Studia Psychologica, Vol. 64, No. 3, 2022, 295-312
https://doi.org/10.31577/sp.2022.03.855

Development of Prosocial Moral Reasoning in Young Adolescents and Its Relation to Prosocial Behavior and Meaningfulness of Life: Longitudinal Study

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The aims of our study were to investigate the longitudinal paths of relations between prosocial moral reasoning, prosocial behavior and life meaningfulness in young adolescents. Data were collected at four timepoints (T1–T4) over 5 years using a prosocial behavior questionnaire (Roche & Sol, 1998), a questionnaire on prosocial moral reasoning (PRM) (Carlo, Eisenberg, & Knight, 1992), a revised version of the noo-dynamics test (Popielski, 1991), and the Life Meaningfulness Scale (Halama, 2002). The research sample consisted of 351 participants (49.30% female, M_{age} = 11.93; *SD* =.43) in the first phase (T1–T2), and 343 students (41.6% females; M_{age} = 14.65; *SD* =.57) participating in the second phase (T3–T4). Path model 1, which included relations between prosocial moral reasoning (T1, T2), self-reported prosocial behavior (T1, T2) and salutogenic noo-dynamics (Popielski, 1991), has not found the necessary support in the data. However, path model 2, which included relations between prosocial moral reasoning (T3, T4), self-reported prosocial behavior (T3, T4) and life meaningfulness (Halama, 2002) in adolescents aged 14–15 years old, shows a good fit to the data.

Key words: prosocial moral reasoning, prosocial behavior, meaningfulness of life, young adolescents

Meaningfulness of life is one of the most important aspects in quality of life as it is associated not only with better physical and mental health in general (Halama & Dědová, 2007; Roepke et al., 2014), subjective well-being (Yalçın & Malkoç, 2015; Chen, Tian, & Huebner, 2020), but also with more abstract values as life satisfaction and eudaimonia (Deci & Ryan, 2008; Wong, 2016; McPherson, 2020). Prosocial behavior is considered to be one potential source of meaning in life (Van Tongeren et al., 2015; Klein, 2016), however, there is a lack of knowledge about how the meaning in life is linked to prosocial moral

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Received August 18, 2021

reasoning and prosocial behavior in longitudinal developmental paths, and also lack of information about the age differences in terms of the strength of the relations between these variables. The genesis of this study is the proposal that developmentally higher types of prosocial moral reasoning and prosocial behavior together have impact on the meaning in life as a dependent variable.

Prosocial moral reasoning (PMR) concerns reasoning about conflicts in which the individual must choose between satisfying his or her wants and needs and those of others in a context in which laws, punishments, authorities, formal obligations and other external criteria are irrelevant or de-emphasized (Eisenberg-Berg & Hand, 1979). In other words, the specificity of Eisenberg's concept in comparison with the hitherto prevailing theories of moral development (in particular, Kohlberg & Hersch, 1977) was to pay attention to those aspects of moral reasoning that concerned prosocial decisions, whereas most previous methodologies used to find moral reasoning were based on violations of norms; these approaches were mostly rooted in Kant's deontological ethics. However, duty-based ethics (suppressing the role of emotions, empathy and human life context) do not appear to be sufficient to describe the whole spectrum of morally relevant situations in real life. From this point of view, the construct of PMR has greater potential to build the bridge over the reason–action gap.

Specific types of PMR (hedonistic, approval-oriented, stereotyped, needs-oriented, or internalized) play different role in altruistic and prosocial behavior in adolescents (Bar-Tal, Raviv, & Leiser, 1980; Eisenberg & Fabes, 1990; Fabes et al., 1999; Kumru et al., 2012; Carlo et al., 2013; Eisenberg, 2015; Tur-Porcar et al., 2016; Mestre et al., 2019). At the same time, quality of prosocial moral reasoning and prosocial behavior is crucial for child and youth positive development (Spinrad & Eisenberg, 2009; Benson, Scales, & Syvertsen, 2011) and is generally considered one of the hallmarks of adulthood (Arnett, 2003).

Studies have repeatedly found correlations between age and individual types of PMR (Eisenberg et al., 1987; Carlo et al., 1996). Young children usually use hedonistic reasoning but later, in elementary school, they tend to needs-oriented reasoning more often than hedonistic one; at the same time, both approval-oriented and stereotyped reasoning increase. Internalized prosocial moral reasoning based on internalized affective reactions, self-reflective sympathy and perspective taking is not the dominant mode of reasoning for most early to mid-adolescents (Eisenberg et al., 2005). These orientations increase with age in later adolescence but stereotyped reasoning remains dominant. Relations between higher age and types of PMR with more cognitive advancement are emphasized (e.g., Carlo, 2006). In addition, Eisenberg (1987) suggested that moral action and moral reasoning should become more consistent with age. However, longitudinal research on its development and predictors is still sparse (Eisenberg et al., 1987; Eisenberg et al., 1991; Mestre et al., 2019). Generally, researchers are focused on cross-sectional analysis aiming at screening, for example, the types of PMR in a particular age category, its relations to various psychological constructs (empathy, aggression, value orientation, etc.) and the reliability, and validity of measures of PMR in particular culture conditions.

Naturally, most studies were focused on investigating the links between prosocial moral reasoning and prosocial behavior. Prosocial behavior is defined as any voluntary action intended to benefit others (Batson, 1998; Eisenberg et al., 1998) or behavior involving costs for the self and resulting in benefits for others (Wittek & Bekkers, 2015). Sometimes, the re-

sults of acting are considered, when prosocial behavior is defined as any voluntary action with intention to produce a positive or beneficial outcome for the recipient regardless of whether that action is costly to the donor, neutral in its impact or beneficial (Grusec et al., 2002).

Higher levels of PMR predict both self- and other-reported prosocial behavior (Carlo et al., 2011). Modest relation to prosocial behavior was found: specifically, children's and adolescents' prosocial behavior has been positively related to needs-oriented PMR, negatively related to hedonistic PMR, and sometimes positively related to a composite measure of adolescents' or young adults' overall level of PMR (Eisenberg et al., 2013); these relationships remain stable also in emotionally critical situations (De Caroli et al., 2014).

Meaning in Life, Prosocial Behavior and Prosocial Moral Reasoning

The concept of meaning in life is generally used for explaining the state of valuable living, life satisfaction, based on investing in something larger than the self (Seligman, 2002). The topic is frequently associated with existentialist analyses and logotherapy introduced by V. E. Frankl (1946/2005, 1966), who strongly linked the sense of meaning with the unique human ability of self-transcendence. Nay, the will to meaning is a spiritual and primary motivation for self-transcendence (Wong, 2016). The predictive power of self-transcendence values in helping behavior was confirmed, with self-transcendence values impacting PMR (which predicts prosocial behavior) and, in turn, influencing the propensity to help indirectly (Paciello, 2013). Research by Ebersole (1998) showed that prosociality was one of the possible sources of meaning in life in various age groups (including children and adolescents). Prosociality is mainly presented as an interpersonal orientation, which can decrease egoistic behavioral tendencies and support life meaningfulness through self-transcendence, which includes actions intended to make the world better (Wong, 1998).

Additionally, existential analysis (Frankl, 1969/2014) brings to the theory of personality the idea of the three-dimensionality of man. Man has a physiological (physical), psychological (mental) and noological (spiritual) dimension. Thanks to the ability to transcend the psychophysical and psychological dimension, man is able to make responsible decisions about himself, achieving a distance from his own "destiny" (psychophysical determination), and thus gaining a certain degree of unconditional freedom. The noodynamics theory expresses the contradiction (dynamics) between what is actually present in a man's life (what he experiences), and what he should be – what he strives for, in accordance with his values (Halama, 1999). When desire to find out the significance of our existence fails, this leads to existential frustration or noogenic neurosis (Crumbaugh & Maholick, 1964; Schulenberg et al., 2011; Frankl, 2014). Based on this, the hypothesis about the link between self-transcendence behavior, which can be operationalized as prosocial behavior, and positive (salutogenic) noodynamics can be formulated.

Halama (2007, p. 56) defines the meaning of life as "a personal system of beliefs, goals and values that enables a person to experience, realize and manage his or her life as valuable, purposeful and fulfilling". This definition is rooted in Frankl's approach, as well as the Reker and Wong´s one (1988, p. 220–221), who defined personal meaning as the "cognizance of order, coherence and purpose in one's existence, the pursuit and attainment of worthwhile goals, and an accompanying sense of fulfilment". They considered meaning in life as a multidimensional construct containing

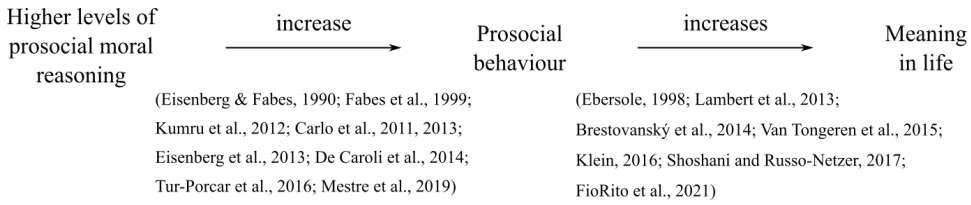
three interconnected components: cognitive, motivational and affective. The cognitive component explains how each individual constructs a belief system to address a number of existential concerns, including understanding the value of specific life events. The motivational component refers to the individual value system – the justification why to "keep one going in spite of the obstacles and setbacks". Affective component then assigns how the realization of the meaning is accompanied by feelings of satisfaction and fulfilment. Such an understanding of the concept is consistent with the Eisenberg's concept of prosocial moral reasoning described above, which differs from cognitivist Kohlbergian or utilitarian conceptions just by including the emotionality and natural motivational context.

As indicated above, prosociality is considered to be one potential source of meaning. The relations of self-reported prosocial behavior to meaning in life have been shown "to the degree that individuals reported acting prosocially, they also feel that their lives are meaningful" (Van Tongeren et al., 2015, p. 8). Helping other people (spending money on others, volunteering) was related to a greater sense of purpose and meaning (Klein, 2016), feelings of belongingness increase meaning in life (Lambert et al., 2013), and vice versa, the need for meaning positively predicted most indicators of prosocial motivation and behavior (FioRito et al., 2021). If we consider meaning in life as part of well-being, we can argue using various research findings for a relation between meaning in life and prosocial behavior: for example, prosocial costs lead to stronger improvements in happiness in situations that actually promote social connection (Aknin et al., 2013) and prosocial behavior can increase well-being without contact with the beneficiary (Martela & Ryan, 2016). The relation between personal meaning and prosocial personality is also strengthened by religious identity (Furrow et al., 2004). However, studies did not confirm significant gender differences in meaning in life (Meier & Edwards, 1974; Fecková & Halama, 2009; McDonald et al., 2012).

Nevertheless, research directly focused on correlations between teenage/adolescent prosocial behavior and meaning in life has occurred rarely. Shek et al. (1994) used the Chinese Purpose in Life Test (C-PIL) in Chinese secondary school pupils. Results affirm significantly that pupils with higher C-PIL scores show less antisocial behavior and more prosocial behavior; the data suggested that purpose in life is associated with positive social behavior, as indexed by prosocial behavior. Significant correlations were found between the data of the test on noo-dynamics and self-reported and peer-reported pupils' prosocial behavior, as well as between positive noo-dynamics and interiorized and stereotyped PMR (Brestovanský et al., 2014; Rajský & Podmanický, 2016). Shoshani and Russo-Netzer (2017) found moderate correlations between prosocial behavior and meaning in life in all three subscales (attitude, creativity and experience).

As shown in Picture 1, the relations between the individual variables are described relatively richly, so the current research allows us to consider their interconnection in the longitudinal conditions.

The core concept in Eisenberg's theory of the prosocial moral reasoning development is internalization of moral values and prosocial attitudes, distinguishing between internalized and needs-oriented reasoning (Eisenberg et al., 2005). In other words, the highest level of prosocial moral reasoning can be defined as 'prosociality becomes integral part of the meaning of life'. When Eisenberg et al. (2005) describe the internalized mode of reasoning, among others they name it "an affect because of gain (loss) of self-respect". In a positive



Picture 1 Relations between the three key variables

sense, it is meant here to be the orientation to feeling good, often about oneself, as a consequence of living up to internalized values. This dynamic process is similar to Frankl's noodynamic contradiction between what is and what should be, as described above.

As there si no study about relations and interconnections between meaning in life, PMR and prosocial behavior to date, the present study was designed to investigate the role of PMR and prosocial behavior in strengthening the dynamics of the development of perceived life meaningfulness.

Hypotheses

In summary, in terms of the relations between PMR, prosocial behavior and meaning in life, we hypothesized that the first two partially explained the variance of the third one in cross-sectional data and were longitudinally positively linked to meaning in life.

Method

Participants

Participants were selected by simple intentional selection from public schools within the area of Western Slovakia. The research sample consisted of 579 participants (50.3% female, M_{age} = 11.6; *SD* =.57) at time 1 (T1). At this time the students were 5th graders from 26 primary schools in the western part of Slovakia (except Bratislava); 74.3% of participants lived in intact families with father and mother and 86.2% lived in towns with over 5000 inhabitants. The second measures (T2) included 351 participants (49.30% female, M_{age} = 11.93; *SD* =.43). The number of participants decreased to 60.83% compared to the 1st stage, because several teachers refused to answer the next round of questionnaires and did not want to be further involved in the project. Furthermore, some data were excluded due to careless participants (e.g., using same choices through all the questionnaire), so that the first path model (see results below) included data within T1 and T2 waves consisting of 293 paired responses. For the 3rd measure (T3), some new participants were invited, so there were 543 participants (46.1% female, M_{age} = 13.76; *SD* = .55) again from the western part of Slovakia (23 primary schools); 74.9% of participants lived in intact families and 74.7% lived in towns with over 5000 inhabitants. For the similar reasons as described above, there remained 343 students participating in the last (T4) stage (41.6% females; M_{age} = 14.65; *SD* = .57). So that, for the purposes of the longitudinal path models calculations the stages were divided into two phases: phase 1 (T1 to T2) and phase 2 (T3 to T4).

Procedure

The study proposal was approved by the Scientific Grant Agency of the Ministry of Edu-

cation, Science, Research and Sport of the Slovak Republic. Participation by students and teachers was voluntary and participants were free to stop participating at any time. The research was part of the in-service teacher training program. For such purposes, the general parent consent signed at the school year beginning was applied. Furthermore, all the data gathering in each participating school was agreed upon and coordinated with a school psychologist, who is authorized to carry out such surveys. Authors of the study worked only and exclusively with anonymized data.

Data were collected at four timepoints (T1–T4) over five years and respondents were monitored from the 5th to the 9th grade of secondary school in: October 2014, June 2015, June 2017, and May 2018. All measures were administered in 60-min sessions by trained collaborators in the classroom during school lessons. Each participant was assigned an anonymous code for the first phase (timepoints T1 and T2) and a different code for the second phase (T3 and T4), so that it was possible to calculate models and relations between T1 and T2 or T3 and T4 but not throughout all four waves in uninterrupted continuity. This phase separation was also forced by changes in the composition of the respondents, as described above.

Measures

The set of instruments for the first phase (T1 and T2) consisted of a revised version of a school questionnaire on prosocial behavior (PROS; Roche & Sol, 1998), a questionnaire on PMR (PROM; Carlo, Eisenberg, & Knight, 1992) and a revised version of the noo-dynamics test (Popielski, 1991). For the second phase, the Life Meaningfulness Scale (Halama, 2002) was included.

Prosocial Behavior Questionnaire (PROS)

Roche's questionnaire originally consisted of 40 items representing 10 various types of prosocial behavior (help, sharing, etc.; Roche & Sol, 1998). The number of items in the instrument has been halved based on exploratory factor analysis, which revealed only one common factor and the pilot interviews with respondents. The participants received a self-report form, a peer-report form and a form for student evaluation by the teacher. Peer evaluation was carried out by a random draw, with every pupil being evaluated by just one schoolmate in the first and second waves. Teachers evaluated all students in their class with an item scale ranging from 1 (I do not agree at all) to 4 (I agree totally).

The reliability of the PROS during the first three waves in all three forms (self, peer and teacher evaluation) was calculated as follows: first wave (T1): self-report .82, peer report .93, teacher report .93; second wave (T2): self-report .88, peer report .92, teacher report .92; third wave (T3): self-report .81, peer report .92, teacher report .93.

Correlations between the PROS and the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997) were computed to verify concurrent validity (with five items of Goodman's SDQ representing prosocial behavior): PROS to SDQ (r = .65, p < .001) for self-report form; PROS to SDQ (r = .68, p < .001) for peer-report form; and PROS to SDQ (r = .71, p < .001) for teacher-report form.

Based on factor analysis that consistently showed one strongly loaded factor from T1 to T4, in the third and fourth waves (T3 and T4) the original PROS with 21 prosocial items was radically simplified to PROS-8, which has only four prosocial items but four aggressive behavior items have been added. This short-

ened version made it possible to involve more students in the evaluation of their classmate, so that not just one but three peers commented on every single student. With the same logic, Caprara et al. (2014) used three items (consoling, helping, and sharing) to cover the prosocial behavior construct and two items for aggressive (physical and verbal) behavior. In the PROS-8 instrument, the two additional items referred to hidden aggression and social lack of interest: "This person defames others (he attacks others in a hidden way)"; and "This person has no interest in others at all". The reliability of this shortened version, which was applied in the fourth wave (T4), was calculated as: self-report, .70; peer report, .86; teacher report, .90.

Prosocial Moral Reasoning Questionnaire (PROM)

Five out of seven stories on the PROM (Carlo, Eisenberg, & Knight, 1992) were used for the study. The instrument was successfully adapted in Slovak cultural conditions (Brestovanský, Kusý, & Adamkovič, 2016). Every story with a prosocial moral dilemma contained a list of three behavioral choices as to what the character in the story should do, six reasons why the character should behave in that way (five categories of PMR and a lie/nonsense item) and a ranking of how important each reason was in making their decision. The following text is a sample story from the PROM: "*Sandy was a student at school. One day Sandy was walking into her new class early and saw an older girl teasing and making fun of another girl's clothes. The girl was crying. There was no one else around and Sandy did not know the girls very well, but she had heard that the girl that was being teased was very poor and the older girl had a lot of friends. Sandy thought that maybe she should try to stop the older girl but she was afraid that the older girl and her friends might pick on her and tease her also.*" Five categories of the reasoning include hedonistic reasoning (e.g., *"It depends whether Sandy can find other friends to do things within school"*), needs-oriented reasoning (e.g., *"It depends whether the other girl is crying a lot"*), approval-oriented reasoning (e.g., *"It depends whether Sandy's classmates would approve of what she does"*), stereotyped reasoning (e.g., *"It depends whether Sandy thinks the older girl is mean or not"*), and internalized reasoning (e.g., *"It depends whether Sandy thinks that she is doing what she believes she should do"*).

Each "category score" is divided by the "potential category score" to achieve a correct relative strength of the category. The potential category score is the sum of all the PMR category scores (except the lie/nonsense items) and this gives a "proportion (or percentage) category score".

The reliability (Cronbach's α) of the PROM for the individual dimensions in the four waves was calculated as follows: T1 (N = 516): hedonistic .54, approval-oriented .70, stereotyped .76, needs-oriented .74, internalized .84; T2 (N = 340): hedonistic .61, approval-oriented .79, stereotyped .74, needs-oriented .73; internalized .80; T3 (N = 425): hedonistic .44, approval-oriented .75, stereotyped .70, needs-oriented .64, internalized .75; and T4 (N = 351): hedonistic .52, approval-oriented .77, stereotyped .71, needs-oriented .63, internalized .77.

Noo-dynamics Test

The noo-dynamics test (Popielski, 1991) consists of 100 items that cover 36 dimensions grouped into four categories: noetic qualities, noetic temporality, noetic activities and noetic attitudes. The questionnaire comprises two complementary parts: noo-salutogenic (50 items) and noo-pathologic (50 items). Twelve

dimensions (36 items) were selected for the study on the basis of their relationship to prosociality: freedom, responsibility, self-esteem, affirmation, trust and value orientation were selected in the category "noetic quality"; and dialogical approach, creativity, acceptance of the others, goodwill/kindness, promptitude for abnegation, and respect for own conscience/persuasion were selected in the category "noetic activities". The item scale ranged from 1 (I do not agree at all) to 4 (I agree totally). The reliability of the noo-salutogenic items (18) was α = .82 (*N* = 524) in T1 and α = .85 (*N* = 353) in T2. The reliability of the noo-pathologic items (18) was α = .75 (*N* = 525) in T1 and α = .79 (*N* = 354) in T2.

Life Meaningfulness Scale

The Life Meaningfulness Scale measures the general level of meaning in life (Halama, 2002). The scale consists of 18 items divided into three dimensions based on a three-component theory of meaning (Reker & Wong, 1988): a cognitive dimension related to overall life orientation, understanding of life and one's place in the world (e.g., "I consider my life valuable and useful"); a motivational dimension related to goals, plans, strength and perseverance in implementation (e.g., "my life is the things I am fully engaged in"); and an affective dimension related to life satisfaction, fulfilment, negative disgust and a sense of monotony (e.g., "I am happy with my life, even if it is sometimes difficult"). Respondents score items on a five-point scale from 1 (I do not agree at all) to 5 (I agree totally). The higher the overall score, the higher the level of life meaningfulness. The scale has satisfactory reliability, factor structure and convergent validity (Halama, 2002). The reliability of the scores for the three dimensions was α = .74 (*N* = 366) in T3 and α = .77 (*N* = 290) in T4.

Results

Tables 1 and 2 present means (including independent-sample *t*-tests considering gender), standard deviations and results for the correlations at times T1/T2 and T3/T4 computed in SPSS v20. The correlations consistently showed that prosocial behaviors correlated positively with the other variables – PMR, salutogenic noo-dynamics and meaning in life. Specifically, self-reported prosocial behavior showed higher correlations with the variables compared to the peer or teacher reports. Similarly, the composite PMR score correlated positively with salutogenic noo-dynamics and life meaningfulness (the weighted PROM composite provides an overall measure of the relative preference for higher PMR).

There were significant main effects of gender at every timepoint (T1–T4) in almost all variables. Girls continuously gained a higher score in three individual forms of the prosocial behavior scale (self, peer, teacher), salutogenic noo-dynamics and internalized and stereotyped PMR.

The PMR score of an individual PROM category (hedonistic, approval-oriented, stereotyped, needs-oriented or internalized) is calculated as the ratio of the "category score" and the "potential category score". The potential category score is the sum of all the PMR category scores. Dividing the category score by the potential category score gives a proportion category score that, theoretically, can range from 0.05 to 0.55 within an individual category. In actual measured cases, the categories ranged from .158 to .237. However, the development of scores in individual types of PMR differed depending on gender. In the first year no significant differences were found between boys and girls, but as development progressed the differences began to increase, with hedonistic and approval-oriented reasoning persisting in boys but

Table 1 *Descriptives and correlations among noo-dynamics, prosocial behavior and prosocial moral reasoning in waves T1 (N = 436) and T2 (N = 342)*

	1	2	3	4	5	6	7	8	9	10	11	12	13	*Mean*[1]		*SD*	
														Boys	Girls	Boys	Girls
1. Salutogenic noo-dynamics T1	-													53.95	55.23^{p}	7.25	7.06
2. Salutogenic noo-dynamics T2	.646**	-												55.61	58.18*	8.08	7.18
3. Pathologic noo-dynamics T1	-.210**	-.220**	-											35.96	35.07	6.35	6.82
4. Pathologic noo-dynamics T2	-.340**	-.334**	.446**	-										37.19	35.39^{p}	7.71	6.56
5. Prosocial behavior (Self-report) T1	.466**	.357**	-.177**	-.309**	-									3.00	3.24**	.40	.36
6. Prosocial behavior (Self-report) T2	.310**	.404**	-.145*	-.310**	.350**	-								2.89	3.14**	.50	.43
7. Prosocial behavior (Peer report) T1	.193**	.254**	-.184**	-.168*	.354**	.280**	-							2.52	2.99**	.63	.54
8. Prosocial behavior (Peer report) T2	.205**	.284**	-.138^{p}	-.230**	.239**	.241**	.311**	-						2.65	2.91**	.73	.68
9. Prosocial behavior (Teacher report) T1	.116*	.209**	-.048	-.157*	.231**	.220**	.345**	.346**	-					2.81	3.09**	.45	.41
10. Prosocial behavior (Teacher report) T2	.253**	.296**	-.068	-.153^{p}	.242**	.177^{p}	.362**	.292**	.504**	-				2.85	3.15**	.43	.43
11. Prosocial behavior composite T1	.320**	.365**	-.197**	-.274**	.655**	.399**	.837**	.408**	.694**	.483**	-			2.76	3.12**	.38	.32
12. Prosocial behavior composite T2	.351**	.415**	-.191^{p}	-.295**	.398**	.613**	.483**	.818**	.458**	.624**	.586**	-		2.80	3.07**	.39	.36
13. PROM composite T1	.148**	.241**	-.137*	-.116^{p}	.078	−.010	.139*	.013	.023	.235**	.133*	.044	-	1.84	1.84	.10	.12
14. PROM composite T2	.354**	.321**	-.283**	-.260**	.294**	.281**	.232**	.178*	.120*	.206*	.294**	.264**	.181*	1.87	1.91**	.08	.08

Note. Pearson correlations: $^{**}p < .001$; $^{*}p < .01$; $^{p}p < .05$.

[1]Independent-sample *t*-test: $^{**}p < .001$; $^{*}p < .01$; $^{p}p < .05$.

Table 2 *Descriptives and correlations among life meaningfulness, prosocial behavior and prosocial moral reasoning in waves T3 (N = 425) and T4 (N = 351)*

	1	2	3	4	5	6	7	8	9	10	11	*Mean*[1]		*SD*	
												Boys	Girls	Boys	Girls
1. Meaning in life T3	-											69.80	67.74^{p}	8.11	8.79
2. Meaning in life T4	.465**	-										67.88	67.61	8.71	9.22
3. Prosocial behavior (Self-report) T3	.413**	.232**	-									3.04	3.18**	.38	.37
4. Prosocial behavior (Self-report) T4	.180*	.251**	.339**	-								3.03	3.15^{p}	.42	.40
5. Prosocial behavior (Peer report) T3	.198**	.091	.205**	.086	-							2.60	3.00**	.66	.55
6. Prosocial behavior (Peer report) T4	.119	.200**	.171*	.247**	.212**	-						2.75	2.93*	.54	.55
7. Prosocial behavior (Teacher report) T3	-.001	.029	.170*	.040	.176*	.236**	-					2.87	3.26**	.48	.51
8. Prosocial behavior (Teacher report) T4	.230**	.189*	.237**	.098	.272**	.261**	.460**	-				2.83	3.24**	.68	.66
9. Prosocial behavior composite T3	.307**	.225**	.580**	.246**	.758**	.350**	.690**	.524**	-			2.81	3.15**	.37	.32
10. Prosocial behavior composite T4	.254**	.321**	.314**	.598**	.300**	.731**	.530**	.774**	.617**	-		2.86	3.14**	.45	.39
11. PROM composite T3	.118^{p}	.130	.301**	.029	.133*	.127^{p}	.184**	.189*	.088	.066	-	1.88	1.92**	.09	.09
12. PROM composite T4	.065	.057	.177*	.122^{p}	.153^{p}	.164*	.078	.093	.117	.056	.301**	1.86	1.91**	.10	.09

Note. Pearson correlations: $^{**}p < .001$; $^{*}p < .01$; $^{p}p < .05$.

[1]Independent-sample *t*-test: $^{**}p < .001$; $^{*}p < .01$; $^{p}p < .05$.

declining sharply in girls. In contrast, internalized and stereotyped reasoning was growing significantly faster in girls.

Longitudinal Path Analysis Models

Two path models were examined using structural equation modeling. Model 1 included data within T1 and T2 waves using the noo-dynamics test (Popielski, 1991) and model 2 used data from T3 and T4 waves using the Life Meaningfulness Scale (Halama, 2002).

Model 2 reflected the relations between composite PMR (T3) and life meaningfulness (T4) through self-reported prosocial behavior (T3), life meaningfulness (T3) and self-report-

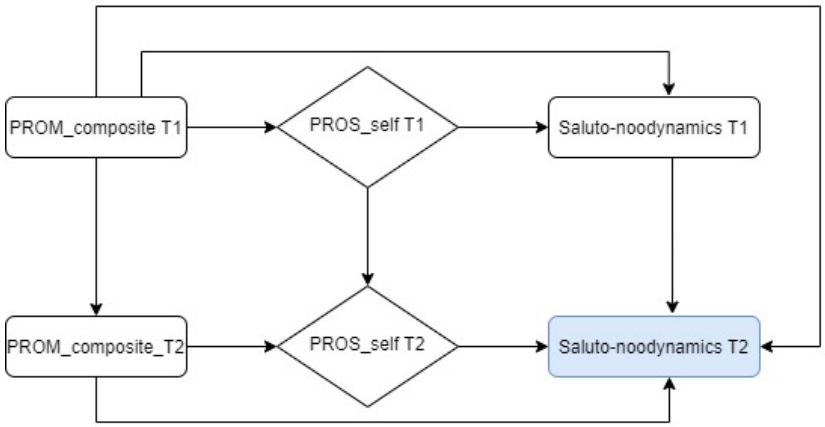


Figure 1 Path model 1 of the relations among prosocial moral reasoning (T1, T2), self-reported prosocial behavior (T1, T2) and salutogenic noo-dynamics (T1, T2).

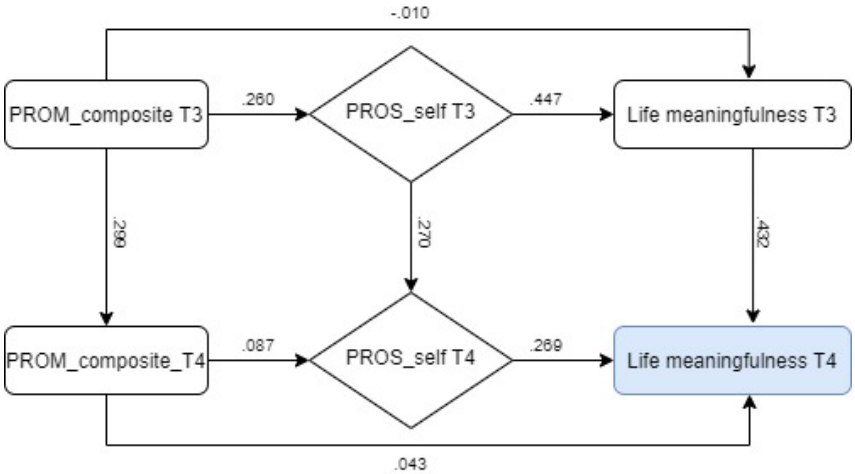


Figure 2 Path model 2 of the relations among prosocial moral reasoning (T3, T4), self-reported prosocial behavior (T3, T4) and life meaningfulness (T3, T4). Standardized estimates are depicted.

ed prosocial behavior (T4). The direct relation between composite PMR (T4) and life meaningfulness (T4) was also included.

The structural models were estimated in the R package lavaan (Rosseel, 2012) using the maximum likelihood method. The models were regarded as falsified based on their chi-square value χ^2 (a significant χ^2 value indicates a misfit of the model) because it is the only formal omnibus test of the (mis)fit of the whole model (Ropovik, 2015). The fit of each model was diagnosed by employing conventional approximate fit indices, namely the comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR). Given the fact that the models have a strong theoretical foundation, no data-driven re-specifications were necessary. Both models captured the relation among variables across two waves. Additionally, to examine potential gender differences in the observed relationships, a multigroup analysis was performed for each model.

The estimates obtained indicated that the hypothesized model 1 (see Figure 1 for a conceptual visualization) deviated substantially from the observed data [$\chi^2(6) = 59.198$, $p < .001$; CFI = 0.879; TLI = 0.698; RMSEA = 0.13, 95%CI (0.10, 0.16); SRMR = 0.11]. In contrast, there were completely different results in model 2 (see Figure 2) [$\chi^2(6) = 6.028$, $p = .420$; CFI = 1.00; TLI = 1.00; RMSEA = 0.003, 95%CI (0.00, 0.06); SRMR = 0.03].

Discussion

The aim of the study was to reveal the relations between PMR, prosocial behavior and meaning in life, and their development during early adolescence. The results confirmed some findings from previous studies. Research in 13-15 year olds showed that there was a moderately strong positive correlation between self-perceived prosociality and meaning in life. The level of pupils' self-perceived prosocial behavior positively correlated with cognitive dimension (at the level of $r = .40$), motivational dimension (at the level of $r = .37$) as well as with affective dimension (at the level of $r = .35$) of meaning in life (Sádovská & Kusý, 2018).

Previous research also confirmed that boys showed significantly higher scores in the approval-oriented and hedonistic types of reasoning, whereas girls showed higher scores in internalized reasoning (Eisenberg et al., 1995; Carlo et al., 1996). However, in general, correlations (although significant) were weak to low-moderate, similar to previous findings (Kumru et al., 2012). Eisenberg et al. (1991) found that self-reported helping behavior at the age of 13–14 years was not significantly related to the composite PMR score, and at the age of 15–16 years this correlation was low (at the level of $r = .30$). The same study revealed that "hedonistic reasoning decreased sharply with age until 11–12 years and then increased slightly in adolescence" (Eisenberg et al., 1991, p. 853). In line with this research, our results showed very similar findings and similar differences based on gender: boys significantly decreased in stereotyped reasoning and significantly increased in hedonistic reasoning from T3 to T4 whereas no significant changes were measured in girls. In general, prosocial behavior during adolescence is gender-specific (Graaff et al., 2018).

Our study provided two longitudinal path models of relations between PMR, prosocial behavior and life meaningfulness. The results can be interpreted in two possible ways: in terms of the respondent's age or operationalization of the meaningfulness construct. With regard to the former, changes in meaning in life for adolescents were shown to depend on age (García-Alandete et al., 2019). It is supposed that children and adolescents become more realistic about their expectations with

age. Considering Piaget's (1952) statement, in which he suggested that children's concrete thinking made it difficult for them to consolidate a coherent sense of self and life, which demanded formal, abstract thought operations that emerged after age 11 years, Shoshani and Russo-Netzer (2017, p. 464) suggest that "the need for meaning is a fundamental existential experience among children as well, although since meaning is manifested differently in children, its detection requires age-appropriate questions, which are defined through concrete operational behaviors, experiences, and thoughts". Steger, Bundick, and Yeager (2011) also posited that the cognitive capacities required to describe and comprehend one's life experience only develop actively during early adolescence.

The second way to interpret the considerable result differences between the two models is methodological. Operationalization of the meaningfulness construct appears to be more appropriate through Halama's Life Meaningfulness Scale compared to Popielski's noo-dynamics questionnaire.

In terms of the PROM reliability, it is worth mentioning that there are repeating problems with a low Cronbach's α in some categories. In a comparative study conducted by the author of the PROM and his Brazilian colleagues (Carlo et al., 1996), the levels of reliability were similar for each type of reasoning: hedonistic (α = .60), approval-oriented (*α* = .85), needs-oriented (*α* = .66), stereotyped (*α* = .71) and internalized (*α* = .64). This was also the case in other studies, where comparable values of reliability (.56–.78) were found for the individual subcategories (Carlo, Eisenberg, & Knight, 1992); in some cases the values were at the limit of acceptability: .46–.88 (Kumru et al., 2012). Most often, the lowest value of Cronbach's α is found in the category of hedonistic reasoning, probably due to the non-normal distribution of respondents' choices for individual items saturating this category. In our study, items of two stories have a flat distribution (kurtosis = -1.28 and -1.11, respectively) and, at the same time, items of another two stories have a significant but opposite skewness (skewness = 1.03 and -.45, respectively). The formulation of the items probably encourages answers at both edges of the scale, which reduces the reliability of the whole category.

Conclusions and Future Directions

To our knowledge, this is the first study to investigate longitudinal paths of relations between PMR, prosocial behavior and life meaningfulness. The study included two longitudinal path models that differed in respondents' age and operationalization of the meaningfulness construct. Model 1 described relationships between PMR (T1, T2), self-reported prosocial behavior (T1, T2) and salutogenic noo-dynamics (Popielski, 1991); the results indicate that the proposed model has not found the necessary support in the data. Model 2 included relations between prosocial moral reasoning (T3, T4), self-reported prosocial behavior (T3, T4) and life meaningfulness (Halama, 2002) in adolescents aged 14–15 years old; the results show a good fit, so we can conclude that there are strong relations between the constructs.

One of the long-term goals of moral reasoning research is to discover how to get as close as possible to overcoming the so-called reason–action gap. Considering its links to moral emotions and empathy, the construct of PMR should appear to be more appropriate compared to those based on duty or categorical rules. However, data analysis showed that the correlations and regression coefficients between reasoning and behavior were similar to those based on different moral reasoning constructs (King & Mayhew, 2002). In order to bring moral judgment closer to the complexity of life and thus reduce the gap between

judgment and action, it will be necessary to work with more complex stories contextually linked to the respondent and provide a broad portfolio of solutions/possible decisions at multiple levels of cognitive processes. In this context, moral feelings are re-emerging as aspects influencing moral decision-making. Their function and strength can be documented in distinguishing between the types of dilemmas addressed: in the case of hypothetical dilemmas, respondents score higher and reach higher levels of moral stages compared to real-life dilemmas where emotions are more intense and authentic because they are personally relevant events (Skoe et al., 2002). From the methodological point of view, a relatively narrow view of the moral situation – as is exclusively synonymous with situations of help and altruistic solutions of emotional distress in others – is problematic. In the interpersonal natural context itself, the palette of moral virtues is significantly richer: for example, we can speak of gratitude, humility, honesty or justice. These virtues are missing in the range of PROM stories, which are narrowly focused on helping behavior. A holistic approach is needed to cover the motivational issues in prosocial behavior. As supposed previously, it is probably a combination of three sources: moral identity, moral reasoning and moral emotions (Hardy & Carlo, 2005; Hardy, 2006). In this regard, Darnell et al.'s (2019) contribution appears to be promising because their approach is based on virtue ethics.

Acknowledgements

This work has been supported by the Scientific Grant Agency of the Slovak Republic VEGA under the Grant No. 1/0056/19 and by the grant fund of Trnava University 2019 under the grant No. 3/TU/2019.

M. B. conceived the study, performed the statistical analysis, interpreted the results, and coordinated and drafted the manuscript. A. S. wrote the introduction, was involved in the interpretation of the results, wrote parts of the draft, and revised the manuscript critically. P. K. wrote parts of the methods and measures, revised the manuscript critically, and coordinated the drafted manuscript. R. P. coordinated the data gathering, revised formal requirements, checked the references and revised the manuscript critically. I. P. co-designed the research plan, was involved in the interpretation of the results, and reviewed the manuscript critically. All authors read and approved the final manuscript.

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