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## Beliefs About the World and Coping Strategies in Siblings of Adults with Intellectual Disabilities: The Moderating Effect of Posttraumatic Growth

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### Abstract

Research question: Is there a relationship between beliefs about the world and coping strategies in siblings of adults with intellectual disabilities (ID) and whether posttraumatic growth (PTG) moderates the association. Methods: One hundred and seventy-two siblings of people with ID were included in the sample. The main outcome measures used were the Post-traumatic Growth Inventory (PTGI), the World Assumptions Scale (WAS) and the Coping Orientations to Problems Experienced (COPE). The studies were conducted in Poland. The associations between the variables were examined using correlation and moderation analyses. In the moderation model, beliefs about the world were posited as a predictor, PTG as the moderator, and coping strategies as outcome variables. Main results: Beliefs about the world were significantly associated with the different coping strategies. PTG (total score and individual dimensions, except for spiritual changes) positively correlates with beliefs about the kindness of the world and has significant links with the various coping strategies. PTG moderates the associa-

tion between beliefs about the world and coping strategies in siblings of adults with ID. Conclusions: Beliefs about the world and coping strategies are significantly related and their association is moderated by PTG in siblings of adults with ID.

**Keywords:** beliefs about the world, coping strategies, posttraumatic growth, siblings, intellectual disabilities.

## Introduction

The increasing life expectancy of people with intellectual disabilities (ID) is related to new and improved standards of care provided to them. Since ageing parents start needing support, the basic activities of caring are transferred to adult siblings without disabilities (Coyle et al., 2014; Kruithof et al., 2021). The life situation of siblings of adults with ID specific/exceptional in many respects. While there are already extensive analyses of siblings, one of whom has an ID, focused on childhood and adolescence, there is relatively little research focused on their adulthood. Adulthood includes different, distinctive features of sibling relations, mainly due to new life roles, changing the needs of siblings with disabilities, and the consequences of ageing in parents who cannot continue to be caregivers (Lee & Burke, 2018; Avieli et al., 2019). Although many similarities in the relationships with siblings with ID have been found to those with non-disabled siblings in adulthood, a variety of unique interactions and circumstances have been revealed that affect the nature of the relationships directly resulting from experiencing disability (Doody et al., 2010). Disability is treated as the main trajectory in the life of family members (including siblings), determining their everyday life, roles, perceptions of their place in the world, and predicting their future functioning (Farrell & Krahn, 2014).

The characteristic elements of this period of the functioning of siblings of adults with ID include, *inter alia*, a) the emotional impact of the relationship with the sibling manifested in experiencing together joy, guilt, frustration, stress, anxiety and distance, often as a consequence of the care already provided and future duties (Rossetti & Hall, 2015); b) the need to combine the role of a caregiver of an adult sibling with a disability with other life roles like a parent, an employee, a caregiver for ageing parents, etc. (Hall & Ros-

setti, 2018); c) the needs of siblings with disabilities increasing with age, while parents too require increasing care (Arnold et al., 2012); d) concerns about performing caring responsibilities adequately and responsibly (Burke et al., 2015; Davys et al., 2016); and e) difficulties in successfully fulfilling the role of a guardian with insufficient support from the environment (Coyle et al., 2014).

The specificity of the functioning of siblings of adults with ID is manifest not only in taking over the care of their brother or sister with a disability but also in various dimensions of involvement therewith and performing additional roles not directly related to caregiving. Rossetti and Hall (2018) revealed that the roles most frequently adopted by these siblings include friend, advocate, caregiver, and sibling. They also distinguished five potential categories of adult sibling role involvement, viz. companion, least involved, highly involved, needs-focused, and professional. Arnold and Heller (2018) emphasise that the experience of caring for an adult sibling with an ID is reflected in at least five areas: health and well-being, financial situation, cultural context, quality of relations with siblings, and planning for the future, in which care is an integral part of everyday functioning. Other researchers (Hodapp et al., 2017) point to similar areas of functioning of these siblings, highlighting problems/challenges (including life successes), life choices (marriage, children, career choice), sibling relations, and current and anticipated future care for siblings with ID. Importantly, research suggests that even when people report not having strong relationships with their siblings with ID, they still feel strongly responsible for their everyday lives, the quality of their functioning, etc. They take over, naturally, the responsibility for their siblings with disabilities and all related challenges that are part of adult life and decisions about the future (Heller & Arnold, 2010; Kruithof et al., 2021).

The psychosocial effects of having adult siblings with ID, accumulating around the care provided, have not been clearly defined in research so far. As shown by a research review by Lee and Burke (2018), early research emphasised problems, burdens, and experiences of higher levels of stress, and anxiety. In recent years, increasing attention has been paid to the positive aspects. While research results are inconclusive, in general, they reveal a rather stable and long-term close relationship with siblings with intellectual disability (Heller & Arnold, 2010), or an improvement in relations with siblings that in-

creases with age, most evident in adulthood (Tomeny et al., 2017), and greater emotional closeness (Floyd et al., 2016). Adult siblings of people with ID are shown to experience post-traumatic growth (Findler & Vardi, 2009), character enhancement, improved morality, cohesion of family relationships (Heller & Arnold, 2010), a sense of being more responsible, tolerance for differences, and better perception of goodness in others, more flexibility and helpfulness (Wilson et al., 2008; Rossetti & Hall, 2015). Data also show positive and satisfying relationships with siblings closely related to good health and the perception of the benefits of being a sibling to a brother or sister with a disability (Hodapp & Urbano, 2007), positive attitudes towards relations with siblings correlated with greater satisfaction with life (Tomeny et al., 2017), positive daily relations with siblings with disabilities (including Down syndrome), and satisfaction with spending time together (Rossetti et al., 2020). Moreover, adults caring for their siblings with disabilities are more likely to point out the benefits of their relationship, compared to those who do not play this role (Lee et al., 2019).

## **Beliefs about the world and coping strategies**

The so-called core beliefs of an individual about the world, humans, and one's own place in the environment are generalised; they underlie the processes of perceiving and assessing specific situations and circumstances (Jeavons & Greenwood, 2007). The functional role of beliefs, as expressed in the cognitive assessment of phenomena, is relatively well established in the literature on stress, coping, and constructive consequences of traumatic events (Linley & Joseph, 2004; Janoff-Bulman, 2006; Littleton et al., 2007; Tedeschi et al., 2007). Using various strategies for coping with the difficult situations encountered results from using cognitive resources, including assumptions about the world, and the assessment based thereon. Effective coping requires aligning cognitive assessment and a selected strategy. Better adaptation is associated with the adoption of problem-focused strategies in controllable situations and emotion-oriented methods in uncontrolled circumstances (Lazarus & Folkman, 1984). Empirical findings indicate that effective coping is beneficial/adaptive in situations assessed as extremely uncontrolled or poorly controlled (Stanisławski, 2019). Research has shown that belief in the possi-

bility of controlling events and the impact of random situations is associated with adopting different ways of coping with stress. Recognising that the external world is unpredictable, determining the individual's situation, leads to avoidance coping, whereas belief about having an influence on the environment and that the order and purposefulness of the world are subject to personal control, correlate with the flexibility of coping and, depending on the situation, the use of strategies focused on the problem, emotions, and also avoidance (Wu et al., 2020).

Generalised beliefs that the world is orderly, meaningful, and generally favourable to people (referred to as basic hope) positively correlate with the tendency to cope by withdrawing in a situation of loss and a real lack of influence (Trzebiński & Zięba, 2003). Analyses of the significance of these beliefs for the adaptability of a direct reaction to a difficult situation show that they may impact the constructiveness of pre-decision cognitive processes. Research shows that stronger positive beliefs about the world affect positive thinking about the difficulties encountered and the positivity of the emotions related to them (Trzebiński & Zięba, 2004), and they are positively correlated with task-based coping strategies (Byra, 2014).

The relationship between generalised beliefs about the world and coping has not been tested extensively among members of a family with a person with ID. It is relatively well proven that these families cope to varying degrees depending on gender, life stage, family structure, degree of disability, and quality of the relationship (Grant & Whittell, 2001; Moyson & Roeyers, 2011; Jurkiewicz, 2017). Orsmond and Seltzer (2007) found that adult siblings of people with ID more often use problem-focused strategies when they have a better relationship with the sibling and stronger beliefs about the unsuccessful future of their brother or sister. The factor that significantly differentiates the coping strategies applied is gender. Prino et al. (2019) concluded that women more often used transcendent-oriented coping strategies while men used avoidance strategies less when they had a close relationship with their siblings with ID. Significant correlations were also found between personality traits and coping strategies in adult siblings of people with ID (Scigala et al., 2020). To our knowledge, the relationship between beliefs/assumptions about the world and coping in this group of siblings has not been analysed so far. How an individual perceives the world in general, its rules, its predictability,

the possibility of control, humans, and their place in the world, is related to the effort made to deal with the difficult situations encountered. This justifies the need for empirical verification of this correlation in adult siblings of people with ID. We hypothesise that there is a positive correlation between beliefs about the world and these siblings' coping strategies (H1).

### **Posttraumatic growth as a moderator of the relationship between beliefs about the world and coping strategies**

The second aim of this research is to check the moderating role of posttraumatic growth (PTG) in explaining the relationship between beliefs about the world and coping strategies in adult siblings of people with ID. PTG is understood as the actual psychological change that results from successfully handling traumatic events or unfortunate circumstances. This change is not universal and requires a significant reconstruction of cognitive schemas and a reassessment of the trauma or particularly unfortunate circumstances experienced (Tedeschi & Calhoun, 2004). Research indicates the possibility of experiencing psychological growth in connection with being a brother or sister of a person with an intellectual disability (Findler & Vardi, 2009). The stress and inconvenience of growing up with a sibling with a disability may lead to beneficial psychological changes expressed in noticing one's inner strength, developing one's strengths and competencies in coping with difficulties, greater empathy, appreciating simple activities that make up everyday life, understanding and accepting differences, and being more aware and responsible (Hodapp et al., 2010; Carter et al., 2020). According to the functional-descriptive model of the PTG, positive changes in various areas are related to cognitive processing and rebuilding basic assumptions about the world, oneself, others, and life (Calhoun & Tedeschi, 2006; Henson et al., 2021). PTG is linked to beliefs about the world since cognitive assumptions about the world must consider a new assessment of unfortunate situations and circumstances when experiencing positive psychological changes (Calhoun & Tedeschi, 2006; Janoff-Bulman, 2006). People with higher PTG are more involved in reconstructing their cognitive beliefs (Tomich & Helgeson, 2004; Brooks et al., 2017), have stronger beliefs about the order and purposefulness of the world (Byra & Ćwirynkała, 2020), and adopt flexible coping

strategies, both approach and avoidance-oriented coping (Kunz et al., 2018; Byra, 2019). Based on the cited research results, it can be assumed that the moderation model will explain how the relationship between beliefs about the world and coping at different levels of PTG changes in adult siblings of people with ID. Therefore, we hypothesise that PTG moderates the relationship between beliefs about the world and the coping strategies in siblings of people with ID (H2).

## Method

### Participants

The respondents were recruited through contact with institutions supporting families of people with ID, and institutions, foundations, or associations employing people with disabilities. Adult non-disabled siblings of people with ID were contacted; 220 of them were invited to participate in the research, of which 48 refused due to lack of time. The studies were conducted in Poland.

Ultimately, 172 siblings of people with ID were included in the sample. One hundred and fifty-one (87.79%) respondents were females, and 21 (12.21%) were males. Their age ranged from 19 to 49 ( $M = 30.72$ ,  $SD = 10.50$ ). Ninety-two respondents were city residents (53.48%) while 80 (46.51%) were rural residents. The educational attainment of the respondents was as follows: primary education (5, 2.90%), vocational (25, 14.53%), secondary (44, 25.58%), college (22, 12.79%), higher education (44, 25.58%). The remaining 32 (18.60%) respondents were students. The majority of the respondents were single (106, 61.63%), 62 (36.05%) were married, and 4 (2.33%) were divorced. One hundred and fifteen respondents (66.86%) were employed while 57 (33.14%) indicated a lack of permanent employment. The average assessment of the respondents' financial situation was  $M = 3.55$  ( $SD = 0.70$ ). The respondents rated it on a 5-point scale, where 1 is a very low rating and 5 is a very high rating. The gender of siblings with ID was as follows: 101 (58.72%) had a brother, and 71 (41.28%) had a sister. The mean age of siblings with ID was  $M = 29.31$  ( $SD = 19.25$ ). The respondents indicated the degree of disability of their siblings as light (29, 16.86%), moderate (53, 30.81%), severe (54,

31.40%), and profound (36, 20.93%). Most respondents (139, 80.81%) indicated specific difficult situations they experienced due to their siblings' disability. Moreover, 107 (62.21%) respondents reported an event (situation) in the life of their sibling that was so significant that it changed the respondent's attitude towards life. The respondents assessed the quality of their relations with their disabled siblings as relatively high ( $M = 3.55$ ;  $SD = 0.70$  on a 1–5 scale, where 1 is very low and 5 is very high). Most of the respondents (116, 67.44%) lived with their disabled siblings.

## Measures

PTG was measured using the Polish version of the Posttraumatic Growth Inventory (PTGI, Tedeschi & Calhoun, 1996; Ogińska-Bulik & Juczyński, 2010). The PTGI comprises 21 items rated using a six-point scale, from 0 (*I did not experience this change as a result of my crisis*) to 5 (*I experienced this change to a very great degree as a result of my crisis*). The total PTGI score is the sum of the results obtained in the 4 subscales and ranges from 0 to 105. Higher scores imply greater PTG (Ogińska-Bulik & Juczyński, 2010). For the current sample, Cronbach's  $\alpha$  for the total PTGI was .92. The Polish version of PTGI has a four-factor structure: (1) changes in self-perception – CHSP (Cronbach's  $\alpha = .87$ ), (2) changes in relation to others – CHRO (Cronbach's  $\alpha = .85$ ), (3) appreciation of life – AL (Cronbach's  $\alpha = .73$ ), and (4) spiritual changes – SCH (Cronbach's  $\alpha = .63$ ).

The Polish adaptation of the *World Assumptions Scale* (WAS, Janoff-Bulman, 1989; Załuski & Gajdosz, 2012) was used to measure the beliefs about the world. WAS is a 32-item scale determining beliefs in three categories: kindness of the surrounding world (KSW, Cronbach's  $\alpha = 0.77$ ), meaningfulness and explainability of life events (MELE, Cronbach's  $\alpha = .73$ ), and human valence (HV, Cronbach's  $\alpha = .72$ ). Individual items are rated using a six-point scale, from 1 (I strongly disagree) to 6 (I strongly agree).

The Polish version of *The Coping Orientations to Problems Experienced* (COPE) developed by K. Wrześniewski (1996) was used to evaluate coping mechanisms. It is a 60-item scale determining the frequency of applying the following strategies: focus on the problem (PRO, Cronbach's  $\alpha = .71$ ), de-



nial (D, Cronbach's  $\alpha = .80$ ), focus on/venting of emotions (EM, Cronbach's  $\alpha = .75$ ), seeking emotional support (SUP, Cronbach's  $\alpha = .70$ ), acceptance (AC, Cronbach's  $\alpha = .86$ ), religion (REL, Cronbach's  $\alpha = .89$ ), humour (HUM, Cronbach's  $\alpha = .84$ ) and alcohol/drug use ideation (ALK, Cronbach's  $\alpha = .79$ ).

To examine whether PTG moderated the relationship between beliefs about the world and coping strategies in situations concerning the disability of siblings, we performed moderation analyses using the Process macro for SPSS. Beliefs about the world were posited as a predictor, PTG as moderator, and coping strategies as outcome variables.

## Results

Table 1 depicts the correlations between the respondents' beliefs about the surrounding world and strategies for coping with situations related to sibling disability, as well as PTG (total score and individual dimensions). Beliefs about the kindness of the surrounding world positively correlate with the strategies focused on the problem and seeking emotional support, and negatively with ALK (alcohol/drug use ideation). The second category of beliefs, meaningfulness and explainability of life events, is positively associated with the PRO, AC, and HUM strategies and negatively with REL. Beliefs about human valence, on the other hand, correlate positively with problem-focused, emotional, and denial-based coping. PTG (total score and individual dimensions, except for spiritual changes) positively correlates with beliefs about the kindness of the world. Beliefs regarding the meaningfulness and explainability of life events negatively correlate with posttraumatic spiritual changes, and the PTG dimension of appreciation of life is positively associated with beliefs about human valence. PTG also shows significant links with the various coping strategies used by the respondents. It is positively associated with SUP, REL, and HUM, and negatively with D, EM, and ALK.

Table 1. Intercorrelations (Pearson's  $r$ ) between the variables analysed

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. WAS: Kindness of the surrounding world	–															
2. WAS: Meaningfulness and explainability of life events	0.38**	–														
3. WAS: Human valence	0.30**	0.45**	–													
4. COPE: Focus on the problem	0.22**	0.43**	0.29**	–												
5. COPE: Denial	-0.12	0.15	0.26**	0.06	–											
6. COPE: Focus on/venting of emotions	-0.11	0.08	0.18*	0.22**	0.32**	–										
7. COPE: Seeking emotional support	0.23**	-0.14	0.06	0.07	-0.09	0.32**	–									
8. COPE: Acceptance	-0.03	0.29**	0.08	0.52***	0.16*	0.22**	-0.11	–								
9. COPE: Religion	-0.11	-0.39**	-0.14	-0.31**	0.06	0.14	0.11	-0.07	–							
10. COPE: Humour	0.05	0.36**	0.12	0.13	0.37**	0.07	0.17*	0.28**	0.01	–						
11. COPE: Alcohol/drug use ideation	-0.19*	0.16	0.03	-0.04	0.24**	0.31**	-0.15	0.16*	-0.20*	0.26**	–					

Table 1. (continued)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
12. PTGI: Changes in self-perception	0.42**	-0.05	0.06	0.14	-0.23**	-0.23**	0.32**	0.05	0.09	0.11	-0.21*	-	-	-	-	-
13. PTGI: Changes in relating to others	0.46**	0.06	0.03	0.04	-0.24**	-0.23	0.36**	-0.10	0.22**	-0.04	-0.35**	0.76***	-	-	-	-
14. PTGI: Appreciation of life	0.31**	0.09	0.23**	0.11	0.14	-0.14	0.03	0.06	0.21*	-0.04	-0.19*	0.57***	0.65***	-	-	-
15. PTGI: Spiritual change	0.01	-0.35**	-0.09	-0.38**	-0.03	-0.03	0.05	-0.13	0.71***	0.08	-0.31**	0.27**	0.40**	0.42***	-	-
16. Total PTGI	0.44**	0.06	0.07	0.06	-0.23**	-0.23**	0.31**	-0.07	0.26**	0.18*	-0.32**	0.91***	0.92***	0.75***	0.54***	-

\* p < 0.05; \*\* p < 0.01; \*\*\* p < 0.001

WAS – World Assumptions Scale; COPE –Coping Orientations to Problems Experienced; PTGI – Posttraumatic Growth Inventory

Source: Own research.

Table 2 presents the results for models of association between beliefs about the world and coping strategies, assuming it is moderated by PTG. The models show that there are significant relationships between the beliefs of the kindness of the surrounding world and the coping strategies of focusing on the problem, seeking emotional support, and alcohol/drug use ideation.

Table 2. Magnitude and statistical significance of effects of beliefs of the kindness of the surrounding world and PTG on coping strategies of focusing on the problem, seeking emotional support and alcohol/drug use ideation in siblings of adults with ID

Coping strategies		B	SE	t	P	LLCI	ULCI
Focus on the problem	constant	-7.647	13.585	-0.563	.045	-34.473	19.179
	KSW	1.711	.504	3.396	.009	.716	2.706
	PTG	.512	.190	2.694	.007	.137	.888
	KSW x PTG	-.019	.007	-2.819	.005	-.033	-.006
$R^2 = .29; F(3.163) = 5.663; p < .001$							
Seeking emotional support	constant	-5.329	5.973	-.892	.373	-17.123	6.464
	KSW	.498	.221	2.251	.025	.061	.935
	PTG	.200	.083	2.405	.017	.036	.365
	KSW x PTG	-.006	.003	-1.961	.054	-.012	.000
$R^2 = .13; F(3.167) = 8.049; p < .001$							
Alcohol/drug use ideation	constant	23.067	5.384	4.284	.000	12.437	33.698
	KSW	-.531	.199	-2.667	.008	-.925	-.138
	PTG	-.239	.075	-3.187	.001	-.387	-.091
	KSW x PTG	.007	.002	2.649	.008	.001	.012
$R^2 = .14; F(3.165) = 8.957; p < .001$							

Source: Own research.

Data in Table 2 show the created models are significant, accounting for 13–29% of the variance of the analysed coping strategies. They show the relationship between the respondents’ beliefs in the kindness of the surrounding world and coping strategies, in the case of focus on the problem and alcohol/drug use ideation, with the participation of a moderator, viz. PTG. The moderating function of the PTG was not found in the relationship between the respondents’ beliefs of this type and their use of coping based on seeking emotional support. The analysis showed that beliefs about the kindness of the surrounding world were positively associated with the use of problem-focused coping only in the case of high ( $B = .666, SE = .164, t = 4.062, CI\ 95\% = [.342, .990]$ ) and average ( $B = .334, SE = .111, t = 3.011, CI\ 95\% = [.115, .553]$ ) PTG levels. The change in  $R^2$  was significant here ( $\Delta R^2 = .04, F(1,163) = 7.95, p = .005$ ). It was also found that beliefs about the kindness of the surrounding world are negatively associated with the coping strategy alcohol/drug use ideation, only in the case of high PTG ( $B = .141, SE = .064, t = -2.184, CI\ 95\% = [-.268, -.013]$ ). There was a significant change in  $R^2$  ( $\Delta R^2 = .03, F(1,165) = 7.02, p = .008$ ).

Table 3 presents the results concerning the relationship between beliefs of meaningfulness and explainability of life events and the coping strategies of focus on the problem, acceptance, religion and humour, with the moderating role of PTG.

Table 3. Magnitude and statistical significance of effects of beliefs of meaningfulness and explainability of life events and PTG on coping strategies of focus on the problem, acceptance, religion and humour in siblings of adults with ID

Coping strategies		B	SE	t	P	LLCI	ULCI
Focus on the problem	constant	-12.318	11.501	-1.071	.285	-35.033	10.396
	MELE	1.167	.269	4.325	.098	.634	1.700
	PTG	.494	.154	3.192	.077	.188	.800
	MELE x PTG	-.011	.003	-3.099	.002	-.018	-.004
$R^2 = .24; F(3,157) = 5.663; p < .001$							

Table 3. (continued)

Coping strategies		B	SE	t	P	LLCI	ULCI
<b>Acceptance</b>	constant	-7.790	13.198	-.590	.555	33.852	-18.272
	MELE	3.487	.901	3.870	.042	1.708	5.267
	PTG	.508	.174	2.906	.114	.163	.853
	MELE x PTG	-.036	.012	-3.038	.073	.060	-.013
<i>R</i> <sup>2</sup> = .16; <i>F</i> (3.162) = 8.494; <i>p</i> < .001							
<b>Religion</b>	constant	22.633	7.820	2.894	.004	7.189	38.076
	MELE	-.436	.183	-2.375	.018	-.798	-.073
	PTG	-.077	.105	-.732	.464	-.285	.130
	MELE x PTG	.003	.002	1.262	.208	-.001	.008
<i>R</i> <sup>2</sup> = .22; <i>F</i> (3.162) = 14.982; <i>p</i> < .001							
<b>Humour</b>	constant	-16.466	5.851	-2.814	.005	-28.020	-4.911
	MELE	.565	.137	4.116	.211	.294	.836
	PTG	.253	.078	3.220	.091	.098	.409
	MELE x PTG	-.005	.001	-3.125	.002	-.009	-.002
<i>R</i> <sup>2</sup> = .18; <i>F</i> (3.162) = 11.886; <i>p</i> < .001							

Source: Own research.

All four models turned out to be significant, accounting for 16–24% of the variance of the analysed coping strategies. Two coping strategies, viz. focus on the problem and humour, are related to respondents’ beliefs of the meaningfulness and explain ability of life events, with the participation of a PTG moderator. The analysis showed that the meaningfulness and explain ability of life event beliefs are positively related to the strategy of focus on the problem ( $\Delta R^2 = .05$ ,  $F(1,157) = 9.61$ ,  $p = .002$ ) only in the case of average ( $B = .558$ ,  $SE = .088$ ,  $t = 6.344$ ,  $CI\ 95\% = [.038, .733]$ ) or high PTG ( $B = .343$ ,  $SE = .057$ ,  $t = 6.053$ ,  $CI\ 95\% = [.231, .455]$ ). Moreover, beliefs of this type are positively

related to the strategy humour ( $\Delta R^2 = .04$ ,  $F(1,162) = 9.77$ ,  $p = .021$ ) only in the case of high PTG ( $B = .244$ ,  $SE = .043$ ,  $t = 5.718$ ,  $CI\ 95\% = [.159, .328]$ ). The other two models involving coping strategies – acceptance ( $\Delta R^2 = .03$ ,  $F(1,159) = 8.01$ ,  $p = .096$ ) and religion ( $\Delta R^2 = .03$ ,  $F(1,163) = 7.21$ ,  $p = .112$ ) – using PTG as a moderator were found to be irrelevant.

Table 4. Magnitude and statistical significance of effects of beliefs of human valence and PTG on coping strategies of focus on the problem, denial and focus on/venting of emotions in siblings of adults with ID

Coping strategies		B	SE	t	p	LLCI	ULCI
Focus on the problem	constant	-19.166	16.248	-1.179	.239	-51.258	12.925
	HV	1.320	.375	3.521	.000	.579	2.061
	PTG	.645	.234	2.751	.006	.182	1.108
	HV x PTG	-.014	.005	-2.76	.006	-.025	-.004
$R^2 = .13$ ; $F(3.158) = 7.622$ ; $p < .001$							
Denial	constant	17.249	5.818	2.964	.003	5.759	28.738
	HV	-.219	.135	-1.623	.106	-.487	.047
	PTG	-.193	.079	-2.432	.016	-.350	-.036
	HV x PTG	.004	.001	2.426	.016	.000	.008
$R^2 = .11$ ; $F(3.163) = 6.206$ ; $p < .001$							
Focus on/venting of emotions	constant	22.899	6.491	3.527	.000	10.080	35.717
	HV	-.259	.151	-1.717	.087	-.557	.038
	PTG	-.242	.088	-2.734	.006	-.417	-.067
	HV x PTG	.004	.002	2.333	.020	.000	.008
$R^2 = .16$ ; $F(3.163) = 7.595$ ; $p < .001$							

Source: Own research.

Data in Table 4 shows that respondents' beliefs regarding human valence are significantly related to how frequently they use coping strategies such as focus on the problem, denial and focus on / venting of emotions. The moderating role of PTG in all these relationships was demonstrated. Beliefs about human valence are positively related to the strategy of focus on the problem ( $\Delta R^2 = .04$ ,  $F(1,162) = 9.77$ ,  $p = .021$ ) only with high PTG ( $B = .533$ ,  $SE = .114$ ,  $t = 4.670$ ,  $CI\ 95\% = [.308, .758]$ ). Positive relationships are found between such beliefs and the coping strategy denial ( $\Delta R^2 = .03$ ,  $F(1,163) = 5.88$ ,  $p = .016$ ) in respondents with average PTG ( $B = .111$ ,  $SE = .029$ ,  $t = 3.861$ ,  $CI\ 95\% = [.054, .167]$ ) and high PTG ( $B = .174$ ,  $SE = .041$ ,  $t = 4.214$ ,  $CI\ 95\% = [.093, .256]$ ). The analysis also revealed that respondents' beliefs about human valence are positively related to the strategy of focus on/venting of emotions ( $\Delta R^2 = .03$ ,  $F(1,163) = 5.46$ ,  $p = .020$ ) only with the presence of high PTG ( $B = .164$ ,  $SE = .046$ ,  $t = 3.558$ ,  $CI\ 95\% = [.073, .255]$ ).

## Discussion and conclusions

This study aimed to examine the relationship between respondents' beliefs about the world and their strategies for coping with difficult situations related to the disability of their adult sibling. We also investigated whether post-traumatic growth moderates this relationship. The analysis confirmed the existence of this relationship and the significant moderating role of PTG, but only in the case of some coping strategies.

The results obtained indicate the analysed categories of beliefs about the world, viz. kindness of the surrounding world, meaningfulness and explainability of life events and human valence are associated with certain coping strategies. Interestingly, only problem-focused coping is related to these three categories of beliefs and these relationships are moderated by PTG. It was found that stronger beliefs about the kindness of the surrounding world, meaningfulness and explainability of life events and human valence are related to a higher frequency of using task-based coping with problems related to the disability of adult siblings, but only in people with higher PTG. These results are consistent with previous findings and with the theories of coping and post-traumatic growth (Trzebiński & Zięba, 2004; Byra, 2017; Wu et al., 2020). Experiencing growth is associated with a certain cognitive restructur-



ing, a change in beliefs about the world, life, events, and human strength in adversity. This change is based on the fact that they are more flexible, constructive and conducive to being courageous and persistent in confronting the difficulties encountered. It is probable, therefore, that the stronger beliefs found in our research about the kindness of the surrounding world, meaningfulness and controllability of events are associated with attempts to solve problems when they are shaped and strengthened by the ongoing cognitive reconstruction leading to PTG (Linley & Joseph, 2004; Tedeschi et al., 2007; Henson et al., 2021). Siblings of people with ID use task-based coping to deal with disability-related difficulties more often when they experience PTG and are convinced of the kindness of others, the possibility of control, and the meaning of these difficulties in their life, as well as the value of human beings and their strengths, regardless of life circumstances. Our research also revealed a negative relationship between beliefs about the kindness of the surrounding world and avoidance coping by alcohol/drug use ideation in people with high PTG. Constructive changes that comprise PTG in the perception of oneself, others, life, etc., corresponding to belief in the positivity of the surrounding world, may weaken/minimise the tendency to avoid difficulties through the use of stimulants, with the probable recognition of the pointlessness of such a coping strategy (Tomich & Helgeson, 2004). Our analyses indicated that siblings of adults with ID more often cope with difficulties by framing them humorously if they express stronger beliefs about the meaningfulness and explain ability of life events. Such a relationship was found in people experiencing high PTG, which not only strengthens such beliefs but also promotes a flexible perception of situations and distancing oneself from their seriousness, stemming from an increased appreciation of everyday life, in which even small elements can arouse positive emotions (Kunz et al., 2018).

The results presented in this article also revealed that respondents' beliefs about the valence of human beings and concentration on human strengths are positively associated with avoidance and emotional coping when accompanied by higher PTG. It is puzzling that adult siblings of people with ID, convinced of human resources, their own control, and constructive actions, declaring beneficial post-traumatic changes, may at the same time use avoidance coping strategies. This correlation may indicate the presence of prob-

lems in the everyday life of these siblings, which, due to the ID of the brother or sister, are unsolvable, difficult or impossible to change at a given moment. Cognitive restructuring, a tendency to reevaluate events positively, which underlies PTG, may lead to a temporary/periodic denial of the seriousness of these difficulties and a focus on resolving current challenges (Kunz et al., 2018; Henson et al., 2021). Our results also show that stronger beliefs about human valence in people with high PTG are associated with the use of emotion-focused coping strategies more often. These results are consistent with findings about how people experiencing PTG work through their emotions. The strategy of venting emotions related to trauma creates favourable conditions for the development of PTG (Orejuela-Dávila et al., 2019). In people with higher PTG, this may be one of the important strategies for coping with the difficulties encountered, especially permanent ones, or those not subject to change under given circumstances or over time. Siblings of adults with ID experiencing high PTG may more often use strategies for reducing negative affect, for example in a supportive relationship, consequently focusing on reassessing problems related to the disability of their brother or sister. Such a coping strategy may be used to distract from the emotional content and focus on the objective elements of the difficulties encountered, which consequently may help in finding specific ways to overcome or at least minimise them (Kruithof et al., 2021).

Our research results also revealed that the moderating role of PTG was not significant in the case of links between beliefs about the world (including, in particular, meaningfulness and the explain ability of life events) and the coping strategies of religion and acceptance. This means that, regardless of the level of PTG, such stronger beliefs are associated with less frequent use of coping aimed at seeking support in religion and a higher intensity of coping in the form of acceptance of the difficulties encountered in siblings of adults with ID. These results are consistent with previous findings (Prino et al., 2019).

The research results presented here extend the existing findings concerning siblings of adults with ID. However, they are not free from certain limitations, listed below. Firstly, the research used tools based on self-reports, which are associated with the risk of cognitive distortions, including the need for social approval. Secondly, the moderating functions of post-traumatic

growth treated as a result of coping with difficulties experienced relating to siblings' ID were analysed. On the one hand, we found this phenomenon in siblings of adults with such a disability, who are in a special life situation of taking over the role of a guardian of a sibling with a disability and confronting various related challenges. On the other hand, however, we are aware that the PTG measurement may indicate both the result of successful long-term coping with various difficulties resulting from the ID of a brother or sister, and the current confrontation with the challenges of adult life of these siblings. The measurement performed does not allow us to unequivocally determine the source of the identified PTG. Third, in line with the cognitive coping theory, our research focused on the relationship between beliefs about the world and coping strategies. These are preliminary findings that should be expanded to include beliefs directly related to the sibling's disability and the role of the caregiver. Fourth, the low percentage of the explained variance of individual coping strategies revealed in the models, although confirming the significance of beliefs about the world and PTG, suggests the role of other variables. Future studies should investigate the importance of factors related to the role of a caregiver performed by siblings of adults with ID, the quality of the relationship between siblings, and the support received.

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