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ORIGINAL PAPER

# Caregiver Attributions of Toddlers' Behaviors: A Comparison Between Groups of Children with Differing Developmental Concerns

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## Abstract

Little is known about the attributional patterns of caregivers of autistic children, particularly in relation to caregivers of children with other developmental or behavioral disorders. This study examined differences in caregiver attributions of child behavior between three groups: toddlers with (1) Autism spectrum disorder (ASD) or ASD concerns; (2) Other developmental concerns; and (3) No concerns. Qualitative descriptions of actual child behaviors were coded using a three-stage content analysis. Regression analyses were utilized to determine if group membership predicted types of positive and challenging behaviors caregivers endorsed, as well as their attributions of these behaviors. Caregivers of children with ASD or ASD concerns endorsed similar types of behaviors, but rated their child's positive behaviors as less characteristic of their child and more a function of the particular situation, less stable or permanent, and less controllable as compared to caregivers of toddlers with other developmental or no concerns. Additionally, they rated their child's challenging behaviors as more stable or permanent and less controllable as compared to caregivers of toddlers with other developmental concerns or no concerns. These findings suggest that caregivers of children with ASD and ASD related concerns may be vulnerable to a negative attributional pattern, which can have important implications for child and family functioning and overall quality of life.

**Keywords** Caregivers · Attributions · Behaviors · Early childhood · Autism

Caregiver attributions refer to a caregiver's search for the meaning of their child's behavior (both positive and challenging) and the caregiver's use of causal factors in framing their reaction to their child's behavior (Colalillo et al., 2015; Williamson & Johnston, 2015). Research on caregiver attributions has been based largely on Weiner's (1985) Attribution Theory, in which attributions of behavior are conceptualized to guide future decision making and action. In this model, a positive or challenging behavior induces a primary affective reaction within the caregiver. The caregiver then analyzes the situational context and identifies an attribution or cause of the behavior, which in turn, generates further expectations, emotional responses, and behavioral plans for how to respond during future interactions with the child.

In line with Weiner's model, caregiver attributions for child behavior are often further conceptualized within three main dimensions: (1) locus of control (i.e., the extent to which the behavior is perceived to result from characteristics that are internal to the person versus an external or environmental stimulus); (2) stability (i.e., the extent to which the behavior is perceived as stable over time or susceptible to change); and (3) controllability (i.e., the extent to which the behavior is perceived to be under the individual's control; Weiner, 1985). Focusing on these three dimensions in tandem is helpful for understanding the underlying structure of causal inferences and the way in which they interrelate to impact caregivers' affective and behavioral reactions. For example, when faced with the child's challenging behavior, *negative* caregiver attributions are those in which a caregiver views their child's behavior as stable, internal, and intentional, while *positive* attributions reflect the belief that their child's challenging behavior fluctuates, is due to external factors, and is not always within their control (Williamson

Because our sample contains non-parent caregivers in addition to parents, we will refer to both parents and caregivers as "caregivers" throughout the manuscript.

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& Johnston, 2015). It has been theorized that negative attributions emerge, in part, due to dysfunctional cognitions regarding behavior (Burgess et al., 2005; Hastings et al., 2014). Goodnow (1988) posited that caregivers tend to evaluate their own child and their behaviors positively, as this allows them to act as a consistent, effective, and warm caretakers, several of the main goals of caregiving. However, this optimistic outlook tends to shift when caregivers begin to observe problematic symptomatology in their children and they may begin to view their child as more responsible for these behaviors. It has been hypothesized that this outlook may serve as a protective mechanism for perceived caregiving competence (Gretarsson & Gelfand, 1988).

## Importance of Caregiver Attributions of Behavior

Social information processing theories of parenting posit that social-cognitive constructs, such as caregivers' beliefs and attributions about their children's behaviors, influence how caregivers interact with their children, as well as broader childrearing practices and decisions (Azar et al., 2013; Bugental & Grusec, 2006; Leerkes et al., 2015). These attributions have been found to be influenced by caregiver-level factors, including caregiver stress, and relationship-level factors, including previous interactions with their children (Bugental & Corpuz, 2019). Negative attributions can elicit automatic negative emotionality toward the child and restrict the consideration of alternative explanations and adaptive problem solving, thus contributing to unideal caregiving behaviors (Azar et al., 2017; Bugental & Grusec, 2006). Negative attributions of children's challenging behaviors have been found to be related to several aspects of caregiving behaviors including harsh discipline, coercion, less positive affect, and lower caregiver-child reciprocity during interactions (Beckerman et al., 2017; Bugental & Grusec, 2006; Park et al., 2016; Wang et al., 2013). These attributions have also been linked to higher levels of caregiver-child aggression and higher risk for maltreatment as measured by official county records of abuse and neglect (Berlin et al., 2013; Rodriguez et al., 2017; Rodriguez & Wittig, 2019).

Interestingly, caregiver attributions have been found to mediate the association between caregiver stress and mental health and harsh and abusive discipline, highlighting the impact that caregivers' interpretation of their child's behavior can have on the caregiver-child dynamic over and above other caregiver-level factors (Beckerman et al., 2017; Leung & Slep, 2006). Additionally, caregiver attributions in childhood have been associated with both childhood internalizing and externalizing problems and responsivity to mental health treatment, both in terms of child outcomes and caregiver satisfaction with and adoption of strategies taught via caregiver-training (Kil et al., 2020; Katzman et al., 2017; Mattek et al., 2016; Pereira & Barros, 2018; Sawrikar et al., 2018).

## Caregiver Attributions of Behavior in Clinical Populations

Previous research has demonstrated that caregivers of typically developing (TD) children tend to display a more positively biased attributional style, in which they attribute their child's positive behavior as internal, stable, and controllable, and attribute their child's challenging behavior to factors that are externally caused, unstable, and uncontrollable (Miller, 1995; Morrissey-Kane & Prinz, 1999). However, caregivers of children with developmental delays, neurodivergence, or behavioral concerns have been found to demonstrate a more negatively biased attributional style (Chavira et al., 2000; Hassall & Rose, 2005; Johnston & Freeman, 1997). These biases could impact families' willingness to seek out treatment, as well as their level of engagement and adherence to treatment, and thereby, overall outcomes on both the family and child levels (Mattek et al., 2016; Sawrikar et al., 2018). Promisingly, treatment has been shown to potentially impact caregiver attributional patterns (Johnston & Ohan, 2005).

The attributional patterns of caregivers of autistic children have been studied less extensively relative to caregivers of children with other developmental or behavioral disorders. Caregivers of autistic children differ from those with other types of developmental or behavioral disorders in myriad ways, including more elevated caregiver stress (Hayes & Watson, 2013), poorer reported quality of life (Lee et al., 2007), reduced sense of caregiver competence, and higher levels of depression, anxiety, and frustration (Estes et al., 2014). Of note, the existing limited literature on caregiver attributions in the context of autism spectrum disorder (ASD) has primarily focused on families of children with an ASD diagnosis. While this work is critical, the ways that caregivers of children with ASD respond and interact with their children do not simply stem from a diagnostic label. Rather, caregiver perceptions and the parent–child interactions that develop as a result may emerge well before a child is formally diagnosed. Although there is evidence to support the reliable diagnosis of ASD by age two and findings that parents often report concerns by 18 months of age, studies have shown that many children are not diagnosed with ASD or enrolled in ASD-specific services until much later (Rosenberg et al., 2011; Baio et al., 2018). Given that caregivers of children with ASD have been found to have a more negative attributional style in regard to their children's ASD-related behaviors (Whittingham et al., 2008), the presence of undiagnosed ASD-related behaviors in early development may also affect a

caregiver's attributions of their child's behavior, potentially resulting in harsher parenting practices and poorer child outcomes in terms of response to intervention and overall developmental trajectories. Examining attributional patterns in caregivers of autistic children or children at a high likelihood of autism is a promising avenue for research, as caregiver interventions for autism may benefit from assessing and targeting caregivers' pre-existing attributional patterns to help improve treatment outcomes and overall developmental trajectory; however, results from the few studies in this area are inconsistent.

Findings by Berliner et al. (2020) and Hartley et al. (2013) demonstrated that caregivers of autistic children tended to rate their child's challenging behavior as more internal and stable (negative attributional bias), while other research has found that caregivers of autistic children tend to have a more positive attributional bias in regard to their child's challenging behavior (Berliner et al., 2020; Whittingham et al., 2008). Interestingly, Berliner et al. (2020) reported that caregiver attributions tend to mediate the relation between ASD status and child challenging behavior. Regarding positive behaviors, results were also variable. Certain studies concluded that caregivers of autistic children displayed a more positive attributional bias toward their child's desirable behaviors (Hartley et al., 2013; Whittingham et al., 2008), while others found a tendency toward a more negative attributional bias (Bussanich et al., 2017).

One potential explanation for these inconsistent findings may be due to the specific methods utilized. Several of these studies focused on only hypothetical behaviors or on only child positive *or* challenging behavior. Many studies did not utilize a comparison group of caregivers of typically developing children or children with other developmental or behavioral concerns and included children in a large age range. Previous research has shown that caregiver attributions may shift in tandem with their child's development and caregivers of very young (or developmentally delayed) children may be particularly vulnerable to caregiver negative attributions, given the potential ambiguity of the causes of their behaviors (Azar et al., 2013; Dix et al., 1986). To help clarify these inconsistencies, it may be helpful to examine caregiver attributions for real-life child positive and challenging behaviors during early childhood specifically. Additionally, this work could also serve to directly compare attributions between caregivers of children with ASD or ASD concerns, other developmental concerns, or no concerns to better understand their unique attributional patterns. This knowledge could help providers who serve these families individualize treatment to address negative attributions and promote desired outcomes.

## The Current Study

The current study utilized regression analyses to examine the types of child behaviors endorsed by caregivers of toddlers with ASD or ASD concerns, toddlers with other developmental concerns, or typically developing toddlers. Specifically, we examined if: (a) Concerns Group status predicts caregiver-reported child positive and challenging behavior; and (b) Concerns Group status predicts domain-level caregiver attributions of both positive and challenging child behaviors (i.e., Locus of Control, Stability, Controllability).

## Method

### Overview and Approach

The present study was part of a larger community-based project examining the implementation of a service delivery model aimed at increasing evidence-based ASD screening and ASD-specific early intervention practices within primary care and early intervention (EI) settings (see Ibañez et al., 2019 for complete study protocol). The study was reviewed and approved by the Institutional Review Board (IRB) at The University of Washington and all participants provided informed consent.

### Participants and Recruitment

Primary care providers (PCPs) and EI providers from four diverse counties referred caregiver/toddler dyads from their caseloads to the study. Caregivers interested in participating in the study completed a "permission to contact" form and were contacted by trained research staff to determine their eligibility. Children recruited in primary care were eligible if they were between 16 and 20 months old in order to examine family experiences during their 18-month well-child visit. Children recruited from EI were eligible if they were between 16 and 36 months old in order to examine family experiences with EI. Children with severe medical conditions (e.g., cerebral palsy, blindness, deafness) were excluded from the study.

As part of the screening process, research staff conducted a structured interview to assign children to one of three categories: (1) an ASD diagnosis or ASD-related concerns (e.g., explicit ASD concerns or broader social development concerns consistent with ASD; $n = 61$; henceforth referred to as ASD Concerns group); (2) other developmental concerns (e.g., delayed language or motor development; $n = 61$; henceforth referred to as DD Concerns group); and (3) those with no reported concerns ($n = 169$; henceforth referred to as

No Concerns group). Specifically, caregivers were asked if they had explicit concerns about ASD or social development as well as any other concerns related to language, motor, sensory, cognitive, and/or behavioral development. Research staff were trained to ask follow-up questions if further clarification from the caregiver was needed to understand specific concerns. An algorithm developed by the research team was used to assign caregivers to the appropriate concerns group based on the types of concerns they endorsed during the structured interview at study enrollment. Two trained members of the research team with experience with early signs of autism and developmental concerns worked together to apply the algorithm to each case in order to assign each family to a group. In rare instances when consensus was not achieved, a principal investigator or co-investigator reviewed the case and assigned a group. For the ASD Concerns group, seven caregivers reported that their child had an ASD diagnosis during the screening process. However, none of these diagnoses were made via formal standardized assessment by a qualified professional. Given the lack of standardized ASD assessment, as well as the small number of children with reported diagnoses, the ASD and ASD Concerns groups were combined for analyses. Families in the ASD Concerns and DD Concerns groups tended to be referred from either their child's PCP or EI provider, while participants in the No Concerns group were primarily recruited through their child's PCP at the time of the18-month well-child visit.

The sample for the current study included $N = 291$ dyads. Participant characteristics are presented in Table 1. Child's age differed significantly between groups in that the mean child age in the ASD Concerns group is higher than in both other groups, $p < 0.001$. Child's sex differed significantly between groups in that there were significantly fewer males and more females in the No Concerns group than in both other groups, $p < 0.01$. Child's ethnicity differed significantly between groups in that there were more children who were identified as Hispanic/Latino in the ASD Concerns group than in both other groups, $p < 0.05$. There were no other group differences on demographic factors.

## Procedure

The present study is based on select questions that caregivers completed at their time of entry into the study. Caregivers completed all questionnaires online via REDCap (Research Electronic Data Capture).

## Measures

### Parental Attributions Questionnaire (PAQ)

Caregiver descriptions of their child's positive and challenging behavior, as well as their attributions of these behaviors were collected via the Parental Attribution Questionnaire (PAQ), a modified version of the Attribution and Control Questionnaire that has previously been used with parents and caregivers of autistic children and adolescents, and has demonstrated adequate internal consistency (Whittingham et al., 2008). Caregivers are asked to describe a recent incident in which their child exhibited positive behavior and another in which their child exhibited challenging behavior. Caregivers then rate their agreement using a 5-point Likert scale from "strongly disagree" to "strongly agree" (midpoint is "undecided") with 12 statements related to the main attributions (causes) of the behavior. These statements can be broken down to reflect three attributional dimensions—locus of control, stability, and controllability (two items per dimension; See Table 2 for PAQ questions). Even numbered questions were reverse coded and mean scores (i.e., 1–5 rating across two items) were calculated for each dimension and separately by type of behavior (i.e., Positive-Locus of Control, Positive-Stability, Positive-Controllability, Negative-Locus of Control, Negative-Stability, Negative-Controllability; See Table 3 for a breakdown of attributions by behavior type and overall attributional style). Higher scores on the PAQ reflect more internal, stable, and controllable attributions of child behavior. In the present sample, the PAQ had variable internal consistency (Positive-Locus of Control $\alpha = 0.24$, Positive-Stability $\alpha = 0.69$, Positive-Controllability $\alpha = 0.76$, Negative-Locus of Control $\alpha = 0.24$, Negative-Stability $\alpha = 0.71$., Negative-Controllability $\alpha = 0.68$). These measures of internal consistency are consistent with the original analysis of internal consistency for the PAQ (Whittingham et al., 2008), in which α levels for Locus of Control tended to be lower than the other two dimensions.

To examine the behavioral descriptions that caregivers provided for their child's positive and challenging behavior, a team of three research staff members completed a three-stage content analysis (Fowler, 2013) on the qualitative comments from the open-ended questions. The first stage of the interactive process included identification of categories by each member of the research team. Team members then met and determined coding categories for use in the analysis. During the second stage, each research team member independently coded all of the comments based on the defined category structure. Comment codes were not mutually exclusive and comments could be coded for more than one category. Also during this stage, each member shared their category codes for the responses and discussed and reconciled codes if there was a lack of agreement about category assignment. Any outlying comments were labeled as miscellaneous, and the research team reviewed and determined whether another category was needed. During the third stage, each research team member verified the categories they coded. This interactive and iterative analysis process facilitated an exhaustive list of mutually exclusive category

**Table 1** Demographics

| Participant characteristics | ASD Concerns (n = 61) | DD Concerns (n = 61) | No Concerns (n = 169) | Total (n = 291) |
|---|---|---|---|---|
| Age *M* (range) | 27.92 (19–41) | 23.10 (16–34) | 20.53 (17–24) | 22.60 (16–41) |
| Gender | | | | |
| Male | 65.0% | 62.3% | 47.3% | 54.1% |
| Female | 35.0% | 37.7% | 52.7% | 45.9% |
| Race | | | | |
| American Indian or Alaska Native | 3.4% | 3.3% | 1.8% | 2.4% |
| Asian | 10.2% | 9.8% | 0.0% | 6.2% |
| Native Hawaiian or Pacific Islander | 0.0% | 1.6% | 0.0% | 0.3% |
| Black/African-American | 0.0% | 0.0% | 1.2% | 0.7% |
| White | 74.6% | 72.1% | 84.6% | 79.9% |
| Other | 1.7%% | 4.9% | 1.2% | 2.1% |
| More than one race | 10.2% | 4.9% | 7.1% | 7.3% |
| Unknown | 0.0% | 3.3% | 0.6% | 1.0% |
| Ethnicity | | | | |
| Hispanic or Latino | 23.2% | 14.5% | 16.0% | 17.2% |
| Not Hispanic or Latino | 73.2% | 83.6% | 81.1% | 81.6% |
| Unknown | 3.6% | 1.8% | 0.0% | 1.2% |
| Caregiver Relation | | | | |
| Biological mother | 80.6% | 89.0% | 93.6% | 89.9% |
| Adoptive mother | 9.7% | 3.1% | 0.0% | 2.7% |
| Grandmother | 4.8% | 3.1% | 0.0% | 1.7% |
| Foster mother | 3.2% | 1.6% | 0.6% | 1.3% |
| Biological father | 1.6% | 3.1% | 4.1% | 3.4% |
| Adoptive father | 0.0% | 0.0% | 1.2% | 0.7% |
| Other | 0.0% | 0.0% | 0.6% | 0.3% |
| Parental education | | | | |
| Less than 8th grade | 1.6% | 1.6% | 0.0% | 0.7% |
| 9-11th grade | 3.2% | 1.6% | 4.7% | 3.7% |
| High school or GED | 14.5% | 11.1% | 7.6% | 9.8% |
| Trade or vocational school | 11.3% | 3.2% | 7.6% | 7.4% |
| Associates or 2-year degree | 19.4% | 15.9% | 13.5% | 15.2% |
| Some college | 25.8% | 19.0% | 15.8% | 18.6% |
| College (4-year degree) | 14.5% | 27.0% | 33.3% | 28.0% |
| Master's degree | 6.5% | 17.5% | 11.1% | 11.5% |
| Professional degree | 3.2% | 3.2% | 6.4% | 5.1% |

**Table 2** Questions on parental attributions questionnaire (asked for both positive and challenging behavior)

| | |
|---|---|
| Locus of control questions | Question 1: In my opinion, the causes of this behavior are mostly characteristics of my child (for example, ability, intelligence, personality, etc.) |
| | Question 2: In my opinion, the causes of this behavior are mostly characteristics of that particular situation. That is, my child would not behave like that in other situations |
| Stability questions | Question 3: In my opinion, the causes of this behavior are mostly permanent and will continue to exist in the future (for example, a permanent personality characteristic) |
| | Question 4: In my opinion, the causes of this behavior are mostly temporary and will pass with time (for example, it is a stage) |
| Controllability questions | Question 5: In my opinion, my child could control this behavior if s/he wanted to |
| | Question 6: In my opinion, my child has no control over this behavior |

**Table 3** Descriptions of attributional dimensions by overall caregiver attributional style and type of child behavior

| Caregiver positive attributional style | | |
|---|---|---|
| | Positive child behavior (e.g., shares toy with peer) | Challenging child behavior (e.g., hits sibling) |
| Locus of control | Perceive positive behavior as due to internal characteristics of the child | Perceive challenging behavior as due to due to external (or environmental) factors |
| Stability | Perceive positive behavior as stable over time | Perceive challenging behavior as unstable or constantly changing over time |
| Controllability | Perceive positive behavior as under the child's control | Perceive challenging behavior as out of the child's control |
| Caregiver negative attributional style | | |
| | Positive child behavior (e.g., shares toy with peer) | Challenging child behavior (e.g., hits sibling) |
| Locus of control | Perceive positive behavior as due to external (or environmental) factors | Perceive challenging behavior as due to internal characteristics of the child |
| Stability | Perceive positive behavior as unstable or constantly changing over time | Perceive challenging behavior as stable over time |
| Controllability | Perceive positive behavior as out of the child's control | Perceive challenging behavior as under the child's control |

codes (Fowler, 2013). Two additional coders with expertise on ASD and behavior management independently coded all responses and demonstrated high levels of agreement for both categories (87%). These were the final codes utilized to determine types of positive and challenging behaviors endorsed by caregivers.

## Results

Quantitative analyses were conducted in SPSS version 28 (IBM Corp., 2021).

### Types of Positive and Challenging Behaviors Reported

Qualitative analysis of positive and challenging behaviors reported by caregivers revealed five main categories of positive behaviors and eight main categories of challenging behaviors. Tables 4 and 5 provide a comprehensive list of categories of positive and challenging behaviors with related quotes, as well as the frequency with which each type of behavior was endorsed by caregivers in each group, as well as overall. The most commonly endorsed categories of positive behaviors across groups were: Prosocial Behaviors, Following Direct Instructions, and Independently Completing Daily Tasks. The most commonly endorsed categories of challenging behaviors across groups were Aggression Toward People/Animals, Destructive Behavior, and Tantrumming. Coders were not able to categorize four comments in the responses for challenging behaviors and four comments in the responses for positive behaviors because the comments were too vague or did not explicitly report on a behavior (i.e., "I haven't come across something like this yet," "She is always pretty good").

### Group as a Predictor of Behavioral Categories Reported

Logistic regression analyses were performed to ascertain the effects of Concerns Group membership on the likelihood that caregivers endorsed each type of behavior—both positive and challenging. Because there were differences in age, sex, and ethnicity between groups, these variables were included in the logistic regression models. None of the models were significant, indicating that Concerns Group membership was not a significant predictor of types of behaviors endorsed by caregivers. These findings indicate that any differences in caregiver attributions found can be attributable to actual attributional biases as opposed to differing endorsed behaviors.

### Group as a Predictor of Attributions for Behaviors

To examine differences in attributions for the toddlers' behaviors, a set of linear regressions was conducted to determine if Concerns Group status significantly predicted caregiver attributions across the three dimensions for both positive and challenging behaviors. Age, sex, and ethnicity were included as covariates in the linear regression models.

### Positive Behaviors

#### Locus of Control

Results of the multiple linear regression predicting caregiver-reported Locus of Control indicated that there was a significant effect of age, sex, ethnicity, and Concerns Group on Locus of Control of child positive behavior, ($F(5, 281) = 3.75$, $p < 0.001$, $R^2 = 0.06$). The individual predictors were examined further and indicated that DD Concerns

**Table 4** Challenging behaviors endorsed by caregivers

| Code | Description | # of times endorsed ASD Concerns (%) | # of times endorsed DD Concerns (%) | # of times endorsed No Concerns (%) | # times endorsed total (%) |
|---|---|---|---|---|---|
| Aggression toward people/ animals | Hitting, biting, scratching, pulling hair, kicking | 22 (36.1%) | 27 (44.3%) | 54 (32.0%) | 103 (35.4%) |
| Destructive behavior | Breaking objects, making messes, throwing items | 14 (23.0%) | 16 (26.2%) | 53 (31.4%) | 83 (28.5%) |
| Tantrumming behaviors | Screaming, crying, falling to the floor | 17 (27.9%) | 13 (21.3%) | 36 (21.3%) | 66 (22.7%) |
| Non-compliance—direct prompt | Direct non-compliance when given a command/prompt | 5 (8.2%) | 7 (11.5%) | 30(17.8%) | 42 (14.4%) |
| Unsafe behaviors | Eating/sucking on non-food items, climbing on high objects, elopement, self-harm | 15 (24.6%) | 9 (14.8%) | 18 (10.7%) | 42 (14.4%) |
| Non-compliance—established rule | Disrobing, not following schedules or daily routines (e.g., going to bed, eating, toileting) | 3 (4.9%) | 5 (8.2%) | 19 (11.2%) | 27 (9.3%) |
| Inappropriate social behaviors | Not sharing, fighting over toys, taking things away, ignoring others, inappropriate communication (e.g., bad language), running away from peers | 6 (9.8%) | 5 (8.2%) | 21 (12.4%) | 32 (11.0%) |
| Rigid behaviors | Needing to follow a certain routine or do things a certain way | 1 (1.6%) | 2 (3.3%) | 1 (0.6%) | 4 (1.4%) |

Group status (t = 2.05, $p < 0.05$) and No Concerns Group status ($t = 3.58$, $p < 0.001$) were significant predictors in the model. That is, caregivers with children in the DD Concerns and No Concerns groups rated that their child's positive behaviors were more characteristic of their child and less due to the particular situation than the ASD Concerns group (See Fig. 1 for mean dimension ratings for all groups for positive child behaviors). However, because the Locus of Control dimension of the PAQ demonstrated low internal consistency in our sample, we also examined group as a predictor of response for each individual question in this dimension ("Q1: *In my opinion, the causes of this positive behavior are mostly characteristics of my child (for example, ability, intelligence, personality,* etc.)" and "Q2: *In my opinion, the causes are mostly characteristics of that particular situation. That is, my child would not behave like that in other situations.*"). The model was only significant for Q2 ($F(5, 281) = 3.20$, $p < 0.01$, $R^2 = 0.05$). The individual predictors of response on Q2 were examined further and indicated that DD Concerns Group status (t = -2.55, $p = 0.01$) and No Concerns Group status ($t = -2.98$, $p < 0.01$) were significant predictors in the model, indicating that parents in the DD and No Concerns groups disagreed that their child's positive behaviors were due to the particular situation more often than the ASD Concerns group. That is, parents in the DD and No Concerns group tended to fall into a more positive attributional style than the ASD Concerns group in terms of this question on the Locus of Control dimension.

### Stability

Results of the multiple linear regression predicting caregiver-reported Stability indicated that there was a significant effect of age, sex, ethnicity, and Concerns Group on Stability of child positive behavior, ($F(5, 282) = 5.47$, $p < 0.01$, $R^2 = 0.04$). The individual predictors were examined further and indicated that DD Concerns Group status ($t = 2.35$, $p = 0.02$) and No Concerns Group status ($t = 3.28$, $p = 0.001$) were significant predictors in the model. That is, caregivers with children in the DD Concerns and No Concerns groups rated their child's positive behavior as more stable or permanent than caregivers of children in the ASD Concerns group.

### Controllability

Results of the multiple linear regression predicting caregiver-reported Controllability indicated that there was a collective significant effect of age, sex, ethnicity, and Concerns Group on Controllability of child positive behavior, ($F(5, 279) = 9.86$, $p < 0.001$, $R^2 = 0.15$). The individual predictors were examined further and indicated that DD Concerns Group status ($t = 3.41$, $p < 0.001$) and No Concerns group status ($t = 4.67$, $p < 0.001$) were significant predictors in the model. That is, caregivers with children in the DD and No Concerns groups rated their child's positive behavior as

**Table 5** Positive behaviors endorsed by caregivers

| Code | Description | # of times endorsed ASD Concerns (%) | # of times endorsed DD Concerns (%) | # of times endorsed No Concerns (%) | # of times endorsed total (%) |
|---|---|---|---|---|---|
| Prosocial behaviors | Sharing, using good manners, showing care/empathy, apologizing, waiting for a turn, reciprocal play, imitation, showing affection, bringing someone something they need without being asked, giving high five | 24 (39.3%) | 17 (27.9%) | 65 (38.5%) | 106 (36.4%) |
| Following direct instructions | Compliance to a direct instruction | 12 (19.7%) | 22 (36.1%) | 43 (25.4%) | 77 (26.5%) |
| Independently completing daily tasks | Helping someone/cleaning up without being asked, completing daily living skills independently (dressing, toileting, getting ready, eating), participating in age-appropriate hobbies/activities | 11 (18.0%) | 15 (24.6%) | 51 (30.2%) | 77 (26.5%) |
| Emotion regulation | Stopping in the middle of negative behaviors, understanding level of gentleness to use with others (i.e., babies, animals), remaining calm/quiet during tasks and overstimulating environments, being flexible, waiting patiently, remaining calm after de-escalating from emotional outbursts; not engaging in challenging behaviors | 10 (16.4%) | 3 (4.9%) | 19 (11.2%) | 32 (11.0%) |
| Appropriate communication (verbal or nonverbal) | Signing, using words instead of destructive behaviors, asking/bringing items for help, answering questions, using language to communicate needs | 5 (8.2%) | 3 (4.9%) | 3 (1.8%) | 11 (3.9%) |

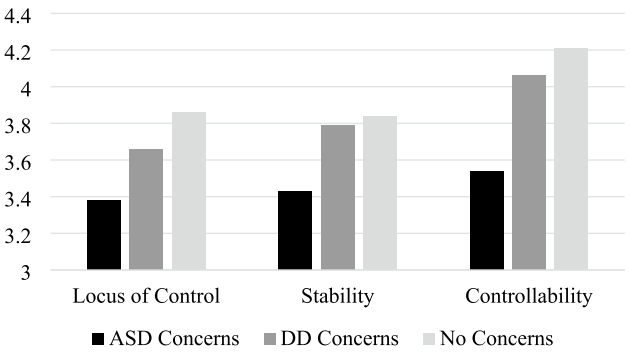


**Fig. 1** Parental attributions by group for positive behaviors. Higher scores indicate an internal locus of control, and more stability and controllability of the behavior

more controllable than caregivers of children in the ASD Concerns group.

## Challenging Behaviors

### Locus of Control

Results of the multiple linear regression predicting caregiver-reported Locus of Control revealed that the model as a whole was not significant, and group membership was not a significant predictor of caregiver-reported locus of control of challenging behaviors. That is, when asked to think about if their child's challenging behavior was due to internal characteristics of their child or external/environmental characteristics, caregivers of children in all groups

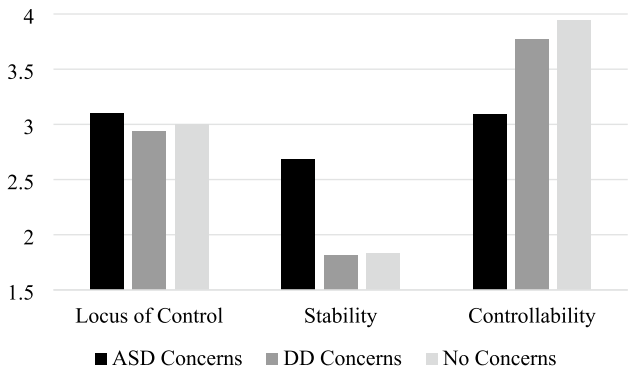


**Fig. 2** Parental attributions by group for challenging behaviors. Higher scores indicate an internal locus of control, and more stability and controllability of the behavior

responded similarly (See Fig. 2 for mean dimension ratings for all groups for challenging child behaviors). Overall, caregivers responded that they were "Undecided" to the two Locus of Control questions, "In my opinion, the causes of this challenging behavior are mostly characteristics of my child (for example, ability, intelligence, personality, etc.)", $M = 3.21$, and "In my opinion, the causes of this challenging behavior are mostly characteristics of that particular situation. That is, my child would not behave like that in other situations", $M = 3.19$. Because the Locus of Control dimension of the PAQ demonstrated low internal consistency in our sample, we also examined group as a predictor of response for each individual question in this dimension. Neither model was significant.

### Stability

Results of the multiple linear regression predicting caregiver-reported Stability indicated that there was a collective significant effect of age, sex, ethnicity, and Concerns Group on Stability of child challenging behavior, ($F(5, 281) = 11.97$, $p < 0.001$, $R^2 = 0.17$). The individual predictors were examined further and indicated that DD Concerns Group status ($t = -5.07$, $p < 0.001$) and No Concerns Group status ($t = -4.97$, $p < 0.001$) were significant predictors in the model. That is, caregivers with children in the DD and No Concerns groups rated their child's challenging behavior as less stable or permanent than caregivers of children in the ASD Concerns group.

### Controllability

Results of the multiple linear regression predicting caregiver-reported Controllability indicated that there was a collective significant effect of age, sex, ethnicity, and Concerns Group on Controllability of child challenging behavior, ($F(5, 282) = 10.17$, $p < 0.001$, $R^2 = 0.15$). The individual predictors were examined further and indicated that DD Concerns Group status ($t = 3.99$, $p < 0.001$) and No Concerns Group status ($t = 4.90$, $p < 0.001$) were significant predictors in the model. That is, caregivers with children in the DD and No Concerns groups rated their child's challenging behavior as more controllable than caregivers of children in the ASD Concerns group.

## Discussion

To our knowledge, this is the first study to examine group differences in caregiver attributions of toddler behavior between toddlers with ASD or ASD concerns, other developmental concerns, and typical development. Unlike previous studies in this area, the inclusion of groups of toddlers with varied developmental concerns allowed us to directly compare the endorsed behaviors and attributional patterns of their caregivers. Results indicate that caregivers of children with different types of developmental concerns (ASD, DD, none) endorsed similar types of behaviors, which strengthens the validity of the findings as being a result of caregiver attributions of their children's behavior rather than differential endorsement of types of behavior based on Concerns Group membership.

Primary study findings revealed that caregivers of children with ASD or ASD concerns differed in their domain-level attributions of both positive and challenging child behaviors (i.e., Locus of Control, Stability, Controllability) as compared to caregivers of children with general developmental concerns or typical development. Specifically, caregivers in this group rated their child's positive behaviors as less characteristic of their child and more a function of the particular situation, less stable or permanent, and less controllable as compared to caregivers of toddlers with developmental or no concerns. Additionally, caregivers of children in the ASD Concerns group reported their child's challenging behaviors as more stable or permanent and less controllable as compared to caregivers of toddlers with developmental concerns or no concerns. Of note, when asked to rate if their child's challenging behavior was due to internal characteristics of their child or external/environmental characteristics (i.e., Locus of Control), caregivers of children in the ASD Concerns group responded similarly to those with children who had developmental concerns or no concerns.

The differential attributional patterns between caregivers of children with ASD or ASD concerns and typical development replicates previous work involving clinical populations. However, as previous work has not directly compared caregivers of children with ASD concerns and general developmental concerns, this study is the first to find differential

attribution patterns between caregivers in these two groups, such that caregivers in the ASD group are displaying more negatively biased attributions as compared to caregivers in the DD group. These findings suggest that, relative to caregivers of children with typical development or other developmental concerns, caregivers of autistic children, and even those of children with early signs of ASD but no official diagnosis, may be vulnerable to a negative attribution pattern, which can have important implications for caregiver and family functioning, response to intervention, and overall developmental trajectories and quality of life.

It has been hypothesized that negative attributional patterns develop as a protective mechanism for perceived caregiving competence (Gretarsson & Gelfand, 1988). Caregiver attribution patterns that suggest a negative bias regarding children's challenging behavior have been linked to poorer caregiving quality and harsher, more reactive parenting strategies (Chavira et al., 2000; Daggett et al., 2000; Leung & Slep, 2006; Snyder et al., 2005). However, it has been suggested that caregiver attributions may be a potential mechanism of change for improving parenting outcomes, as caregivers may use these attributions to guide their parenting responses (Novick et al., 2022). Additionally, several studies have found that caregivers who attribute their child's behavior as dispositional, permanent, and uncontrollable may feel that their child's behavior cannot be altered and, therefore, may not be as effectively engaged in treatment efforts or motivated to access evidence-based treatment, or may perceive recommended intervention programs as unacceptable (Choi & Kovshoff, 2013; Johnston et al., 2005; Mah & Johnston, 2008; Morrissey-Kane & Prinz, 1999; Reimers et al., 1995). Caregiver attributions have also been identified as predictors of treatment outcomes, in that negative and change-resistant (i.e., caregiver's perceptions of the cause of the child's challenging behavior as permanent) attributions about child behavior uniquely predict poorer child behavior outcomes in parenting interventions (Hoza, et al., 2006; Sawrikar et al., 2018; Watson, 1986).

The present results suggest that even caregivers with ASD concerns for their child, not only those who have a child diagnosed with ASD, may be susceptible to ascribing negative attributions to their child's behavior and thus, are at risk for less optimal early intervention outcomes. Interestingly, previous work similarly found that caregivers with children who display early features of ASD, but are not yet diagnosed, report higher levels of parenting-related stress as compared to caregivers of children with other developmental concerns or typical development (DesChamps et al., 2020). The findings from the current study add to this evidence that caregivers may be vulnerable to parenting challenges even before their children are diagnosed, and highlights the importance of supporting children and their families early in the ASD diagnostic process across a variety of domains through early intervention.

Fortunately, previous research suggests that caregiver attributions may be changeable with intervention. Notably, a recent study demonstrated that the integration of cognitive behavioral skills targeting mothers' thoughts, feelings and behaviors in standard behavioral parent training resulted in a more positive attributional style, which, in turn, mitigated observed negative parenting in mothers of children with ADHD and co-occurring mood symptoms (Novick et al., 2022). However, there is more limited research with ASD populations. One study with families of autistic children found that, following participation in a behavioral parent training program, caregivers were less likely to believe their child's misbehavior was caused by the child's disposition and more likely to consider situational factors, as well as less likely to believe their child's ASD related behavior was permanent (Whittingham et al., 2009). Although these findings are promising, additional work is needed to better understand how to address these attributions in caregivers of children not yet diagnosed with ASD. As caregivers of younger children with ASD-related concerns may display unique attributional patterns, they may also respond to treatment experiences in unique ways. Thus, professionals may need to identify and challenge distorted attributions of parent-referent stability to promote caregiver acceptance of ASD-specialized treatments, especially in the early toddler years. Possible next steps for caregiver attribution research within ASD samples could focus on assessing attributions in the context of early intervention and understanding how to effectively alter negatively biased attributions, or prevent the self-protective pattern of negative attributions from developing in the first place. Part C EI contexts would be an ideal place to incorporate these treatment components, as EI serves children from birth to three years with identified developmental concerns, including social communication delays, and is designed to teach families to interact with and respond to their child in developmentally appropriate ways (IDEA, 2004). Previous research that addressed caregiver attributions within existing child intervention programs supports the potential value of incorporating these attributions as treatment targets for improving child behavioral concerns, parenting practices, and engagement with evidence-based treatment (Kazdin & Whitley, 2003; Sawrikar et al., 2020).

Although this study is unique in its investigation, there are several important limitations to acknowledge. This study, while novel in its comparison groups, was cross-sectional, limiting the generalizability to age-related changes in attribution patterns. Although beyond the scope of this study, future work could examine shifting caregiver attributions over time, particularly once caregivers begin to have ASD concerns or as children transition to more demanding settings such as school. Furthermore, the composition of the

Concerns Group membership was determined based on caregiver report and not through a formal child assessment. However, to provide more structure and standardization around groupings, an algorithm was developed and families were coded into different groups. Reliability for these groupings was high. Additionally, all data utilized was gathered via self-report at one point in time, which, while making it more accessible to caregivers and increasing study participation, may result in biased or socially desirable responding. Caregivers may see discussion of their children's positive and challenging behavior as reflective of themselves or their parenting and may have offered less stigmatizing examples of their children's behavior or report favorable perceptions of their children's behavior.

Another limitation of our study is the low internal consistency of Locus of Control dimensions for both Positive and Challenging child behaviors on the PAQ in our sample. Original research on the PAQ (Whittingham et al., 2008) similarly demonstrated lower internal consistency on the Locus of Control dimension than the Stability and Controllability dimensions for both positive and ASD-specific behavior. Despite this, the PAQ is the most widely used measure of parental attributions for ASD populations (Berliner et al., 2020; Bussanich et al., 2017; Choi & Kovshoff, 2013; Hartley et al., 2013). Upon further examination of the measure, it seems less logical to sum the questions about Locus of Control than the questions about Controllability of Stability on the PAQ. The questions on Controllability and Stability seem to lead to a "spectrum" of responses, in which a child's behavior can be perceived as more or less controllable or stable. However, it is not as straightforward to characterize Locus of Control on a spectrum, in which one end behavior is perceived as more due to the situation and the other end due to the child's internal characteristics, as, hypothetically, a parent could endorse both of these. Future research is needed to determine more optimal and reliable ways to measure parental attributions in the Locus of Control for this population.

Caregivers in this study reported real-life behaviors of their children, which strengthens the validity of caregiver's attributional ratings. However, it is also worth noting that caregivers often reported on more than one behavior within their open-ended response (e.g., "My child hit his brother and broke his toy") but attributional ratings were provided on the endorsed positive or challenging behavior(s) as a whole. Therefore, we were not able to parse out exactly which behavior was driving attributions. Additionally, caregivers were only asked to provide one example of a positive and a challenging behavior. Future research could include additional responses with specific and varied behaviors that offer the opportunity for a more comprehensive and comparable examination of behaviors that caregivers are considering when making attributions. For example, it would be informative to gather data from caregivers on several of the most commonly reported behavior codes reported in this study (e.g., aggression and prosocial behaviors) to explore potential differential ratings based on the type of challenging or positive behavior.

Finally, although the current sample was diverse, we did not explicitly consider the impact of cultural influences on caregiver behavior examples and attributions for these behaviors. There is evidence for cultural differences in caregivers' attributions of child behavior that may also partially mediate the relationship between ethnicity and mental health service use (Chiang et al., 2000; Yeh et al., 2005). Thus, it would be important for future work to consider the effect of cultural group on caregiver perceptions of their children's challenging and positive behavior, especially within the context of treatment.

Overall, the findings of this study suggest that caregivers of children with ASD and ASD Concerns display a more negative attributional bias in that their children's challenging behavior is viewed as less controllable and more permanent, and their children's positive behavior as less controllable, less permanent, and more situation-specific relative to caregivers of children with Other Developmental Concerns or No Concerns. This finding is pertinent when considering the close association between caregiver attributions and important parenting factors such as discipline style, motivation to engage in parent-mediated child treatment, and successful child and caregiver treatment outcomes (e.g., Choi & Kovshoff, 2013; Novick et al., 2022; Sawrikar et al., 2018), which can have an impact on the long-term parent–child relationship and key individual outcomes. Previous research has suggested that parental attributions are malleable with intervention and may be an important focus for enhancing treatment outcomes in parent behavioral training (Sawrikar et al., 2020). However, work with young children, especially those not yet diagnosed with ASD, has yet to apply these findings. Future research should aim to examine the relationship between caregiver attributions of children with ASD related concerns and treatment participation, acceptability, and outcomes as well as investigate the integration of changing attributions into ASD-specialized early intervention.

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## Declarations

**Conflict of interest** All authors declare that they have no conflicts of interest.

**Data Availability** The datasets used and analyzed during the current study are available from the corresponding author on reasonable request.

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