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Temper Tantrums in Toddlers and Preschoolers: Longitudinal Associations with Adjustment Problems

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ABSTRACT: *Objective:* We examined parent reports of temper tantrum characteristics (e.g., frequency, duration, and behavioral profile) in toddlers and preschoolers and their longitudinal association with internalizing and externalizing adjustment problems. *Methods:* Parents of 1- to 5-year-olds (N = 861, M_{age} = 36 months, 47% girls) reported their child's temper tantrum frequency, duration, and behaviors. A subsample also reported on their child's tantrums and adjustment problems 1 year later (n = 252). We first compared the distribution of temper tantrum frequency and duration for different ages. Next, we examined which factors underlie the tantrum behaviors and whether behavioral profiles could be distinguished based on configurations of these factors within children. Finally, we performed regression analyses predicting internalizing and externalizing adjustment problems by temper tantrum frequency, duration, and behavioral profile, controlling for child sex and age. *Results:* Chi-square tests indicated that overall, tantrum frequency declined, whereas tantrum duration increased across the 1- to 5-year age range. We found that based on 4 tantrum behavior factors (anger, distress, aggression, and self-injurious behavior), 3 profiles characterized the tantrum behavior of children in the sample: a low-intensity profile (26%), a moderate-intensity profile (32%), and a high aggressive/self-injurious profile (42%). More frequent tantrums predicted more externalizing problems, whereas longer tantrum duration predicted internalizing problems. The high aggressive/self-injurious profile predicted adjustment problems above and beyond tantrum duration and frequency. *Conclusion:* Parent reports of different tantrum characteristics are uniquely predictive of different types of problems and may each be important to include in screening efforts for adjustment problems in young children.

(*J Dev Behav Pediatr* 43:409–417, 2022) **Index terms:** temper tantrums, externalizing problems, internalizing problems, preschoolers, toddlers.

Temper tantrums are generally believed to be a normal phenomenon that naturally fades as children grow. At the same time, tantrums are considered early symptoms of disruptive behavior problems[1,2] and are implicated in the development of both behavioral[3] and mood disorders.[4] Although temper tantrums might be a first signal of problematic development, surprisingly little is known about their prevalence. A large-scale study of 1490 children between the ages of 3 and 5 years showed that most children (83.7%) had displayed some form of tantrum during the past month, but only 4.4% of children had displayed tantrums daily, indicating that especially daily tantrums may be problematic.[5] Overall, tantrums were most frequent for 3-year-olds and declined thereafter. However, this study did not include children younger than 3 years, leaving unclear whether tantrum frequency peaks earlier. Another smaller sample study (N = 132), including children younger than 12 months up to 13 years, found that 21% of children had daily tantrums, but this estimate was not differentiated by age.[6] More research is needed to establish how temper tantrum frequency is distributed for different ages. Daily tantrums may be more normative for children younger than 3 years, making this a less informative indicator for this age. More knowledge about temper tantrums is necessary to allow for a distinction between normal and abnormal presentations of dysregulated temper, helping parents and professionals to evaluate when they may need to worry about children's behavior.[7]

In addition to tantrum frequency, we propose that tantrum duration might be an informative indicator of potential problems because children who display especially long tantrums may be getting stuck in a negative emotional state, unable to regulate out of it.[8] Potegal et al.[9] reported a duration between 1 and 5 minutes for 75% of children, with the average duration increasing by around a minute per year from around 2 minutes for 1-year-olds to 4 minutes for 4-year-olds. Another study, including children from ages

12 months up to 13 years, reported a duration of less than 5 minutes for only 8% of cases and a duration of 5 to 10 minutes for 47% of cases.[6] Duration was not differentiated by age here, but perhaps the higher percentages of longer durations were due to the inclusion of older children, although one might expect that as emotion regulatory capacity increases with age, overall tantrum duration would decrease. However, duration may increase because children become more goal-directed as they get older.[10] This may lead children to become even more frustrated when their goal is blocked and at the same time may result in more instrumental tantrum behavior that is aimed more toward trying to get caregivers to give in to them. At the same time, children become less easily distracted, which may also help them to sustain their tantrums for longer to try and achieve their goal.[11]

TEMPER TANTRUM BEHAVIORS: FACTORS AND PROFILES

Problematic tantrums may be further distinguished by the type of behavior that children display. A study that coded tantrum behaviors from parental narratives describing their children's tantrums as they occurred derived the following behaviors: crying, screaming, shouting, lowering the body/falling to the floor, kicking, hitting, pulling/pushing, running away, freezing, stamping, whining, throwing something, and clinging to someone.[12] Investigation of the underlying structure of these behaviors yielded 5 factors: high, intermediate, and low anger; distress; and coping style. Another study of 279 3- to 6-year-old children[4] included a wide range of aggressive behaviors: kicking others, hitting others, throwing objects, breaking objects, hitting self, head banging, holding breath, biting self, nondirected kicking, stamping feet, hitting wall, biting others, and spitting. Within the aggressive behavior, 4 factors could be distinguished: destructive aggressive behaviors, self-injurious behavior, nondestructive aggression, and oral aggression (i.e., biting or spitting). Children with a disruptive behavior and/or major depressive disorder diagnosis had elevated levels of all these aggressive behavior factors.

Although a multitude of tantrum behaviors can be described by a few underlying factors, not all combinations of these factors may be equally likely. For instance, although most children may display more distressed than aggressive behavior, a small subgroup of children might be characterized by high levels of different types of aggressive behaviors. Taking a person-centered approach, examining which typical within-child configurations of tantrum behaviors can be identified, might be especially helpful for clinicians and parents in helping to identify children at risk for developing problems because it is more in line with the actual presentation of temper tantrums in children.

TEMPER TANTRUM CHARACTERISTICS AND ADJUSTMENT PROBLEMS

Knowing which characteristics are relatively common versus which are relatively rare can provide an indication of a distinction between normal and problematic temper tantrums in young children. At the same time, although research has shown that temper tantrums are associated with adjustment problems,[3,4] it is not yet known whether different tantrum characteristics are equally predictive of adjustment problems. In addition, we do not know whether different characteristics are associated with internalizing versus externalizing adjustment problems. Those tantrum characteristics that are most predictive of later adjustment problems would be especially important to include in the screening of young children at a time when much may still be done to prevent these problems.

THIS STUDY

Our first aim was to investigate how several characteristics of temper tantrums differ across ages. To this end, we cross-sectionally investigated tantrum frequency and duration in a large sample of tantrums of 1- to 5-year-old children (parents reported about N = 861 individual children, with n = 279 providing information for 2 ages, resulting in a total sample N = 1140 cases for tantrum descriptions). We expected around 5% of 3-year-old children to display daily tantrums[5] and likely a somewhat higher percentage in younger children.[6] Regarding tantrum duration, we expected that most tantrums would last either up to 5 minutes[9] or between 5 and 10 minutes,[4,6] with tantrum duration increasing with increasing age.[9] In addition, we examined whether tantrum behaviors could be described by a few underlying tantrum behavior factors, differentiating other directed aggressive behaviors from self-injuring[4] and general distress behaviors.[12] As this study includes a community sample and more severely aggressive and self-injurious behaviors are characteristic of children with more serious problems,[4] we expected that a small group of children would be characterized by a profile scoring relatively high on aggressive and/or self-injuring behavior factors. Finally, we examined the unique predictive value of the different temper tantrum characteristics (frequency, duration, and behavioral profile) for internalizing and externalizing adjustment problems 1 year later (N = 202).

METHOD
Sample

This study is part of a larger study examining temper tantrums in toddlers, approved by the ethical review board of the department of Child Development and Education at the University of Amsterdam (ref: 2015-CDE-6367). Between February 2016 and June 2018, bachelor students recruited a community sample of parents with 1- to 5-year-old children online and face-to-face in Amsterdam for a research practical. Parents gave informed consent in the online study environment. In each year of data collection, parents could win a gift certificate of 50 euros. At T1, 884 parents filled out the

questions regarding temper tantrums. Data for 11 children were excluded from our analyses because of severe physical disabilities or developmental delays that could affect socioemotional development, and 12 children were excluded because they were younger than 10 months or older than 5 years, resulting in a total sample of N = 861 children. Of these, 408 parents indicated they would like to be contacted about a follow-up study. These participants were e-mailed a follow-up questionnaire approximately a year after their T1 measurement. Among those who indicated interest in the follow-up study, there was a response rate of 71%, with n = 289 parents who eventually provided information on temper tantrums at the follow-up and n = 279 parents who had children who fell within the age range of interest at the follow-up. A sample of n = 252 filled out information regarding child problem behavior (months to follow-up: M = 12.18, SD = 1.37, range 9–15 months). In the longitudinal analyses of the predictive value of tantrum characteristics, only children who had ever had a tantrum could be included, resulting in a sample of n = 202. For an attrition analysis, see supplementary material S1, Supplemental Digital Content 1, http://links.lww.com/JDBP/A352. For the final sample, the children's mean age at T1 was 36 months (SD = 14.16 months, range = 10–71 months; 53% boys), and parents' mean age at T1 was 33 years (SD = 4.75 years, range = 21%–51%; 95% were mothers). Most were 2-parent families (93%), with most children having siblings (67%) and attending day care (75%). Most parents had a college degree (73%), followed by secondary vocational education (21%) and high school (6%).

Instruments

Tantrum Characteristics

Tantrum characteristics were assessed at both T1 and T2. To assess tantrum frequency, tantrum duration, and tantrum behaviors, we first asked parents whether their child ever had a tantrum. If parents responded with "yes," we asked them about the tantrum frequency in the past month. Parents could choose from 5 answer categories: (0) *not at all*, (1) *1 or 2 times*, (2) *each week*, (3) *multiple times a week*, or (4) *(almost) every day*. Children who were reported to never have had a tantrum were assigned a score of 0 on the variable that assessed tantrum frequency in the past month. To assess tantrum duration, parents filled out how long a temper tantrum usually lasted for their child on a 4-point scale: 1 (*less than 5 minutes*), 2 (*6–10 minutes*), 3 (*11–30 minutes*), or 4 (*more than 30 minutes*). Next, parents reported on a scale from 1 (never) to 7 (always) how often their child displayed the following behaviors during a tantrum: screaming, crying, kicking, hitting, throwing the body to the floor, throwing an object, pushing/pulling, spitting, grabbing onto someone or something, biting, stamping, banging head to wall/floor, holding breath, freezing, or running away. Behaviors were included from a previous study that derived these behaviors from parental descriptions of tantrums (we excluded affiliate and whine, which were only coded as tantrum behaviors if they accompanied another tantrum behavior).[12] We added head banging, biting, and holding breath because these were included in several other studies[4–6] and included "grabbing hold of someone/something."

Adjustment Problems

At T2 only, parents filled out 25 items of the Internalizing Problem Scale (the emotionally reactive, withdrawn, and anxious/depressed subscales, e.g., "My child is unhappy, sad, or depressed") and 24 items of the Externalizing Problem Behavior Scale (the attention problem and aggressive behavior problem subscales, e.g., "My child does not seem to feel guilty after misbehavior") of the Dutch version of the Child Behavior Checklist (1, 5-5).[1] Parents are instructed to indicate for the past 2 months how characteristic the item was of their child's behavior, with each item rated as 0 (*not true*), 1 (*sometimes/somewhat true*), or 2 (*often/very true*). We excluded the item "has temper tantrums or hot temper" from the externalizing subscale for this study to avoid item overlap. An internalizing variable and an externalizing variable were computed by averaging scores across items. Cronbach's alphas for the present sample were 0.87 for externalizing problems and 0.86 for internalizing problems.

Data Analysis

We first describe percentages of each tantrum frequency and duration category for each 1-year period between 1 and 5 years. As χ^2 tests indicated that none of the T1 and T2 reports for the same ages differed significantly, it was feasible to combine the T1 reports and the T2 reports for the same ages. Differences in distributions of answer categories for tantrum frequency and duration for the different age groups were tested using χ^2 tests. Regarding the tantrum behaviors, we first performed an exploratory factor analysis (EFA) (with categorical variables) to examine whether the behaviors could be reduced to several underlying factors. The final solution was selected based on the number of factors that provided a significant improvement in the model fit, the absolute model fit of the model (with Root Mean Square Error of Approximation close to 0.06 and Comparative Fit Index and Tucker-Lewis Index close to 0.95 indicating good fit[13]), and the interpretability of the factors. We report all factor loadings >0.26.[12] Next, we fitted a confirmatory factor model (CFA) to the chosen solution, saved factor scores, and used these as an input for a latent profile analysis (LPA) to examine whether subgroups could be distinguished based on their scores on the underlying factors. We assessed the model fit of the LPA with the Lo-Mendell-Rubin adjusted likelihood ratio test, which compares models with a model with k-1 profiles,[14] and the sample size—adjusted Bayesian information criterion. When these fit indices were contradictory, we consulted the bootstrap likelihood ratio

test.[15] Next, we performed a multivariate analysis of variance to examine differences between profiles in the tantrum behavior factors.

To answer our final research question, regarding the predictive value of each of the temper tantrum characteristics at T1 for internalizing and externalizing problems at T2, 2 hierarchical regression analyses were run. We added child sex and age as control variables in the first step and tantrum frequency, tantrum duration, and tantrum behavioral profile (dummy coded) as predictors in the second step. When outliers were detected (>3 SDs above the mean), the results were presented without outliers, and differences between the final sample and the full sample were indicated in the text. Analyses were performed using IBM SPSS (version 25),[16] with the exception of the EFA, CFA, and LPA, which were performed in Mplus, version 7.31.[17]

RESULTS
Tantrum Frequency and Duration

Percentages of each tantrum frequency and duration category for each 1 year period between 1 and 5 years are given in Table 1. The percentage of children who ever had a tantrum versus those who did not differed significantly across ages, $\chi^2(4) = 24.30$ and $p < 0.001$, with a significant increase from age 1 to 2 years and further stability across older ages. For each age, children were most likely to have had a tantrum once or twice in the past month. The percentage of children who had daily tantrums was between 10.1% and 11.9% for 1- and 2-year-olds and only between 2.4% and 5.1% for 3- to 5-year-old children.

Although tantrum frequency decreased as children got older, average tantrum duration increased ($\chi^2(12) = 54.45$, $p < 0.001$): 1- to 3-year-olds typically had tantrums that lasted 1 to 5 minutes, whereas approximately as many 4-year-olds had tantrums lasting up to 10 minutes. Most 5-year-olds had tantrums that lasted between 6 and 10 minutes. Tantrums that lasted longer than 30 minutes were very uncommon at any age, with the highest in-

cidence at age 2 years (2.3%). Boys and girls did not differ regarding tantrum frequency, $T(1024.08) = 1.71$, $p = 0.088$, or duration, $T(882) = 0.903$, $p = 0.367$. We found significant longitudinal associations for tantrum frequency (Spearman's r = 0.46, $p < 0.001$) and duration (Spearman's r = 0.50, $p < 0.001$), indicating that relative differences between children in these characteristics were moderately stable across time.

Tantrum Behavior Factors and Profiles

The exploratory factor analysis of the tantrum behaviors indicated a significantly improving model fit up to a 6-factor solution, which fit the data well (Root Mean Square Error of Approximation [RMSEA] = 0.018 [0.000; 0.031], Comparative Fit Index [CFI] = 0.998, Tucker-Lewis Index [TLI] = 0.993). However, one factor emerged that was only indicated by "down," and another factor separated biting and stamping from other angry and aggressive behaviors. As these 2 factors could not be readily interpreted, we inspected a solution with 2 factors less. This solution fit the data well (RMSEA = 0.055 [0.047; 0.063], CFI = 0.965, TLI = 0.993) and differentiated a distress factor (yelling, crying, or down) from an anger factor (screaming or stamping), an aggression factor (kicking, hitting, throwing, pushing/pulling, spitting, grabbing, biting, or running away), and a self-injurious behavior factor (banging head, holding breath, or freezing). For factor loadings, see Table 2.

Next, we fitted a confirmatory 4-factor model. After including residual covariances among items based on modification indices (of these, 6 covariances were not included because they resulted in an error in model estimation), the model fit the data well (RMSEA = 0.055 [0.048; 0.062], CFI = 0.959, TLI = 0.933), and all factor loadings were significant and in the expected direction. Saved factor scores served as an input for latent profile analysis, with variances freely estimated across classes. A 2-profile model fit significantly better than a 1-profile model (Lo-Mendell-Rubin [LMR] adjusted likelihood ratio test [LRT] [9] = 1375.10, $p < 0.001$, and Bayesian

Table 1. Temper Tantrum Frequency and Duration Distribution Across Ages

Age	Tantrum Frequency						Tantrum Duration			
	Ever had a tantrum (%)	Never in past month (%)	1–2 times (%)	Every week (%)	Multiple times a week (%)	Almost every day (%)	1–5 min (%)	6–10 min (%)	11–30 min (%)	>30 min (%)
1-year-olds (n = 193)	78.2$_a$	23.6$_a$	28.7$_a$	16.3$_a$	21.3$_{a,b}$	10.1$_{a,b}$	73.3$_a$	22.2$_a$	4.4$_a$	0.0$_a$
2-year-olds (n = 328)	88.4$_b$	12.5$_b$	35.6$_{a,b}$	22.4$_a$	17.5$_{a,b,c}$	11.9$_b$	52.8$_b$	37.0$_b$	7.9$_{a,b}$	2.3$_a$
3-year-olds (n = 307)	91.5$_b$	9.5$_b$	43.6$_{b,c}$	17.6$_a$	24.2$_b$	5.1$_a$	51.8$_b$	35.6$_{a,b}$	12.1$_{a,b,c}$	0.4$_a$
4-year-olds (n = 212)	91.0$_b$	10.6$_b$	55.0$_c$	18.9$_a$	11.7$_{a,c}$	3.9$_a$	41.6$_{b,c}$	42.2$_b$	14.9$_{b,c}$	1.2$_a$
5-year-olds (n = 100)	83.0$_{a,b}$	20.0$_{a,b}$	54.1$_c$	17.6$_a$	5.9$_c$	2.4$_{a,b}$	32.4$_c$	47.1$_b$	20.6$_c$	0.0$_a$

Different ages that have the same subscript within a category of temper tantrum frequency or duration are not significantly different. Ever had a tantrum, $\chi^2(4) = 24.30$, $p < 0.001$; tantrum frequency in the past month: $\chi^2(16) = 79.19$, $p < 0.001$.

Table 2. Loadings of the Behavior Items for the Confirmatory 4-Factor Model

Behaviors	F1: Anger	F2: Distress	F3: Aggression	F4: Self-Injurious
Yelling	*0.605*			−0.334
Stamping	0.406			
Screaming	0.387	**0.433**		
Crying	0.432	**0.561**		
Down		**0.587**		0.320
Kicking			**0.580**	
Hitting			**0.732**	
Throwing something	−0.287		**0.805**	
Pushing/pulling			**0.743**	
Spitting			**0.555**	
Grabbing			**0.243**	
Biting			**0.473**	
Running away			**0.303**	
Banging head				**0.442**
Holding breath				**0.858**
Freezing				**0.792**

Only cross loadings >0.26 are displayed, with the highest loadings in bold.

information criterion [BIC] = 2921.63). The LMR test did not indicate that a 3-profile model fit better than a 2-profile model (LMR adjusted LRT (9) = 666.87, p = 0.053), but the BIC did decrease (BIC = 2276.46). Therefore, the bootstrap likelihood ratio test (BLRT) was consulted, which indicated a significant improvement in the model fit (BLRT (9) = 677.77, p < 0.001). For the 4-profile model, the LRT test was again not significant, whereas the BIC did decrease (LMR adjusted LRT test (9) = 424.94, p = 0.092, adjusted BIC = 1878.61). For this model, the best log likelihood was not replicated for the BLRT (even with random starts increased to 500 and final stage iterations increased to 200). Therefore, the 3-profile model was chosen as the final model.

A multivariate analysis of variance on the factor scores indicated that the overall effect of the profile was significant ($F(81,780) = 244.51$, p < 0.001, Wilks Λ = 0.23, partial η^2 = 0.52). Effects were significant for all tantrum factors at p < 0.001, with a partial η^2 of 0.59 for anger, 0.68 for aggression, 0.61 for distress, and 0.52 for self-injurious behavior. Post hoc tests indicated that all factors significantly differed between classes at p < 0.001. For a graphical representation of the mean factor scores for the profiles, see Figure 1.

The smallest profile was relatively low on all tantrum factors; we called it the low-intensity profile (26%). A moderate-intensity profile (32%) was mostly elevated on aggression relative to the low-intensity profile. Levels of distress and anger were also elevated, whereas levels of self-injurious behavior were only very slightly higher. Finally, an aggressive/self-injurious profile had the highest levels of distress and anger and especially high levels of aggressive and self-injurious behavior relative to the other profiles. Unexpectedly, with 42% of the children

classified as belonging to this profile, it made up a large part of the sample. General loglinear modeling indicated a significant association between T1 and T2 classification, $\chi^2(4) = 29.30$, p < 0.001; staying in the same profile occurred more often than expected by chance, whereas transitioning to another profile did not. Boys and girls did not differ in the relative distribution of cases across the profiles, $\chi^2(2) = 1.27$, p = 0.531.

Prediction of Adjustment Problems

For externalizing problems, no outliers were detected, whereas for internalizing problems, 2 outliers were detected. The results without outliers are summarized in Table 3, and main differences between the results of analyses with and without outliers are indicated in the text.

For externalizing problems, the first step (including child sex and age) was significant ($F(2,199) = 5.06$, p = 0.007, R^2 = 0.05). Girls had less externalizing problems than boys did, whereas age was not a significant predictor. Adding the tantrum characteristics resulted in a significant improvement ($\Delta F(4,195) = 6.95$, p < 0.001, ΔR^2 = 0.12). Controlling for child sex and age, higher tantrum frequency predicted more externalizing problems, whereas longer tantrum duration did not. Children in the aggressive/self-injurious tantrum profile exhibited more externalizing problems 1 year later than children in the low-intensity profile, whereas children in the moderate-intensity profile did not.

For internalizing problems, the first step (including child sex and age) was not significant ($F(2,197) = 0.80$, p = 0.452, R^2 = 0.01). Adding the tantrum characteristics resulted in a significant improvement ($\Delta F(4,193) = 0.153$, p < 0.001, ΔR^2 = 0.15). In contrast to
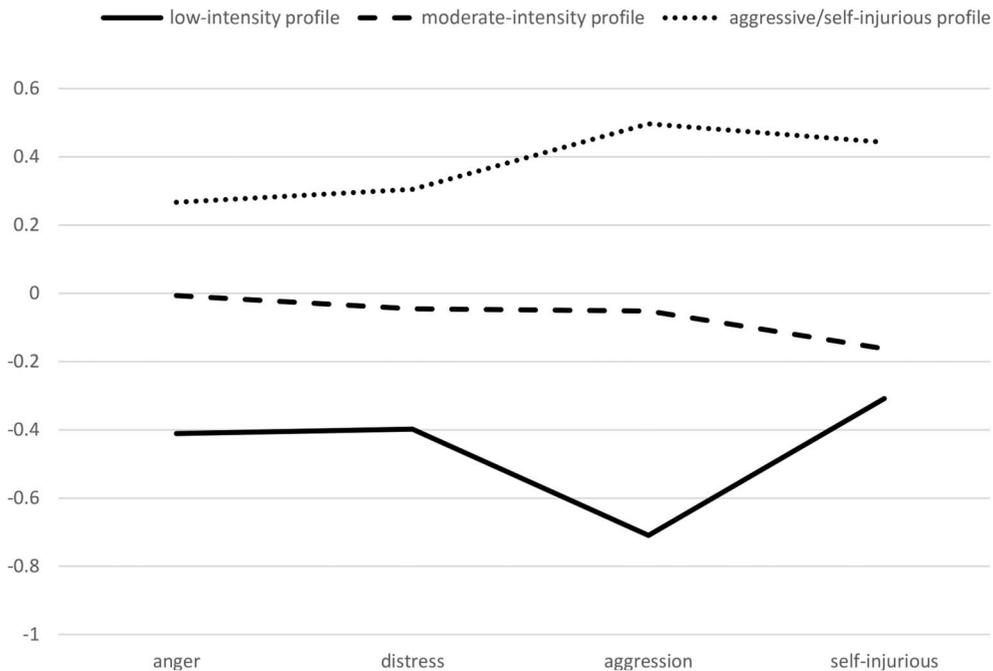
413

Figure 1. Mean levels on the four tantrum behavior factors for the three tantrum behavior profiles.

externalizing problems and controlling for child sex and age, tantrum frequency was not predictive of internalizing problems, whereas longer tantrum duration was. The aggressive/self-injurious tantrum profile also had more internalizing problems than the low-intensity profile, whereas the moderate tantrum profile did not differ. In the model without the outliers removed, the effect of being in the aggressive/self-injurious tantrum profile was no longer significant ($p = 0.072$). Otherwise, the pattern of effects was similar.

DISCUSSION

Our findings indicate that throwing daily tantrums was already quite uncommon for 2-year-olds and only reported for around 12% of the children. However, it was much more common at this age than for children 3 years and older (between around 2% and 5%). The percentages for 3- to 5-year-olds are highly similar to those found by Wakschlag et al.,[5] who found an average of 4.4% for their group and concluded that daily tantrums were an indicator of clinical problem levels in their study. We extend these findings by showing that daily tantrums are twice as common for 1- and 2-year-olds. Therefore, daily tantrums might be a less clear sign of clinically relevant problems for children younger than 3 years. Regarding tantrum duration, up until age 4 years, most tantrums were less than 5 minutes, but for 4- and 5-year-olds, it was most common for tantrums to last between 6 and 10 minutes, indicating that inconsistency in modal duration in previous studies might have been due to different ages included in those studies.[4,6,9]

Tantrum Behavior Factors and Profiles

We differentiated between 4 tantrum behavior factors: anger, distress, aggression, and self-injurious behavior. "Yelling" and "stamping" clearly loaded on the anger factor, and "down" (i.e., throwing oneself to the

Table 3. Results of the Regression Analyses Predicting T2 Internalizing and Externalizing Behavior

	Externalizing Problems			Internalizing Problems		
	b(SE)	β	p	b(SE)	β	p
Intercept	0.47 (0.09)		<0.001	0.08 (0.06)		0.197
Child sex[a]	−0.08 (0.04)	−0.14	0.041	0.00 (0.03)	0.01	0.902
Child age (mo)	−0.00 (0.00)	−0.08	0.282	0.00 (0.00)	0.09	0.231
Tantrum frequency	0.05 (0.02)	0.17	0.017	0.01 (0.01)	0.06	0.454
Tantrum duration	0.01 (0.03)	0.03	0.636	0.05 (0.02)	0.16	0.021
Moderate-intensity profile	−0.00 (0.06)	−0.00	0.966	−0.03 (0.04)	−0.06	0.515
Aggressive/self-injurious profile	0.15 (0.05)	0.25	0.005	0.12 (0.04)	0.28	0.002

[a]Child sex was coded: boy = 0 and girl = 1.

floor) clearly loaded on the distress variable, with "screaming" and "crying" also loading substantially on the anger factor in addition to their primary factor of distress. The aggression factor included all behaviors that might harm someone or something, with the item "running away" also loading on this factor as somewhat of an odd one out. Perhaps this reflects a general high level of physical activity for children displaying these aggressive behaviors.[18] Different from our findings, Potegal and Davidson[12] found 3 factors of angry behaviors that differentiated high, intermediate, and low anger rather than destructive aggressive behaviors from non-destructive displays of anger. Our findings are more in line with a qualitative distinction between experiences of anger and displays of aggression[19] so that children can be very angry while still not displaying destructive aggressive behavior, for instance, when they yell very loudly.

Our fourth factor was a self-injurious behavior factor, including "holding breath," "banging head," and "freezing." Similar to the study by Belden et al.,[4] who only included aggressive behavior, the self-injurious behavior factor included "head banging" and "holding breath." They also included "hitting self" and "biting self" as items and did not include "freezing," making the factors not directly comparable. Freezing can accompany a breath holding spell, which may explain why it is included in this factor here.[20] In addition, a study by Belden et al.[44] indicated that children with a diagnosis of major depressive disorder were specifically elevated on the self-injurious behavior factor (as compared with those diagnosed with a disruptive behavior disorder or healthy controls). Perhaps this factor reflects an early tendency to use self-injury as a means to regulate the negative affect, as has been found for adults.[21] Especially in light of recent findings indicating a cumulative incidence of 27% for self-injurious behavior for typically developing adolescents,[22] more research is necessary to investigate the (heterotypic) continuity of this self-injurious behavior across development.

Based on the configuration of scores on the 4 behavior factors, we found that 3 profiles could be distinguished in our sample. We expected that a small group of children would be characterized by a profile displaying relatively high levels of aggressive behaviors. We did find a profile with high levels of aggressive and self-injurious behavior. However, although a minority, this was not a small group (42%), indicating that this profile is relatively common in children. In addition, underscoring the normativity of (some) tantrum behavior, the low-intensity profile was the smallest of the 3 groups, slightly smaller than the intermediate-intensity profile.

Tantrum Characteristics and Adjustment Problems

The second aim of this study was to examine the predictive utility of tantrum frequency, duration, and behavior profile for internalizing and externalizing adjustment problems. We found that different tantrum characteristics differentially predicted internalizing and externalizing adjustment problems: Higher tantrum frequency was predictive of externalizing problems, whereas longer tantrum duration was predictive of internalizing problems. This suggests that the tendency to "lose one's temper" is associated with externalizing problems in children, whereas difficulty "finding one's temper back again" is primarily associated with internalizing problems in children. This idea is supported by the outcomes of previous research, which showed that emotional inertia or the tendency to get stuck in emotions is associated with internalizing psychopathology in adolescents[23] and in adults.[24] In addition, research on temporal ordering of different tantrum behaviors indicates that the first stage of the temper tantrum—losing one's temper—is dominated by anger, whereas distress takes over after a while.[9,25] Longer tantrum duration may thus be an indication of children getting stuck in this distress phase. By contrast, however, although children diagnosed with major depressive disorder have also been found to have longer tantrums than healthy controls, the duration was only slightly higher than for children with a disruptive behavior disorder without major depressive disorder.[4] In addition, a recent study found that in 3- to 5-year-old children, sadness inertia was longitudinally associated with a general measure of impairment, but not to measures of internalizing problems specifically.[26] More research is necessary to investigate whether indeed differences in the temporal dynamics of tantrum behaviors are predictive of internalizing versus externalizing problems.

Whereas tantrum duration and frequency were differentially predictive of internalizing and externalizing problems, being classified in the high aggression/self-injurious behavior profile, although relatively common, was a predictor for both internalizing and externalizing problems, over and above the other tantrum characteristics. As profiles derived from parental reports of tantrum behaviors clearly have an added predictive value above and beyond tantrum frequency and duration, this might be an easy and inexpensive way to better predict which children are at risk for adjustment problems. The potential use of parental reports is especially interesting in light of previous reports that showed a predictive value of clinical observations of children's tantrum behavior above maternal reports of tantrum characteristics.[7] As observations by clinicians are expensive and ttime consuming and might not always be feasible, making more optimal use of parental reports of tantrum behaviors might actually provide a time-efficient, low-cost alternative in further optimizing screening practices in preventive youth care. It is important to note that the specific types of behaviors that we ask about in our study are those that are actually exhibited by many children, just not to the same extent. This is different from the Child Behavior Checklist (which includes "screaming" and "crying" as behaviors that may be displayed during a tantrum but also outside of one),[1] for

which most parents would score zeroes on (almost) all questions. This makes inquiring about temper tantrums less problematic for parents whose children are not at risk, which is of course necessary for screening.

Our results are also relevant to the disruptive mood dysregulation disorder that was added to the Fifth Edition of the Diagnostic and Statistical Manual of Mental Disorders.[27] Frequent temper tantrums (>3 per week) are a main symptom, and the disorder can only be diagnosed after age 6 years because temper tantrums are considered normative before this age.[27] The results of this study show that for children younger than 6 years, severe tantrums are already predictive of later problems, supporting the possibility of extending this diagnosis to younger children,[28] as in the disorder of dysregulated anger and aggression in early childhood in the DC: 0 to 5.[29]

Strengths and Limitations

This study has several strengths. First, we examined multiple tantrum characteristics together in a relatively large sample of children that ranged in age from 1 to 5 years. Second, we took a person-centered approach by examining how tantrum behavior factors were configured differently for different subgroups of children. The benefit of taking a person-centered approach is that it takes into account the fact that different risk factors may cluster within children and that a cluster can be identified that may be especially at risk of problematic development and that can be described to parents and professionals. Third, we included a follow-up assessment allowing us to examine which characteristics were specifically predictive of adjustment problems. Despite these strengths, some limitations are also worth mentioning. First, although we had a relatively large sample for the first measurement, the longitudinal sample was much smaller. This may have explained why the results with and without outliers were different regarding the prediction of internalizing problems from the tantrum behavior profile. Second, we did not include a measure of adjustment problems in the first assessment. Therefore, we do not know whether these tantrum characteristics are an indicator of adjustment problems before they arise or whether children already showed these problems. Relatedly, we examined differences in the distribution of the tantrum characteristics cross-sectionally, and longitudinal research is necessary to examine the development of these characteristics in children as they grow older. In our sample, the percentage of children who had ever had a tantrum was lower for the 5-year-olds than for younger ages. If all children came from the same population, we would have expected this percentage to decrease with age, as more and more children will have ever had a tantrum. Either the 5-year-old sample was different from the other sample in that they were just relatively less likely to have ever had a tantrum or because tantrums were more frequent for younger ages, this might have been underreported for the 5-year-olds because of recall bias. Third, although it is especially useful to see how much predictive value parental reports of their child's behavior are, it should be noted that parents also reported on the child's adjustment problems, and associations may have been influenced by mono-informant bias. Fourth, we did not have any data available on the racial/ethnic background of our sample. Therefore, we do not know whether the sample was representative of the population in this regard. Fifth, our measures of tantrum duration, frequency, and behaviors were not standardized. At present, different measures are used by different studies, with different ranges included in the answer categories.[4-7,9] Devising a standardized measure will help in improving comparability of findings across studies.

CONCLUSION

It has been found that parents of preschoolers with clinical levels of problem behavior are not more likely to seek professional help than parents of children without these problems.[30] A barrier to service use was that most parents believed that the behavior would improve by itself. Although, indeed, for most children this may be the case, some relatively easy to communicate indicators could foreshadow more serious problems. Our study shows, in particular, that daily tantrums, although more common than for 3- to 5-year-olds, still only occur in around 10% of the 1- and 2-year-old children. For 1- and 2-year-olds, a tantrum duration of longer than 5 minutes is quite uncommon, whereas for older children, this would need to be increased to longer than 10 minutes. In addition, when children's tantrums are characterized by aggressive behaviors, especially when they include self-injurious behaviors, it would be good to pay extra attention to children's development. Although this profile is quite common, belonging to this profile predicts more adjustment problems 1 year later. Getting this information to health care providers and parents may aid in the prevention of adjustment problems in children at this early age, when much can still be done to improve developmental outcomes for children. Temper tantrums are a topic that practitioners at well-baby clinics can easily address with all parents because they represent a normal phenomenon of childhood that is very relevant for many parents. As it is important for effective screening to be able to reach the entire population, this may be more effective than asking parents to fill out questionnaires about problems they feel may not apply to them, in which parents may not understand why they are asked these questions or may feel uncomfortable opening up about them.

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