly White/Caucasian, non-Hispanic and involved mothers of autistic individuals, our null effects here may be related to our sample. Future research should consider involving fathers in such investigations.

The findings of the present study suggest two overall longitudinal patterns. First, there is *declining well-being* in terms of adult problem behavior and mother's depressive symptoms following the Recession. Autistic adults and their mothers are already vulnerable and disadvantaged relative to peers, so any additional decline is particularly important to note. Further, the Recession shifted the trajectory of problem behavior, disrupting the overall pattern of gradual improvement (i.e., decreasing problem behavior) for autistic adults. This pattern of results suggests perhaps that the impacts of the Recession on mental health might outlast the duration of the economic Recession, particularly for autistic adults. On the other hand, a second pattern of results for other outcomes is *stability* from before to after the Recession, suggesting that there is a safety net for autistic adults provided by the service system and by their families. Although we found a statistically significant reduction in the rate of change in residing in the family home from before to after the recession, the absence of a larger Recession effect on residential status could suggest that families provided a safety net in the form of housing supports that otherwise would have resulted in larger changes.

The current study is not without limitations. The present analyses separated each outcome to determine its unique changes over time. Separate models did not allow us to control for other outcomes within each model or to look deeper into relationships between outcomes over time. For example, we are unable to evaluate whether one change in outcome causally contributed to a change in other outcomes. A cross-lagged panel design with select outcomes would be necessary to determine these pathways of change. Future studies could additionally expand the conceptual model further by incorporating additional predictors of specific outcomes (e.g., social support resources). It is also important to note the limited ethnic and racial diversity of the sample. However, there was socioeconomic diversity which may be more sensitive to aspects of the Recession. Specifically, at Time 1, the median annual household income of the sample was in the range of \$50-60K, with 11.5% of families earning less than \$20k/year (near to the US poverty line of \$17,050 that year for a family of 4). Further 54.9% of mothers in the sample did not have a college degree at Time 1. Although there was documented socioeconomic and educational diversity, the sample was predominately white, limiting the external validity of the results.

Notwithstanding these limitations, the current study contributes to the understanding of the impact that the Great Recession had on families of autistic individuals. The current analyses used a within-person repeated measures approach utilizing multiple waves of data within preand post-Recession eras. Further, accounting for existing trends leading up to the Recession allowed for an examination of discontinuous change that could more likely be attributed to the Recession, or deviation from the expected trend for each individual, above and beyond what may have naturally occurred without the Recession. Importantly, as shown in Table 2, the effect of age was controlled, which is critically important in a longitudinal study that extends as long as the present one. Thus, the effects are above and beyond ongoing aging trends. In addition, the effect of ID status was controlled, which also is important given the heterogeneity of autistic individuals who may have different life course trajectories if they have ID or have average intellectual functioning.

The results have a number of important implications for improving the emotional wellbeing of autistic individuals and fostering the resiliency of their families. Results suggest that it is critically important to provide a service safety net for families and autistic adults during difficult societal periods. These findings are of special importance now in the period since the beginning of the COVID-19 pandemic, in which autistic individuals have been particularly vulnerable to stress and impacts on their daily living activities and community participation (Adams et al., 2021; Pfeiffer et al., 2021). Similar as the Great Recession, the pandemic has significantly worsened society-wide inequalities and could result in cumulative problems/disadvantages in employment and mental health for autistic individuals and their families. Overall, our results suggest that autistic individuals and their families may be at risk for long-term impacts, particularly for problem behavior and mental health, for many years after a major economic event and point to the need for comprehensive services. Our results also point to sources of protection and resilience for autistic adults and their mothers, particularly in physical health and vocational activities/employment.

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| Time point | Time 1 | Time 2 | Time 3 | Time 4 | Time 5Time 6Time 7 | | Time 8 | | |
|---|----------------|----------------|----------------|----------------|--------------------|---------------|----------------|---------------|--|
| Time period/dates | 10/98-4/00 | 6/00-10/01 | 5/02-3/03 | 1/04-2/05 | 10/07-10/08 | 5/09-7/10 | 7/11-7/12 | 6/13-5/14 | |
| Sample size | n=392 | n=342 | n=325 | n=281 | n=240 | n=235 | n=225 | n=177 | |
| Autistic Individuals | M (SD) | M (SD) | M (SD) | M (SD) | |
| Physical health status | 3.19 (0.74) | 3.25 (0.67) | 3.21 (0.69) | 3.13 (0.66) | 3.11 (0.73) | 3.16 (0.74) | 3.05 (0.75) | 3.09 (0.72) | |
| Problem behavior (SIB- R) | 115.63 (11.31) | 112.98 (10.19) | 113.14 (10.56) | 111.52 (10.37) | 110.69 (9.75) | 110.01 (9.26) | 111.35 (10.16) | 110.76 (9.37) | |
| Vocational | 4.55 (2.23) | 4.81 (2.19) | 4.79 (2.28) | 4.89 (2.48) | 4.81 (2.49) | 4.93 (2.45) | 4.82 (2.40) | 4.99 (2.52) | |
| Independence | | | | | | | | | |
| Current residential status | 0.35 (0.48) | 0.38 (0.49) | 0.41 (0.49) | 0.46 (0.50) | 0.56 (0.50) | 0.52 (0.50) | 0.53 (0.50) | 0.55 (0.50) | |
| Mothers | M (SD) | M (SD) | M (SD) | M (SD) | |
| Physical health status | 2.92 (0.72) | 2.87 (0.69) | 2.86 (0.70) | 2.89 (0.71) | 2.89 (0.69) | 2.85 (0.75) | 2.74 (0.78) | 2.88 (.73) | |
| Depressive Symptoms | 12.60 (9.99) | 12.14 (9.53) | 12.33 (9.98) | 12.19 (10.17) | 13.12 (11.01) | 13.75 (10.74) | 13.21 (11.34) | 12.35 (10.41) | |
| (CES-D) | | | | | | | | | |
| Employment status n (%) | | | | | | | | | |
| Not employed | 133 (34.0%) | 116 (34.6%) | 111 (35.1%) | 100 (35.6%) | 90 (40.4%) | 96 (44.0%) | 87 (43.3%) | 61 (37.7%) | |
| Employed seasonally or part-time | 117 (29.9%) | 103 (30.7%) | 101 (32.0%) | 83 (29.5%) | 54 (24.2%) | 48 (22.0%) | 44 (21.9%) | 49 (30.2%) | |
| Employed full-time | 141 (36.1%) | 116 (34.6%) | 104 (32.9%) | 98 (34.9%) | 79 (35.4%) | 74 (33.9%) | 70 (34.8%) | 52 (32.1%) | |
| Notes. Physical health status [range: 1-4; 1 = poor, 4 = excellent]; Scales of Independent Behaviors-Revised (SIB-R) [range: 0–170, with higher scores indicating | | | | | | | | | |
| | | | | | | | | | |

Table 1. Descriptive statistics for variables of interest

Notes. Physical health status [range: 1-4; 1 = poor, 4 = excellent]; Scales of Independent Behaviors-Revised (SIB-R) [range: 0–170, with higher scores indicating more severe problem behavior]; Vocational Independence [range: 1-9, with higher scores indicating higher vocational attainment]; Current residential status [0=co-residing, 1=not co-residing]; Center for Epidemiological Studies–Depression Scale (CES-D) [range: 0-60, with higher scores indicating higher levels of depressive symptoms; clinical cut-off = 16]; Employment status [range: 0-2; 0 = Not employed, 1 = Employed seasonally or *Employed part-time*, and 2 = Employed full-time].

| | | Mean | | | | Slope | Covariates | | | | | | |
|---------------|--------------------|--------------------|----------|-----------|--------------------|-------|--------------------|------|--------|--------------|-------|--------------|-------|
| Dependent | Pre- | "Jump" | | Post- | Pre-Recession | | Post-Recession | | Change | Age | | ID | |
| Variable | Recession | Estimate | ; | Recession | | | | | in | | | | |
| | | | | | | | | | | | | | |
| Autistic | Est. (<i>SE</i>) | Est. (<i>SE</i>) | р | Est. | Est. (<i>SE</i>) | р | Est. (<i>SE</i>) | р | р | Est. | р | Est. | р |
| Individuals | | | | | | | | | | | | | |
| Physical | 3.11 (0.09) | 0.01 (0.06) | .925 | 3.12 | -0.01 (0.01) | .082 | -0.01 (0.01) | .076 | >.500 | -0.01 (0.00) | .103 | 0.06 (0.07) | .354 |
| health status | | | | | | | | | | | | | |
| Problem | 108.64 (1.20) | 1.38 (0.68) | .044 | 110.02 | -0.72 (0.10) | <.001 | 0.03 (0.10) | .769 | <.001 | -0.31 (0.04) | <.001 | 5.86 (0.87) | <.001 |
| behavior | | | | | | | | | | | | | |
| (SIB-R) | | | | | | | | | | | | | |
| Vocational | 4.88 (0.36) | -0.13 (0.22) | .569 | 4.75 | -0.03 (0.03) | .368 | 0.02 (0.03) | .560 | .250 | -0.02 (0.01) | .018 | -1.97 (0.25) | <.001 |
| Independence | | | | | | | | | | | | | |
| Current | 0.52 (0.05) | 0.02 (0.03) | .412 | 0.54 | 0.02 (0.00) | <.001 | 0.01 (0.00) | .097 | .030 | 0.02 (0.00) | <.001 | 0.16 (0.04) | <.001 |
| residential | | | | | | | | | | | | | |
| status | | | | | | | | | | | | | |
| Mothers | Est. (<i>SE</i>) | Est. (<i>SE</i>) | р | Est. | Est. (<i>SE</i>) | р | Est. (<i>SE</i>) | р | р | Est. | р | Est. | P |
| Physical | 2.81 (0.09) | 0.02 (0.06) | .770 | 2.82 | -0.01 (0.01) | .151 | -0.02 (0.01) | .028 | >.500 | -0.01 (0.00) | .007 | 0.06 (0.07) | .417 |
| health status | | | | | | | | | | | | | |
| Depressive | 11.94 (1.34) | 1.51 (0.72) | .036 | 13.46 | -0.08 (0.10) | .431 | -0.17 (0.11) | .116 | >.500 | -0.08 (0.05) | .082 | -0.76 (0.95) | .424 |
| Symptoms | | | | | | | | | | | | | |
| (CES-D) | | | | | | | | | | | | | |
| Employment | 1.57 (0.14) | -0.09 (0.09) | .307 | 1.48 | -0.01 (0.01) | .419 | -0.02 (0.01) | .104 | >.500 | -0.06 (0.00) | <.001 | 0.14 (0.11) | .213 |
| status | | | | | | | | | | | | | |

 Table 2. Growth curve model coefficients and hypothesis test statistics

Note. p-values (for intercept "jump" and slope) are for the difference between pre-Recession and post-Recession. Significant p-values (<.05) are bolded. Age entered was the age of the autistic individual at Time 1. Intellectual Disability (ID) status was coded as 0 = no ID, 1 = ID. Physical health status [range: 1-4; 1 = poor, 4 = excellent]; Scales of Independent Behaviors-Revised (SIB-R) [range: 0–170, with higher scores indicating more severe problem behavior]; Vocational Independence [range: 1-9, with higher scores indicating higher vocational attainment]; Current residential status [0=co-residing, 1=not co-residing]; Center for Epidemiological Studies–Depression Scale (CES-D) [range: 0-60, with higher scores indicating higher levels of depressive symptoms; clinical cut-off = 16]; Employment status [range: 0-2; 0 = Not employed, 1 = Employed seasonally or Employed part-time, and 2 = Employed full-time].



Figure 1. Mean estimates across time with slope lines for adult problem behavior, adjusted for individual age and intellectual disability status of the adult with ASD.

Note. SIB-R: Scales of Independent Behaviors-Revised

Figure 2. Adjusted mean estimates across time with slope lines for adult residential status, adjusted for individual age and intellectual disability status of the adult with ASD.



Note. Current Residential Status was coded as: co-residing (0), not co-residing (1).



Figure 3. Adjusted mean estimates across time with slope lines for mother depressive symptoms, adjusted for individual age and intellectual disability status of the adult with ASD.

Note. CES-D: Center for Epidemiological Studies–Depression Scale