

UNDERSTANDING DIFFICULT TEMPERAMENT IN ADULTS: A MIXED-METHODS STUDY

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Abstract

Difficult temperament is a set of behavioral characteristics that are associated with mental health and a significant predictor of psychopathology. This study aims to investigate which temperamental characteristics can be considered attributes of difficult temperament in Lithuanian adults. The sample consisted of 429 adults between 18 and 79 years of age. The Adult Temperament Questionnaire was used to assess temperamental characteristics and perceived difficult temperament. Data were analyzed using a mixed-methods approach. The results revealed that the set of attributes perceived as constituting difficult temperament includes characteristics such as negative mood, intensity of emotional reactions, low adaptability, withdrawal, and low regularity. Quantitative data analysis uncovered an unexpected negative relationship between perceived difficult temperament and the rhythmicity characteristic, while a new category of stubbornness emerged in the qualitative data. The findings provide new knowledge about both the cultural specifics of difficult temperament and the content of the temperament construct in general. These results can also aid in the development of further research on difficult temperament, as well as in the planning of mental health interventions and psychological counseling.

KEY WORDS: *adulthood, difficult temperament, mixed methods.*

Resumen

El temperamento difícil es un conjunto de características conductuales asociadas a la salud mental y un predictor significativo de psicopatología. El objetivo de este estudio era investigar qué características temperamentales pueden considerarse atributos del temperamento difícil en adultos lituanos. La muestra consistió en 429 adultos de entre 18 y 79 años de edad. Se utilizó el "Cuestionario de temperamento adulto" para evaluar las características temperamentales y el temperamento difícil percibido. Los datos se analizaron mediante un enfoque de métodos mixtos. Los resultados mostraron que el conjunto de atributos percibidos como constitutivos del temperamento difícil incluye características como el estado de ánimo negativo, la intensidad de las reacciones emocionales, la baja adaptabilidad, el retraimiento y la baja regularidad. El análisis de los datos cuantitativos reveló una inesperada relación negativa entre el temperamento difícil percibido y la característica de ritmicidad, mientras que en los datos cualitativos surgió una nueva categoría de terquedad.

Estos hallazgos aportan nuevos conocimientos tanto sobre las especificidades culturales del temperamento difícil como sobre el contenido del constructo temperamento en general. Estos resultados también pueden ayudar en el desarrollo de nuevas investigaciones sobre el temperamento difícil, así como en la planificación de intervenciones de salud mental y asesoramiento psicológico.

PALABRAS CLAVE: *adultos, temperamento difícil, métodos mixtos.*

Introduction

The concept of difficult temperament was proposed by American psychiatrists Thomas and Chess and colleagues in the 1960s (Thomas et al., 1968). The authors drew on data from their influential New York Longitudinal Study (NYLS), which focused on following the behavioral style, or temperament, of the same individuals from infancy to adulthood. At the very beginning of the study (Chess et al., 1959; Thomas & Chess, 1977), the authors found that the behavior of infants was described in terms of nine characteristics of their responses to the environment: activity level, rhythmicity or regularity, approach-withdrawal, adaptability, threshold of responsiveness, intensity of reaction, quality of mood, distractibility, and attention span and persistence. Certain constellations of these characteristics were also observed to form three individual temperament profiles, one of which became known as the difficult temperament (the other two being the easy and the slow-to-warm-up temperaments). In the NYLS sample, ten percent of children fell into the difficult temperament group and were characterized by five of the nine characteristics described above, namely, “irregularity in biological functions, negative withdrawal responses to new stimuli, non-adaptability or slow adaptability to change, and intense mood expressions which are frequently negative” (Chess & Thomas, 1987, p. 43). Further analysis of the NYLS data revealed that a difficult temperament profile in early childhood reliably predicted poor overall adjustment and even psychiatric disorders in adulthood. At the same time, working with patients allowed the authors to conclude that temperament-based intervention made it possible to come closer to achieving the desired professional results (Chess & Thomas, 1986, 1987, 1999). Thus, the authors presented reasonable evidence for both the prognostic and functional value of the difficult temperament, and their proposed concept has attracted the interest of both researchers and clinicians.

Since then, difficult temperament has mainly been studied in children, although both empirical studies and systematic reviews covering later age groups have emerged. Longitudinal studies conducted by other authors have shown that difficult temperament in early childhood is associated with behavior problems throughout childhood (Guerin et al., 1997), predicted delinquency, gang involvement (Wolff et al., 2020), and lack of both empathy and self-control (Javakhishvili & Vazsonyi, 2022) in adolescence, less healthy eating over the lifespan (Lipsanen et al., 2020), developmental trauma and/or post-traumatic stress disorder (Wiseman et al., 2021), non-engagement in education, employment and training (Wu, Maughan, et al., 2022), depressive symptoms and lower well-being

(Wu, Meehan, et al., 2022), and a nearly five-fold increased risk of psychotic disorder in adulthood (Brannigan et al., 2020). Cross-sectional studies in adult samples have also revealed that difficult temperament has been associated with aggressive behavior (Giancola, 2004; Giancola, Parrott, et al., 2006; Giancola, Roth, et al., 2006), while individual temperamental characteristics have been shown to predict attention-deficit/hyperactivity disorder symptoms (Kajka et al., 2020) and sleep quality (Lukowski et al., 2019). These original research findings were supported by systematic reviews that confirmed that difficult temperament was associated with intimate partner violence (Curtis et al., 2023) and criminal behavior (Tharshini et al., 2021), and predicted the course of borderline personality disorder (Winsper, 2021).

It should be noted that researchers have used different theoretical approaches to study difficult temperament, and the measurement of the construct also varies. Some authors focus on the pre-known 'universal' constitution of difficult temperament, which is based on the five attributes proposed in the interactionist theory of Chess and Thomas (Brannigan et al., 2020; Javakhishvili & Vazsonyi, 2022; Wiseman et al., 2021), or defined in the context of other temperament theories, such as the behavior genetics-oriented theory of Buss and Plomin (Pesonen et al., 2003) or the developmental model of Rothbart (Lukowski et al., 2019; Wright & Jackson, 2022; Yu & Yan, 2022). This enables researchers to observe how individual attributes or a derived index of difficult temperament relate to outcomes of interest (e.g., psychopathology). A thorough summary of the structure of temperament profiles in various theoretical contexts was compiled by Cloninger et al. (2019), which allows for parallels to the idea of difficult temperament in different theories. Temperamental characteristics are known to be stable across the lifespan, and temperament profile in particular (Korn, 1984; Pesonen et al., 2003), so such a 'universal' approach is reasonable. Other authors searched for a 'unique' content of difficult temperament, specific to a particular social or cultural group. The latter approach incorporates another concept, goodness-/poorness-of-fit, proposed by Chess and Thomas (Chess & Thomas, 1999). The authors state that developmental outcome is determined not by the specific characteristics of the individual, but by how well they fit with the environmental expectations of the individual's behavior. Thus, temperamental characteristics can acquire functional significance only in a specific social context. In the field of difficult temperament research, this assumption has been repeatedly confirmed in cross-cultural studies (DeVries, 1984; Super et al., 2008, 2020). The authors of these studies have focused not only on the constellation of specific characteristics, but also on the search for an answer to the question of what temperamental attributes characterize a person who is considered to have a difficult temperament. In this way, the social nature of the difficult temperament construct has been highlighted, with important roles being played by both the context in which individuals live, and by the individuals themselves, who perceive their functioning in this context. The latter attitude is relevant to the present study, as difficult temperament has not been studied in Lithuania so far; therefore, before commencing more detailed study of the construct and complex analysis of profiles,

it is necessary to understand what temperamental characteristics Lithuanians consider to be attributes of difficult temperament.

There is a large body of knowledge related to difficult temperament in children, whereas relatively little is known about adults in this regard. As can be seen from the original studies and reviews discussed, the same temperamental characteristics are usually considered to be attributes of difficult temperament, regardless of an individual's age or cultural context. The concept of goodness-of-fit assumes that difficult temperament includes characteristics that most deviate from environmental expectations. It is also known that, even at an early age—for example, in the transition from infancy to early childhood or from early to middle childhood—the same temperamental characteristics take on a different meaning (Carey & McDevitt, 1995, 2016). It is reasonable to assume that the environmental demands placed on adults are also different and therefore the content of difficult temperament may differ. Furthermore, the attribute of difficult temperament in one cultural context may not be the same in another one. Thus, the aim of the present study was to investigate which temperamental characteristics can be considered to be attributes of difficult temperament in Lithuanian adults. According to the originators of the concept, knowledge of personal temperament crystallizes during adolescence, while self-image and self-knowledge are already quite mature in adulthood (Chess & Thomas, 1986, 1999). Therefore, the present study focused primarily on the search for the relationship of temperamental characteristics with perceived difficult temperament by following a variable-oriented access and using a mixed-methods approach. Answering this question is likely to provide new insights into the content of difficult temperament in adulthood and contribute to the effectiveness of clinical work with patients.

Method

Participants

The G*Power calculator (Faul et al., 2007, 2009) was used to determine the sample size. For the chosen type of 'a priori' analysis with an alpha level of .05 and a power of .95, a sample size of approximately 250 would be necessary, depending on the statistical criteria used, to detect the medium effect sizes. The sample used in the current study consisted of 429 adults aged between 18 and 79 years ($M= 35.3$, $SD= 11.7$), including 358 female, 69 male, and 2 nonbinary individuals. The level of education of the participants was as follows: 337 had received higher than secondary education and 92 had reached secondary education or lower. The study participants were from various counties in Lithuania and different types of settlement: 303 were from the largest cities of the country (>100,000 inhabitants), 120 from other cities and towns, and 6 from other types of settlement (e.g., suburb). On a slightly modified ten-point MacArthur Scale of Subjective Social Status (Adler et al., 2000), the study participants rated their social status as 6.4 ($SD= 1.5$) on average. Although the sample was predominantly female, it was fairly close to the population in terms of other sociodemographic characteristics.

Instruments

- a) *Lithuanian version of the Chess-Thomas Adult Temperament Questionnaire* (ATQ2-LT; Behavioral-Developmental Initiatives, 2018; Lazdauskas & McDevitt, 2023). The ATQ2-LT assesses nine temperamental characteristics in two ways. First, there are nine scales consisting of 50 items rated on a seven-point scale (from 'hardly ever' to 'almost always'), namely activity level (6 items), rhythmicity of biological functions (6 items), approach-withdrawal (6 items), adaptability (6 items), threshold of responsiveness (5 items), intensity of reaction (6 items), quality of mood (6 items), distractibility (4 items), and attention span and persistence (5 items). In the present study, alpha reliability ranged from .57 (for attention span and persistence) to .84 (for rhythmicity), with a median of .72. Second, there are nine items rated on a six-point scale designed to measure an individual's general impressions, or perceptions, of the nine temperamental characteristics. This aspect is particularly relevant in the context of the present study when analyzing perceived temperamental characteristics, as it also provides valuable information regarding measurement validity (see Behavioral-Developmental Initiatives, 2018). In the current study, correlations between the respective scales and general impression scores ranged from .338 (for threshold) to .666 (for rhythmicity), with a median of .57.
- b) *Ad hoc perceived difficult/easy temperament scale* (PDT). Participants were asked to rate their overall behavioral style (temperament) on a six-point scale ranging from 'very easy' to 'very difficult'. This rating served as an indicator of perceived difficult/easy temperament (PDT) and also made it possible to divide the sample into three groups: the 'difficult' temperament group included individuals who rated their behavior as 'difficult' or 'very difficult'; the 'moderately easy/difficult' temperament group comprised those who rated their behavior as 'somewhat easy' or 'somewhat difficult'; and the 'easy' temperament group consisted of individuals who rated their behavior as 'easy' or 'very easy'. This approach, drawn from the Chess and Thomas theory-based child temperament assessment instruments, where the caregivers are asked to rate how manageable their child is (Behavioral-Developmental Initiatives, 2014). In the present study, the difficult, moderately easy/difficult, and easy temperament groups consisted of 43, 297, and 89 individuals, respectively. These groups exhibited proportionate similarities in terms of gender ($\chi^2= 1.160, p> .05, V= 0.062$), education level ($\chi^2= 5.390, p> .05, V= 0.112$), and type of settlement ($\chi^2= 0.347, p> .05, V= 0.028$). There was a statistically significant age difference among the groups ($p < .001$), with the difficult temperament group having the lowest mean age. Although the effect size was small ($\omega^2= 0.035$), it was important to consider the age variable in the comparative analyses of the groups. Finally, in order to investigate which characteristics of their behavior adults consider to be the most challenging, an open-ended question was presented asking to comment on which characteristics cause them and those around them the most trouble, that is, make their behavior difficult.

Procedure

A mixed-methods study was organized, and data were collected online using a convergent design (Creswell & Creswell, 2018). Information about the study was disseminated via social networks and personal contacts. All participants were asked to fill out a questionnaire and answer an open-ended question. The sample was self-selected, and written consent was obtained from all participants. The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. The study was approved by the Psychology Research Ethics Committee of Vilnius University (No. 31/(1.3E) 25000-KP-50).

Data analysis

Quantitative and qualitative data analyses were performed simultaneously and then integrated, qualitative codes transforming into quantitative variables (Creswell & Creswell, 2018). The quantitative analysis was performed using the IBM SPSS 28.0 software package. Statistical criteria for quantitative data analyses were determined based on sample size and visual inspection of Q-Q plots. Relationships between variables were tested using Pearson's correlation analysis and contingency tables. ANOVA was employed to test the differences in estimates among the three groups, ANCOVA was utilized to investigate differences between these groups while controlling for age, and Student's *t*-test for independent samples was applied to compare the estimates between the two groups. The effect size was determined using a correlation coefficient in case of correlation analysis, Cramer's *V* in the case of chi-squared, omega-squared in the case of ANOVA and ANCOVA, and Hedges' *g* in the case of Student's *t*-test. The following thresholds for small, medium, and large effect sizes were respectively chosen: .10, .30, and .50 for correlation coefficient (*r*) and Cramer's *V*, .01, .06, and .14 for ANOVA (ω^2) and .20, .50, and .80 for Hedges' *g* (Cohen, 1988; Ellis, 2010). The recommended minimum effect sizes representing a 'practically' significant effect (RMPE) for social science data (Ferguson, 2009) were also taken into account.

Content analysis was used to analyze the responses to the open-ended question (Krippendorff, 2018). All responses were divided into units, which were further deductively categorized according to which of the nine temperamental characteristics they were most closely related to. Assignment to these categories was made on the basis of the theoretical and functional description of temperamental characteristics (Behavioral-Developmental Initiatives, 2018; Chess & Thomas, 1986, 1999), as well as the semantic meaning of the terms in the Lithuanian language (Ermanyte, 2015; Keinys, 2021; Lyberis, 2015) (see Appendix A). These data were further quantified by assigning one point for each category mentioned by the participant. After receiving numerical expressions, statistical analysis was performed using 2x3 contingency tables to compare magnitudes of the categories across the tree PDT groups. For convenience, the data analysis steps are described in more detail in the Results section.

Results

Relationship between temperamental characteristics and PDT

In order to examine whether/how individual temperamental characteristics are related to PDT, a correlational analysis of these variables was conducted. Temperament was measured using scales and participants' general impression of their own characteristics (Table 1). As can be seen, positive medium relationships associated PDT with negative mood and high intensity, expressed in both the scales and general impression scores, as well as with low adaptability, as expressed in the general impression score. It is important to note that the lower confidence interval value for these characteristics was greater than the threshold of RMPE. PDT was positively weakly associated with withdrawal (low approach), as measured by both scale and general impression scores. There was also a weak positive relationship between PDT and distractibility, low adaptability, and low activity level, as expressed in scale scores. Other associations between PDT and temperamental characteristics were negligible and/or did not exceed the RMPE. It is important to note that a negative correlation trend was observed between PDT and rhythmicity. In summary, the strongest associations with PDT were observed for negative mood, intensity, low adaptability, and withdrawal (low approach).

Table 1
Relationship between temperamental characteristics and PDT

| Characteristics | Scale x PDT | | | General impression x PDT | | |
|------------------------|-------------|----------------|----------|--------------------------|---------------|----------|
| | <i>r</i> | 95% CI | <i>p</i> | <i>r</i> | 95% CI | <i>p</i> |
| Activity (low) | .201 | [.108, .290] | <.001 | .199 | [.106, .288] | <.001 |
| Rhythmicity (high) | -.115 | [-.207, -.020] | .017 | -.087 | [-.181, .007] | .070 |
| Adaptability (low) | .218 | [.126, .306] | <.001 | .338 | [.252, .419] | <.001 |
| Threshold (high) | .143 | [.049, .234] | .003 | .135 | [.040, .226] | .005 |
| Approach (low) | .283 | [.193, .368] | <.001 | .270 | [.180, .356] | <.001 |
| Distractibility (high) | .221 | [.129, .309] | <.001 | .176 | [.083, .266] | <.001 |
| Intensity (high) | .317 | [.229, .400] | <.001 | .370 | [.285, .449] | <.001 |
| Persistence (low) | .107 | [.013, .200] | .026 | .091 | [-.003, .184] | .059 |
| Mood (negative) | .477 | [.401, .547] | <.001 | .455 | [.377, .527] | <.001 |

Note: PDT= perceived difficult temperament.

Temperamental characteristics across the PDT groups

The next step in the data analysis was to compare the estimates of temperamental characteristics across the different PDT groups (Table 2).

Analysis of the results revealed that scores of many temperamental characteristics were associated with belonging to the difficult, moderate, or easy temperament groups. This was most true for negative mood, as expressed in both scale and general impression scores: the effect size was large, and the lower confidence interval value exceeded the RMPE. Medium effect sizes were obtained for high intensity and withdrawal (low approach), expressed in both scale and

Table 2
Temperamental characteristics across the different PDT groups

| Characteristics | Group 1 | | Group 2 | | Group 3 | | ANOVA | | | ANCOVA | |
|------------------------|------------|------------------|------------|------------------|------------|------------------|-----------|----------------|---------------|-----------|----------------|
| | M(SD) | M _{adj} | M(SD) | M _{adj} | M(SD) | M _{adj} | F | ω ² | 95% CI | F | ω ² |
| Scale | | | | | | | | | | | |
| Activity (low) | 4.30(1.14) | 4.30 | 3.88(1.11) | 3.88 | 3.45(1.02) | 3.45 | 9.725*** | 0.04 | [0.01, 0.08] | 9.402*** | 0.04 |
| Rhythmicity (high) | 3.52(1.45) | 3.74 | 3.93(1.37) | 3.92 | 4.18(1.39) | 4.12 | 3.385* | 0.01 | [-0.01, 0.04] | 1.274 | 0.00 |
| Adaptability (low) | 3.67(1.31) | 3.67 | 3.24(1.01) | 3.24 | 2.87(0.97) | 2.86 | 9.198*** | 0.04 | [0.01, 0.08] | 9.598*** | 0.04 |
| Threshold (high) | 4.84(1.36) | 4.83 | 4.72(1.12) | 4.72 | 4.32(1.22) | 4.32 | 4.750** | 0.02 | [0.00, 0.05] | 4.639* | 0.02 |
| Approach (low) | 5.19(1.22) | 5.15 | 4.36(1.21) | 4.36 | 3.94(1.16) | 3.96 | 15.654*** | 0.06 | [0.02, 0.11] | 13.766*** | 0.06 |
| Distractibility (high) | 4.02(1.39) | 3.95 | 3.94(1.19) | 3.94 | 3.24(1.13) | 3.26 | 12.381*** | 0.05 | [0.01, 0.10] | 11.507*** | 0.05 |
| Intensity (high) | 4.39(1.24) | 4.47 | 3.89(0.97) | 3.89 | 3.44(0.81) | 3.42 | 14.972*** | 0.06 | [0.02, 0.11] | 17.482*** | 0.07 |
| Persistence (low) | 3.41(0.97) | 3.31 | 3.15(0.97) | 3.15 | 2.94(0.83) | 2.97 | 3.687* | 0.01 | [-0.01, 0.04] | 2.122 | 0.01 |
| Mood (negative) | 4.90(0.88) | 4.88 | 3.87(0.81) | 3.88 | 3.29(0.83) | 3.30 | 55.928*** | 0.20 | [0.14, 0.27] | 52.087*** | 0.19 |
| General impression | | | | | | | | | | | |
| Activity (low) | 3.61(1.12) | 3.59 | 3.58(1.00) | 3.58 | 3.06(1.06) | 3.06 | 9.165*** | 0.04 | [0.01, 0.08] | 8.845*** | 0.04 |
| Rhythmicity (high) | 3.47(1.18) | 3.54 | 3.69(1.08) | 3.68 | 3.93(1.06) | 3.91 | 3.002 | 0.01 | [-0.01, 0.04] | 2.096 | 0.01 |
| Adaptability (low) | 3.49(1.22) | 3.51 | 2.75(0.85) | 2.75 | 2.36(0.80) | 2.35 | 23.633*** | 0.10 | [0.05, 0.15] | 23.802*** | 0.10 |
| Threshold (high) | 3.86(1.32) | 3.87 | 3.85(1.04) | 3.85 | 3.45(0.95) | 3.45 | 5.176** | 0.02 | [0.00, 0.05] | 5.169** | 0.02 |
| Approach (low) | 3.88(1.30) | 3.90 | 3.12(1.09) | 3.12 | 2.76(1.08) | 2.76 | 14.718*** | 0.06 | [0.02, 0.11] | 14.625*** | 0.06 |
| Distractibility (high) | 3.58(1.22) | 3.47 | 3.51(1.07) | 3.52 | 3.00(0.97) | 3.03 | 8.464*** | 0.03 | [0.00, 0.07] | 7.363*** | 0.03 |
| Intensity (high) | 4.12(1.53) | 4.20 | 3.31(0.94) | 3.30 | 2.74(0.89) | 2.72 | 27.851*** | 0.11 | [0.06, 0.17] | 31.305*** | 0.12 |
| Persistence (low) | 2.93(1.32) | 2.86 | 2.82(0.98) | 2.83 | 2.54(0.87) | 2.56 | 3.339* | 0.01 | [-0.01, 0.04] | 2.634 | 0.01 |
| Mood (negative) | 4.09(1.02) | 4.02 | 3.00(0.82) | 3.00 | 2.52(0.84) | 2.54 | 50.549*** | 0.19 | [0.12, 0.25] | 43.916*** | 0.16 |

Note: Group 1 (difficult) n= 43; Group 2 (moderate) n= 297; Group 3 (easy) n= 89. Adjusted mean (M_{adj}) and ANCOVA results were obtained with a gendered as a covariate. *p< .05; **p< .01; ***p< .001.

general impression scores. A medium effect size emerged for low adaptability, expressed in the general impression score. A weak effect size was obtained in cases of low activity level and high distractibility. When controlling for participant's age, no more pronounced changes were observed; adjusted means and effect sizes remained very similar. Thus, the characteristics most associated with belonging to the PDT group in this analysis were negative mood, high intensity, withdrawal (low approach), and low adaptability.

Pairwise comparisons of the PDT groups (see Appendix B) revealed at least two important results. First, as might be expected, the difficult and the easy temperament groups differed the most from each other. The differences were particularly pronounced in terms of negative mood, high intensity, withdrawal (low approach), low adaptability, and low activity level. For many of these characteristics, the lower confidence interval of effect size exceeded the RMPE. Second, the results of the moderate temperament group were more distant from the difficult temperament group than from the easy temperament group.

Content analysis of difficult temperament in three PDT groups

Participants were asked to comment on which characteristics cause them and those around them the most trouble, that is, make their behavior difficult. In the first step of data analysis, the responses of all participants were divided into units, each of which reflected the manifestation of one specific behavior. A total of 756 such units was found. In the second step of the analysis, the units found were categorized according to content (see Appendix A). In this step, 558 (73.8%) units were related to one of the nine temperamental characteristics. The remaining units could not be assigned to these categories for two reasons. First, the answers were too laconic, not revealing the context of described behavior, therefore making it possible to attribute them to at least two characteristics. There were a total of 179 (23.7%) such units. One example of this is the characteristic of 'stubbornness' mentioned by the participants. This term is indicated in Lithuanian language dictionaries as having several meanings (Ermanyte, 2015; Keinys, 2021; Lyberis, 2015). One of them refers to the tendency to persistently pursue one's goals, and the other can describe individuals who are difficult to persuade, who stick to their own positions. Thus, in the first case, the characteristic should be assigned to the category of persistence, while in the other case, it would be more suitable to the category of adaptability. As a result, a new category was created in the course of data analysis. Following a similar principle, the category of 'introversion' was created. Second, the behaviors mentioned by the participants had no relation to temperament (answers such as 'Character', 'I do not drink alcohol', 'I tend to hoard and save', etc.). There were a total of 19 (2.5%) such units, and they were not included in further analysis. The third step of the analysis was to code whether the behavior related to each category was mentioned (=1) or not (=0) by each participant. In this step, the magnitude of categories decreased to 647 because some participants mentioned multiple units belonging to the same category. These steps gradually progressed to quantitative analysis, where eleven contingency

tables were analyzed for each category. The results from these tables are shown in Table 3.

As can be seen (Table 3), the participants of all three groups mostly mentioned the behavior associated with the characteristic of negative mood. This behavior accounted for almost half of all units in the difficult temperament group, almost a third in the moderate temperament group, and just over a quarter in the easy temperament group. Although the difference in proportions between groups was not statistically significant ($p = .059$), the effect size indicated ($V = .115$) that this characteristic could be associated with belonging to the PDT group. Another characteristic of temperament mentioned relatively frequently in all PDT groups was intensity. The association of this characteristic with belonging to the PDT group was evidenced by both statistical significance ($p = .015$) and effect size ($V = .140$). The other two characteristics associated with belonging to the PDT group were adaptability and rhythmicity; significant results were also obtained for both statistical significance ($p = .029$, $p = .074$, respectively) and effect size ($V = .129$, $V = .110$, respectively). It is important to note that the category of stubbornness accounted for a quarter of all units in the entire sample, but its distribution did not differ between groups. In summary, this analysis revealed differences in proportions in categories such as mood, intensity, adaptability, and rhythmicity.

Table 3
Magnitudes of categories in three PDT groups

| Categories | Group 1 | Group 2 | Group 3 | Total | $\chi^2(2)$ | V |
|-----------------|------------|------------|------------|-------------|-------------|------|
| | % (n) | % (n) | % (n) | % (n) | | |
| Activity | 2.33 (1) | 7.07 (21) | 3.37 (3) | 5.83 (25) | 2.776 | .080 |
| Rhythmicity | 18.61 (8) | 8.75 (26) | 6.74 (6) | 9.32 (40) | 5.197 | .110 |
| Adaptability | 20.93 (9) | 10.77 (32) | 5.62 (5) | 10.72 (46) | 7.104* | .129 |
| Threshold | 4.65 (2) | 8.75 (26) | 5.62 (5) | 7.69 (33) | 1.571 | .061 |
| Approach | 6.98 (3) | 11.11 (33) | 15.73 (14) | 11.66 (50) | 2.435 | .075 |
| Distractibility | 4.65 (2) | 2.36 (7) | 3.37 (3) | 2.80 (12) | 0.863 | .045 |
| Intensity | 25.58 (11) | 19.53 (58) | 7.87 (7) | 17.72 (76) | 8.419* | .140 |
| Persistence | 9.30 (4) | 14.82 (44) | 19.10 (17) | 15.15 (65) | 2.250 | .072 |
| Mood | 46.51 (20) | 32.32 (96) | 25.84 (23) | 32.40 (139) | 5.658 | .115 |
| Other | | | | | | |
| Stubbornness | 25.58 (11) | 23.91 (71) | 31.46 (28) | 25.64 (110) | 2.050 | .069 |
| Introversion | 13.95 (6) | 11.79 (35) | 11.24 (10) | 11.89 (51) | 0.214 | .022 |

Notes: Group 1 (difficult) $n = 43$; Group 2 (moderate) $n = 297$; Group 3 (easy) $n = 89$. The table shows the percentage and number of participants who mentioned the behavior associated with the corresponding temperamental characteristics. These data are based on information from eleven contingency tables. * $p < .05$.

Discussion

The main aim of this study was to explore the constituent elements of difficult temperament in a sample of adults by following a variable-oriented approach. On the basis of the descriptive results, it can be seen that the difficult temperament group in the current study comprised ten percent of the total sample, and this was

completely consistent with the results in the NYLS sample (Chess & Thomas, 1987). An integrated analysis of quantitative and qualitative data revealed that temperamental characteristics such as negative mood, intensity of emotional reactions and low adaptability were most closely related to PDT. Quantitative data additionally highlighted the characteristic of withdrawal (low approach), and qualitative data added the characteristic of rhythmicity to the list of difficult temperament attributes. These results were also largely consistent with the content of difficult temperament proposed by Chess and Thomas, which includes all five characteristics listed above. If the results of other researchers are ambiguous due to the characteristics of adaptability, withdrawal, or rhythmicity (e.g., Foulds et al., 2017), negative mood and intensity as possible attributes of difficult temperament have taken leading positions in many studies, regardless of both the specifics of the sample and the question under consideration (e.g., Lipsanen et al., 2020; Lucey et al., 2019; Wiseman et al., 2021). Thus, the results of this study support the idea that certain 'universal' attributes of difficult temperament may exist.

A few characteristics of difficult temperament should be discussed in more detail. The first of them is rhythmicity. This characteristic as an attribute of difficult temperament was highlighted by the results of answers to an open-ended question, where it was found that the magnitude of this category in the difficult temperament group was more than twice as large as in the moderate and easy temperament groups. Quantitative data analysis also showed a weak negative association between rhythmicity and PDT. The latter result was unexpected, because the logic of the instrument used in the study, as well as theoretical assumptions, would allow one to expect a positive relationship between these variables. According to the Chess and Thomas theory, rhythmicity is a characteristic whose interpretation should change depending on the age of the person, that is, high rhythmicity is considered desirable in childhood, while low rhythmicity should ensure easier functioning in adulthood. On the other hand, the originators of the theory indicate that rhythmicity is a specific category that can be greatly influenced by external demands (Thomas et al., 1982), while Super and Harkness et al. (2008) found rhythmicity to be a culturally sensitive characteristic in a sample of children. Thus, it is likely that in the context of the present study, rhythmicity also revealed the cultural essence of this characteristic. This result is also important in a practical sense, as it may help to identify the difficulties experienced by irregular individuals when they are required to follow a strict schedule. Due to pressure from the environment, people can consciously or unconsciously suppress this quality of theirs, and as a result experience constant stress, fatigue, or burnout.

Another noteworthy characteristic is the newly identified characteristic of stubbornness. The magnitude of this category in relation to other categories was noteworthy, as the behavior it describes it was mentioned by as many as a quarter of the participants. This category can be linked to at least two characteristics of the Chess-Thomas theory (see Results), and this was well illustrated by the response of one participant, who stated that she was characterized by 'persistence that can turn into stubbornness'. This suggests that individuals see this behavior as both

helping them to achieve their goals and as hindering their flexible response to changing environmental demands. Although the originators of the theory did not distinguish the characteristic of stubbornness, there have been attempts to study it as part of the content of temperament. For example, Rowe and Plomin (1977) analyzed the results of a questionnaire based on the Chess-Thomas theory with the aim of proposing their own inventory and defining stubbornness as a more broadly interpretable factor. This idea has been supported by other authors (Vereecken et al., 2010), while others have separated it from the difficult temperament constellation, indicating an independent stubborn/persistent temperament set (Peterson Edwards et al., 2001). The latter studies have been conducted in samples of infants and children, but this does not negate the relevance of such behavior in adults. Its importance was clearly demonstrated by the participants' reflection on their stubbornness as a behavior that is challenging for both them and those around them. Another alternative interpretation is that inspired by Guazzini et al.'s (2015) study on the 'stubbornness effect'. It may not be a characteristic of temperament so much as the result of poorness of fit, when the demands of the environment and the person's natural way of responding do not find a common language. Thus, regardless of the chosen interpretation, stubbornness deserves further exploration, especially in the context of interpersonal relationships and psychopathology.

Several limitations of the current study are important to note. First, the study sample was predominantly female. Although individual differences exist regardless of a person's gender, and additional analysis did not show a statistically significant relationship between belonging to the PDT group and gender, the sample could be more balanced in terms of this characteristic. Second, qualitative data analysis was based on answering one open-ended question. On the one hand, such a methodological decision made it possible to analyze the responses of the entire sample. The added value of such a decision was that a large amount of information was gathered about what wording in Lithuanian adults use to describe their difficult behavior. On the other hand, a more detailed interview with the participants would have provided more knowledge about their behavior and the context of its occurrence. Thus, in the future, the findings of this study would be enriched by in-depth interview material or answers to open-ended questions asking for more specific examples of behavior. The reliability of the coding system should also be tested. Third, the primarily objective of this study was to identify attributes of difficult temperament. Therefore, a variable-oriented approach was chosen initially. Subsequently, it would be meaningful to leverage a person-centered approach. This would offer a deeper understanding of the diversity within temperamental profiles. Additionally, it would make sense to extend the study by analyzing the features of the difficult temperament constellation across different clinical samples of adults, as well as to investigate the associations of PDT with the risk of psychopathology in the general population.

The results of the current study support the idea of a set of perceived difficult temperament attributes including negative mood, intensity of emotional reactions, low adaptability, low approach, and low regularity. The constellation of these

characteristics can be used as a basis for further difficult temperament research, as well as for planning mental health interventions and psychological counselling.

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Appendix B
Pairwise comparison of temperamental characteristics among the three PDT groups

| Characteristics | Group #1 vs Group #2 | | | Group #1 vs Group #3 | | | Group #2 vs Group #3 | | |
|------------------------|----------------------|-------------|---------------|----------------------|-------------|----------------|----------------------|-------------|----------------------|
| | T-test | Effect-size | | T-test | Effect-size | | T-test | Effect-size | |
| | t | g | 95% CI | t | g | 95% CI | t | g | 95% CI |
| Scale | | | | | | | | | |
| Activity (low) | 2.296 | 0.60 | [0.05, 0.69] | 4.190 | <.001 | [0.42, 1.17] | 3.288 | .003 | [0.16, 0.64] |
| Rhythmicity (high) | -1.875 | .193 | [-0.62, 0.02] | -2.593 | .029 | [-0.84, -0.10] | -1.481 | .148 | [-0.42, 0.06] |
| Adaptability (low) | 2.540 | .031 | [0.09, 0.73] | 4.177 | <.001 | [0.36, 1.10] | 2.935 | .011 | [0.13, 0.60] |
| Threshold (high) | 0.610 | 1.000 | [-0.22, 0.42] | 2.400 | .050 | [0.04, 0.77] | 2.876 | .013 | [0.12, 0.59] |
| Approach (low) | 4.213 | <.001 | [0.36, 1.01] | 5.595 | <.001 | [0.67, 1.44] | 2.856 | .013 | [0.11, 0.58] |
| Distractibility (high) | 0.388 | 1.000 | [-0.26, 0.38] | 3.483 | .002 | [0.26, 1.00] | 4.820 | <.001 | [0.35, 0.83] |
| Intensity (high) | 3.030 | .005 | [0.17, 0.81] | 5.285 | <.001 | [0.59, 1.36] | 3.873 | <.001 | [0.25, 0.72] |
| Persistence (low) | 1.668 | .261 | [-0.05, 0.59] | 2.666 | .024 | [0.16, 0.89] | 1.781 | .227 | [-0.02, 0.45] |
| Mood (negative) | 7.668 | <.001 | [0.92, 1.58] | 10.553 | <.001 | [1.46, 2.32] | 5.887 | <.001 | [0.47, 0.96] |
| General Impression | | | | | | | | | |
| Activity (low) | 0.174 | 1.000 | [-0.29, 0.35] | 2.875 | .013 | [0.14, 0.87] | 4.186 | <.001 | [0.27, 0.75] |
| Rhythmicity (high) | -1.239 | .639 | [-0.52, 0.12] | -2.309 | .064 | [-0.79, -0.06] | -1.885 | .188 | [-0.23, -0.46, 0.01] |
| Adaptability (low) | 5.018 | <.001 | [0.49, 1.14] | 6.872 | <.001 | [0.78, 1.56] | 3.629 | <.001 | [0.22, 0.70] |
| Threshold (high) | 0.049 | 1.000 | [-0.31, 0.33] | 2.101 | .109 | [0.01, 0.74] | 3.161 | .005 | [0.16, 0.63] |
| Approach (low) | 4.172 | <.001 | [0.36, 1.00] | 5.425 | <.001 | [0.58, 1.35] | 2.660 | .024 | [0.09, 0.57] |
| Distractibility (high) | 0.412 | 1.000 | [-0.25, 0.39] | 2.947 | .010 | [0.18, 0.92] | 3.961 | <.001 | [0.25, 0.73] |
| Intensity (high) | 4.813 | <.001 | [0.46, 1.12] | 7.380 | <.001 | [0.81, 1.59] | 4.660 | <.001 | [0.37, 0.85] |
| Persistence (low) | 0.649 | 1.000 | [-0.21, 0.43] | 2.114 | .105 | [0.01, 0.74] | 2.345 | .058 | [0.06, 0.53] |
| Mood (negative) | 7.923 | <.001 | [0.96, 1.62] | 10.049 | <.001 | [1.32, 2.15] | 4.734 | <.001 | [0.35, 0.83] |

Note: Group #1 (difficult) n= 43; Group #2 (moderate) n= 297; Group #3 (easy) n= 89. P-value adjusted for comparing a family of 3.