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Altruism/Non-Altruism Questionnaire – Short Version: The Revision of the Method Based on Bifactor Analysis

ABSTRACT

The Altruism/Non-altruism (A–N) Questionnaire is a tool for measuring altruism, understood as the readiness to act selflessly for the benefit of other people without expecting an external reward. The article presents a review of past research that provides empirical evidence for the tool's validity and the results of two studies aimed at abridging the questionnaire. Study 1 (N = 641) included the shortening of the instrument and a preliminary assessment of the psychometric properties of the abbreviated version. In Study 2 (N = 388), the questionnaire was cross-validated, and its reliability and validity were assessed. The short version of the A–N Questionnaire proved to be a satisfactorily reliable and valid instrument for measuring altruism.

KEYWORDS: altruism; measurement; Altruism/Non-Altruism Questionnaire; prosocial behaviour; bifactor analysis.

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INTRODUCTION

Prosocial behaviour is generally understood as voluntary, deliberate actions that benefit others (Bar-Tal, 1976; Batson & Powell, 2003). Altruism is a prosocial behaviour that people display without expecting external rewards or direct benefits or intending to avoid penalties and punishment (Batson, 2011; Batson & Powell, 2003; Maner & Gailliot, 2007; Śliwak, 2001; Szuster, 2016). Auguste Comte (1891/2009) coined the concept of "altruism" to describe the moral obligation to renounce one's self-interest and live for others, which he considered a duty and a source of happiness for every human being. Due to its atypical nature, altruism as a kind of behaviour has gained particular importance among other forms of prosocial behaviour.

Altruism is a complex construct that incorporates a specific motivation besides the helping behaviour itself. According to some approaches, altruistic behaviour is displayed for future or indirect benefits (Burum et al., 2020; Fehr & Rockenbach, 2004; Marsh, 2016). Others believe that people perform altruistic acts for inner satisfaction. Still, others believe that people can be truly altruistic, and such behaviour can occur even when all stimuli are suppressed (Andreoni et al., 2017; Batson, 1987; Brethel-Haurwitz et al., 2018; Śliwak, 2001; Stich, 2016; Szuster, 2018). For example, Büssing et al. (2013) developed the concept of "generative altruism", which focuses on the consistent pleasure of supporting the success of others and costs time, money, energy, and even the sacrifice of one's own needs and desires for the welfare of others. Seelig and Rosof (2001) recognised the complex reality of altruistic phenomena and used various distinctions in the domain of altruism, including mature altruism. For this study, we assume that altruistic behaviour was a conscious and voluntary action for the benefit of other people; while benefiting others, the acting person is not oriented toward external rewards because helping others is for him or her a value in itself (Śliwak, 2001).

Various methods have been proposed to measure altruism among adults. In particular, two main altruism operationalisation approaches can be mentioned: behavioural trials and psychometric tools. Psychologists with a more experimental orientation often use behavioural indicators of altruism, such as a donation or the presence of helping behaviour in a particular situation (cf. Darley & Batson, 1973; Manucia et al., 1984; Piliavin et al., 1969; Schnall et al., 2010). For example, in the classic Good Samaritan study (Darley & Batson, 1973), the participants were asked to do an experimental procedure in one building and continue it in another building, which required them to pass by an informed confederate. The confederate leaned forward, coughing, eyes closed. The participants' responses were rated based on how they noticed the person in need, asked if they needed help, and insisted on helping. In some studies, participants were asked to share their earnings with another participant. People who sacrificed part of their earnings to pay someone else were believed to be altruistic. Another group of trials uses indirect methods, including economic games (Andreoni & Miller, 2002; Jiang et al., 2015; Kistler et al., 2017), decomposed games (Messick & McClintock, 1968; Murphy & Ackermann, 2014), and trials based on reaction times and priming, such as the Implicit Association Test (Marvel & Resh, 2019; Wu & Guo, 2016).

Behavioural trials have substantial merits, such as objectivity, measurement accuracy, and control of confounding variables (Crano et al., 2014). However, it is not always possible to perform them due to contextual constraints or costs. Moreover, there are some doubts about the theoretical validity of using only behavioural measures to test constructs such as altruism, which contain an incentive component. Moreover, measuring relatively persistent individual differences is often a research objective (Karyłowski, 1982, 1984). For the above reasons, altruism is mainly measured using questionnaire methods.

The psychometric methods for studying altruism are tools based on self-reports or evaluations by others, such as peers, spouses, or co-workers (Martí-Vilar et al., 2019). An example of the latter type is the sociometric technique, in which the remaining members assess an individual's propensity to help other group members (e.g., Karyłowski, 1982). Such procedures assume that the evaluators are familiar with the subjects.

Self-report tests are the most commonly used measures of altruism in the literature. They can be categorised into those whose items concern facts vs. subjective states. An example of a method referring to facts is the classic Self-Report Altruism Scale (SAS) by Rushton et al. (1981), which consists of 20 descriptions of altruistic behaviours assessed by the respondents about the frequency of their involvement in those behaviours. This scale is commonly used as a one-dimensional index of altruism. An example of a method that refers to beliefs is the Generative Altruism Scale developed by Büssing et al. (2013). It consists of seven items describing specific helping actions, assessed in a four-point Likert response format. Another important self-report format is the measurement of behavioural intentions to help others (e.g., Agerström & Björklund, 2009; Pavey et al., 2012). For example, the SAS response format has been modified to express the willingness to act pro-socially (Pavey et al., 2012). Finally, a significant group of self-report measures of altruism are subscales of instruments designed to measure broader constructs, such as pro-sociality (e.g., Altruistic Behaviour in the Prosocial Tendencies Measure [Carlo & Randall, 2002]) or personality (the Altruism facet in the NEO-PI-R [Costa & McCrae, 1992]). Self-descriptive tests involving questions about facts and subjective states capture slightly different constructs, but both are burdened with well-known drawbacks: they are susceptible to a tendency to self-presentation in a better light, conscious manipulation of answers, or a tendency to respond in a certain way.

One of the ways to remedy the above drawbacks is to construct multi-method or semi-projective measures (Moroń, 2012; Motowidlo et al., 2016; Singer et al., 2019; Śliwak, 2005). The latter category includes methods consisting of vignettes describing moral dilemmas experienced by fictional characters. These methods are based on the assumption that the test subjects, reading the stories and identifying with fictional characters, project their motivations. Semi-projective techniques are believed to be less exposed to the influence of changing social approval (Karyłowski, 1982; Szuster, 2018).

The Altruism/Non-Altruism Questionnaire

The Altruism/Non-altruism (A–N) Questionnaire was developed in 1989 by Śliwak (2005). It consists of vignettes for which material was collected in a survey conducted among 100 people asked to provide examples of altruistic and non-altruistic behaviours they observed. To maintain high validity in the aspect of response processes, the best conditions for identifying with the fictional characters were provided: they were described in such a way that the respondents could easily imagine them as being similar to themselves. The characters are always of the same gender as the subjects (two versions were prepared) and of an undefined age. Furthermore, the stories try to consider various life situations to cover a wide range of experiences from the respondents' daily life.

Construct validity was ensured by the fact that the moral dilemmas were constructed so that helping a partner was always crucial for the partner but required some level of sacrifice from the protagonist. Moreover, the possibility of receiving a reward for such behaviour was relatively minimal or none. An example of a story is provided below.

While visiting friends, Maya meets a woman she has never seen before. As they are talking, Maya realises that her interlocutor is struggling with many problems that she (Maya) could solve. Of course, getting these things sorted would require a sacrifice

and would undoubtedly take up a lot of her precious time. Maya, however, has many unsettled matters of her own, and she has known the woman for only a few moments. So, what do you think Maya will do?

The vignettes were divided into two sets, in which different techniques of measuring altruism were used. The stories in the first set had six answers each, expressing a different level of the character's altruistic aptitude. For example, for the above-quoted vignette, the responses were as follows: (a) *She will offer help and say that she is also ready to help in the future*; (b) *She will offer help*; (c) *She will hesitate for a long time but will eventually offer help*; (d) *She will hesitate for a long time and will eventually not offer help*; (e) *She will not offer help*; (f) *She will not offer help and will even add that guests should not bother others with their problems*. The subject is asked to choose the description they have found the most relevant. The second part contained stories along with a resolution of the dilemma posed. The subjects were asked to take a stand on that resolution and say to what extent they agreed with the decision made by the protagonist of the story. The answers were given on a seven-point Likert scale. The score on the A–N scale is the sum of the scores for the two parts.

Twenty stories were generated during test development: 12 in the first and 8 in the second part (Śliwak, 2005). The items for the final version were selected based on a content validity assessment made by 32 competent judges and psychologists: 17 items were obtained, 9 in the first part and 8 in the second part. The reliability coefficients obtained by Śliwak (2005) in the construction study were as follows: test–retest reliability over an interval of 14 days r_{tt} = .86 (n = 65); Cronbach's coefficient α = .81 (n = 424). The questionnaire was also validated against external criteria.

Previous research on the A–N Questionnaire

The A–N Questionnaire has been studied since the moment of its construction. The results of these studies provide information on the validity of the questionnaire while exploring the nomological network of the construct it measures. In preparing the present article, we identified 20 empirical peer-reviewed papers that used the A–N Questionnaire. In addition, the tool was translated into Ukrainian and used in research on altruism among people serving probation (Klimkiv, 2016). Below, we analyse the peer-reviewed studies to establish the nomological network of the construct tested by the questionnaire.

Theoretically, altruistic behaviour and the motivation for such behaviour are the closest to the construct of altruism. In assessing the instrument's validity, Śliwak (2005) compared the scores obtained by volunteers from the *Faith and Light* association who had provided care to mentally and physically disabled persons for at least one year ($n = 30$) with the scores of age- and gender-matched control participants not involved in volunteering ($n = 30$) and three groups formed by dividing a group of students surveyed with the A–N Questionnaire ($n = 158$) based on quartile deviation (low, medium, and high altruism). The volunteers' mean A–N score was significantly higher than in the control group. It was also higher than the scores obtained by the low and medium altruism groups, but lower than the high altruism group's scores (Śliwak, 2005). This result supports the proposition that altruism, as measured by the A–N Questionnaire, is closely associated with altruistic behaviour. By contrast, Milaniak et al. (2018, 2020) did not find significant associations of A–N with attitudes towards transplantation, the intention to declare oneself an organ donor, or the signing of such a declaration. It is not clear why altruism is not associated with this type of prosocial behaviour. The authors suggested a curvilinear relationship with both the intention and donation declaration (Milaniak et al., 2018). Nevertheless, this result suggests that altruism, as measured by the A–N Ques-

tionnaire, is not necessarily associated with all types of prosocial behaviour. The lack of associations may also be because attitudes towards transplantation may be motivated by factors other than altruism (e.g., solidarity [Saunders, 2012]).

The second construct that is close to altruism is altruistic motivation. Some studies used the A–N Questionnaire alongside measures of endo- versus exocentric prosocial motivation (Śliwak, 1993, 1995; Śliwak & Zarzycka, 2012, 2013); however, none of them provided data on the strength of the relationship between these constructs. Therefore, it can only be concluded indirectly, based on data regarding the sizes of the endocentric and exocentric altruist groups, that A–N showed a weak positive correlation with endocentric motivation. However, in a study of 30 volunteers, A–N scores correlated positively (at a similar level) with all types of motivation to volunteer (Aondo-Akaa, 2018). Thus, in keeping with the assumptions of the A–N Questionnaire, this instrument measures generalised motivation to help others.

An essential aspect of determining the content of the construct of "altruism" measured by the A–N Questionnaire is the assessment of its connections with personality, i.e., the search for the so-called altruistic personality. Śliwak and Zarzycka (2012), in their study of the relationships between altruism and the Big Five personality traits, found that the former was significantly associated with agreeableness and conscientiousness. Because altruism is a facet of agreeableness, this finding confirmed the affinity of the two constructs. As assumed, A–N was associated with those personality traits that are related to moral character and action in McCrae and Costa's model. Pokorski et al. (2013) investigated the relationship between altruism and temperament, as viewed from the perspective of the regulatory theory of temperament. Perhaps the most important finding of their study was that this relationship was moderated by age; while in young adults altruism was positively associated with perseverance and negatively

with emotional reactivity, it was associated with sensory sensitivity in seniors.

Śliwak and Leszczuk (1994), who studied the relationships between altruism and self-image in adolescents, discovered a negative correlation between altruism and aggression. Moreover, altruism was negatively associated with exhibition and autonomy needs and positively with needs of nurturance, abasement, deference, and indices of cultural femininity and leadership. In another study of young adults (Śliwak & Hajduk, 1996), the A–N score correlated positively with the majority of social adjustment measures from the categories of socialisation, maturity, and responsibility as well as social achievements and intellectual efficiency; the only aspect of social adjustment that correlated negatively with altruism was a social presence. Finally, in adults, A–N scores correlated positively with emotional intelligence (Pokorski et al., 2013), gratitude (especially appreciation of others) (Tomaszek & Lasota, 2018), and reflective and outer self-awareness; however, they were negatively related to individual and defensive self-awareness (Śliwak & Zarzycka, 2013) and anxiety as defined by Cattell (Śliwak, 2002). These results point to the following features of the construct measured by the A–N Questionnaire: high sensitivity to the social context, its dominance in personality, the relationship of the construct with the ethical dimension of action (virtue), and the predominance of reflective rather than automatic processes. All these aspects are in line with the theoretical assumptions regarding altruism adopted at the stage of the development of the A–N Questionnaire ("conscious and voluntary action for the benefit of other people").

Another group of variables whose relationship with A–N scores has been investigated in previous studies is existential variables. Research has been conducted on the associations between altruism and value preferences defined by Rokeach (Śliwak, 1995). Salvation turned out to be the most critical terminal goal for altruists, and they valued less the pleasures of life than did

non-altruists. The relationships of some values, such as social recognition, with altruism, were moderated by the type of prosocial motivation. Other studies in this area found that altruists had a higher sense of purpose concerning the objectives of life, the meaning of life, affirmation, self-evaluation, responsibility, and freedom, but not about life evaluation and attitude towards death and suicide (Śliwak & Król, 1989); they were also characterised by a higher spiritual transcendence (Piotrowski, 2018). A–N scores correlated positively with the level of religiosity (Śliwak, 1993), individual religiosity (Szymołon, 2002), and intrinsic religious orientation, but they did not correlate with extrinsic or quest orientation (Piotrowski, 2018). The contents of religiosity, such as religious experience and relationship to God, which had a positive character, were positively associated with altruism, and those of a negative nature correlated with it negatively, with no significant correlation obtained for fear and guilt (Śliwak, 1993; Szymołon, 2002). In another study, Śliwak and Zarosińska (2020) investigated the relationship between prosocial behaviours and religiosity in a group of volunteers. Altruism showed statistically significant positive associations with the centrality of religiosity and all its dimensions. The most robust relationship was found between altruism and interest in religious issues. Moreover, altruism was statistically significantly associated with three of the four thinking styles about religion: a negative relationship was found between altruism and literal disaffirmation, while positive correlations were found with symbolic and literal affirmation. These results show a close connection between altruism measured with the A–N Questionnaire and global systems of meaning, which are crucial for the existential understanding and experiencing of the world and the self.

Little is known about the susceptibility of the A–N Questionnaire to the respondents' tendency to show themselves in a more favourable light. In one of his works, Śliwak (2001) conducted a partial correlation analysis to test whether social desirabil-

ity bias significantly modified the associations of A–N with other variables. The analysis demonstrated that those scales that significantly correlated with altruism still showed significant associations when controlled for social desirability bias.

In conclusion, the results obtained indicate that the A–N Questionnaire measures the readiness to show altruistic behaviour. They provide evidence for the theoretical validity of the instrument in the sense of confirming the nomological network of altruism. Altruism is a complex construct with behavioural and motivational aspects. It is strongly prosocial and reflective and is associated with the existential and ethical sphere/virtues as viewed from the perspective of positive psychology. The tool's structure indicates a generic motivation, but further research is needed in this area. Another issue is the tool's susceptibility to social desirability bias, which has not been tested yet. The questionnaire has a particular tradition of use: it has been used in Poland by researchers from various research centers but is still relatively little known, which, along with its substantial size, poses an obstacle to its dissemination. The present article aims to fill this gap at least partially.

The purpose of the present study

In the present paper, we report the results of two studies. In the first study, an abbreviated version of the A–N Questionnaire was developed based on the analysis of the structure of the original version. It was assumed that the scale, although structurally heterogeneous, measured a one-dimensional construct, so it was shortened based on a bifactor model. The second study assessed the reliability and validity of the abridged version. Concerning validity, we expected to obtain a positive correlation with prosocial orientation, a high positive correlation with agreeableness, and a positive correlation with involvement in charity. The data that support the findings of both studies are openly available

from osf.io at https://osf.io/9ur3g. Supplementary materials are available at https://osf.io/j8xak.

STUDY 1

The aim of the first study was to develop an abbreviated version of the A–N Questionnaire by analyzing the structure of the original version.

Method

Sample

The questionnaire sets were distributed by research staff and students to a convenient sample. The "snowball" sampling method was used starting among acquaintances. The total sample consisted of 641 persons (47.4% women), aged 16 to 40 years old (M = 25.0, SD = 4.83). All procedures performed in this study followed the ethical standards of the Institutional Research Committee and complied with the 1964 Declaration of Helsinki and its later amendments.

Materials and methods

The A–N Questionnaire by Śliwak (2005) was used to measure altruism.

Statistical analysis

Confirmatory factor analysis was carried out with the lavaan package (Rosseel, 2012) in R (R Core Team, 2020) by using polychoric correlations to test various factor structure models.

Results

The goal of the first study was to abridge the A–N Questionnaire and to make a preliminary estimate of the psychometric properties of the abbreviated version. The questionnaire was shortened based on the factor structure of its original version, assuming that the tool was one-dimensional, even though it consisted of two parts based on different measurement methods and had a different response format. The structure of the A–N Questionnaire was examined by comparing a set of models: Model 1, a unidimensional model; Model 2, a two-dimensional method model; Model 3, a three-dimensional method-valence model; Model 4, a bifactor method model; and Model 5, a bifactor method-valence model. Model 1 assumed that there was one factor; Model 2 assumed that there were two correlated factors corresponding to the two parts of the questionnaire; and Model 3 assumed that there were three correlated factors: Part 1 of the test, positively worded items of Part 2, and negatively worded items of Part 2 of the questionnaire. The bifactor models assumed that there were, respectively, two (Model 4) and three (Model 5) group factors analogous to Models 2 and 3. All models were estimated using the diagonally weighted least squares method, assuming all items were ordinal, based on the polychoric correlation matrices attached to the article as Supplementary Materials. Summarised fit indices of the competing models are presented in Table 1.

All fit indices had acceptable fit indices; however, the bifactor models performed better. The model with the best fit was the one that included the two parts of the test as group factors. Because the A–N Questionnaire has separate versions for men and women, it was tested for invariance between genders. A weak invariance was obtained at the level of factor loadings ($\Delta\chi^2[31] = 44.84$, $p = .052$). Accordingly, two items whose factor loadings differed between the sexes (items 2 and 11) were discarded. The model comprised of the remaining items (the bifactor adjusted model)

Table 1. Model fit indices for competing models of the factorial structure of the A–N Questionnaire (N = 641).

	χ^2	*df*	*p*	CFI	TLI	RMSEA	SRMR
Model 4: Bifactor (method)	202.04	102	0	.974	.966	.039	.035
Model 5: Bifactor (method-valence)	204.71	102	0	.973	.965	.040	.036
Model 3: Three-dimensional (method-valence)	260.44	116	0	.963	.956	.044	.041
Model 2: Two-dimensional (method)	309.77	118	0	.950	.943	.050	.045
Model 1: Unidimensional	441.09	119	0	.917	.905	.065	.054

Note. The models are presented in order from the best to the poorest.

was well fitted (χ^2[75] = 154.63, $p < .001$, CFI = .975, TLI = .965, RMSEA = .041, 90% CI_{RMSEA} [.032, .050], SRMR = .035) and gender invariant at the level of loadings ($\Delta\chi^2$[27] = 27.33, $p = .446$) and thresholds ($\Delta\chi^2$[52] = 63.28, $p = .136$). The results of this model are shown in Figure 1; for detailed parameter estimates, see the Supplementary Materials.

Based on the bifactor adjusted model of the structure of the A–N Questionnaire, the instrument was shortened by selecting 10 items with the highest global factor loadings, five from each part of the scale. As a preliminary estimation of reliability and validity, we calculated McDonald's ω_T and ω_H coefficients based on the confirmatory model (including 10 items), Cronbach's α and Guttman's λ_6, descriptive statistics, and correlations among subscales. The results are shown in Table 2.

Figure 1. Confirmatory factor analysis of the A–N Questionnaire (N = 641): The final model.

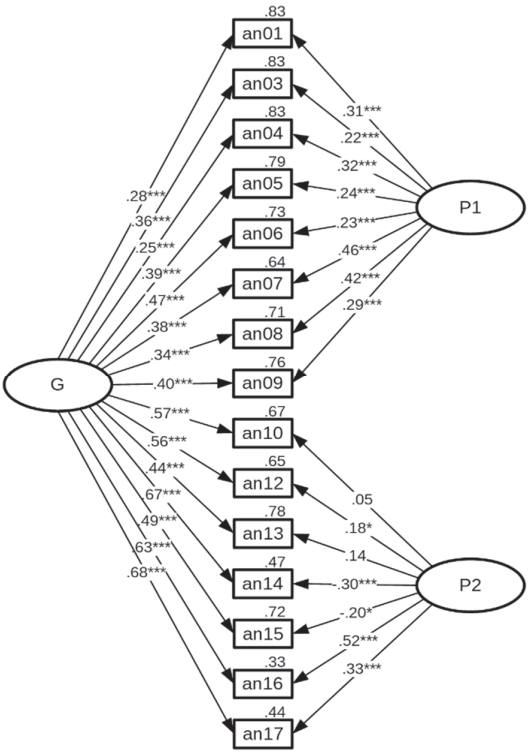


Table 2. Descriptive statistics, reliability coefficients, and intercorrelations between the total and parts scores of Altruism/Non-altruism Questionnaire – Short (N = 641).

Variable	M	SD	Min	Max	ω_T	ω_H	α	λ_6	Total	Part 1
Total AN	46.8	7.99	21	64	.82	.75	.76	.76		
Part 1	21.1	3.66	7	30	.62	.43	.56	.54	.82	
Part 2	25.7	5.39	11	35	.80	.74	.70	.69	.92	.54

Note. M = mean, SD = standard deviation, Min and Max = minimal and maximal value, respectively, ω_T = McDonald's omega total, ω_H = McDonald's omega hierarchical, α = Cronbach's alpha, λ_6 = Guttman's lambda-6.

The A–N Questionnaire measures a one-dimensional construct even though two methods are used to measure it. Group factors, in particular factor 2, can be interpreted as related to the specific response format. Factor 2 considers the extremity of responses since the negatively worded items have the opposite sign in this factor.

STUDY 2

The aim of Study 2 was to cross-validate the abbreviated questionnaire and assess its psychometric parameters: reliability and validity. Regarding validity, the hypothesis was adopted that the A–N altruism score would be positively associated with more prosocial behaviours, the personality trait of agreeableness, and cooperative social orientation, and negatively associated with competitive and individualistic social orientations.

Method

Sample

The Ariadna panel conducted a CAWI survey among registered users. The panel has been operating in Poland under the International Chamber of Commerce / European Society for Opinion and Marketing Research research standards since 2013 based on voluntary paid cooperation (Panel Badawczy Ariadna, 2020). The respondents were rewarded for taking part in the study. Invitations were sent to 46,806 users to participate in the survey. A total of 8,511 users accepted the invitation, with an 18.2% response rate, and 443 responses were obtained. Based on the response time and an analysis of response patterns, 55 unreliable responses were discarded from the sample. The final sample consisted of 388 persons aged 20 to 84 years old ($M = 42.5$, $SD = 13.49$): 52.1% were women,

20.9% lived in the countryside, and 50.3% had higher education. The study was conducted following the Declaration of Helsinki.

Materials and methods

The subjects were given a set of questionnaires.

Altruism. AN-Short was used in the study. The instrument consisted of 10 items (selected in Study 1), five per each of the two parts of the scale. In addition, several changes were introduced in the abbreviated instrument: the response formats of both parts were reduced to 6 points (the midpoint on the Likert scale was removed in Part 2) so that the two parts should contribute equally to the total score. In addition, the instrument's wording was revised and updated, and the names used in it were updated based on the national ranking of names given to children in 2019 (Ministerstwo Cyfryzacji, 2020). The final version of the questionnaire, both the Polish original and an English translation, can be found in the Supplementary Materials.

Charitable behaviours. Two questions were asked about charity: "In the last 12 months, how many times have you donated (1) money (2) other goods to charity?" (response format: *0*, *1*, *2–6*, *7–12*, *13 and more*). The responses reflected the occurrence of charitable behaviours, and the respondents were divided into those whose response was 0 (no charitable behaviour occurred) and the rest (a charitable behaviour occurred).

Social value orientations. Participants were asked to complete the nine-item triple-dominance Measure of Social Value Orientations (SVO) (Van Lange et al., 1997). This method has robust psychometric properties, is a valid predictor of SVO-linked behaviour (Bogaert et al., 2008), and is not influenced by social desirability (Platow, 1994). The task consists of a series of decomposed games in which participants must allocate "points" to themselves and a hypothetical other. For instance, participants might be asked to choose between alternatives corresponding to

a prosocial orientation (e.g., 480 points for self and 480 points for other), an individualist orientation (e.g., 540 points for self and 280 for other), or a competitive orientation (e.g., 480 points for self and 80 points for other). Participants are classified according to their SVO if they make at least six of the nine choices consistent with one orientation. In line with previous work (Au & Kwong, 2004), 72 participants could not be classified on the basis of six consistent choices and were therefore excluded from the analyses involving categorisation by SVO.

Personality. The Big Five traits (i.e., extraversion, agreeableness, conscientiousness, emotional stability, and intellect) were measured by Donnellan et al.'s (2006) scales (IPIP-BFM-20), adapted to Polish by Topolewska et al. (2017). The instrument consists of 20 items rated on a five-point scale (from 1 = *very inaccurate* to 5 = *very accurate*), with higher scores indicating that the trait describes the individual better. The scale is a shortened version of the 50-item Big Five Markers questionnaire from Goldberg's (1992) International Personality Item Pool (IPIP). The reliability of its scales (Cronbach's α) for the present study ranged from 0.71 to 0.84.

Sociodemographic variables. The questionnaire included questions about age, gender, education, and place of residence.

Statistical analysis

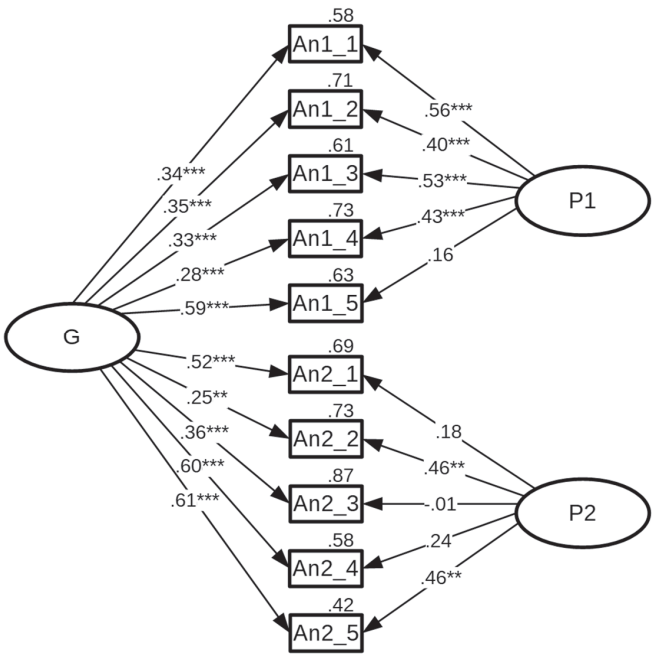
Confirmatory factor analysis was carried out with the lavaan package (Rosseel, 2012) in R (R Core Team, 2020) by using polychoric correlations to test various factor structure models.

Results

Factor structure

To assess the test's factor structure, a bifactor confirmatory model was constructed, analogous to the results obtained in Study 1, in which the main factor (G) and two group factors were distinguished; one group factor consisted of five items based on projective identification, and the other group factor comprised five items directly measuring the respondents' evaluation of samples of behaviour. The model was estimated using the diagonally weighted least squares method, assuming all items were ordinal, based on polychoric correlations matrices attached to the article as Supplementary Materials. This model fitted the data well

Figure 2. Bifactor confirmatory model of AN – Short in Study 2 (N = 443).



($\chi^2[25]=30.50, p=.206, CFI=.994, TLI=.990, RMSEA=.024, 90\%CI_{RMSEA}$ [.000, .049], SRMR = .029). The model results are shown in Figure 2; see the Supplementary Materials for parameter details.

Invariance of measurement between women and men was assessed at the level of factor loadings ($\Delta\chi^2$ [31] = 44.84, p = .052) and thresholds ($\Delta\chi^2$ [31] = 44.84, p = .052).

Reliability and intercorrelations between parts of the scale

The discriminant power of the items for factor G was calculated, the correlation coefficient corrected for item overlap, and scale reliability was found to be in the range of .23–.60.

Satisfactory reliability coefficients were obtained (Table 3). The intercorrelations between the parts of the scale point to differences resulting from the dissimilarity of the methods they are based on.

Table 3. Descriptive statistics, reliabilities, and intercorrelations of the A–N total score and the scores for its two parts (N = 443).

Variable	*M*	*SD*	Min	Max	α	λ_6	ω_T	*r*	
								Total	Part 1
Total	38.93	6.58	18	58	0.72	0.72	0.79		
Part 1	19.06	3.94	9	30	0.66	0.63	0.71	.84	
Part 2	19.87	3.93	9	30	0.61	0.59	0.69	.84	.40

Note. *M, SD, Min, Max*, α, λ_6, ω_T, and *r*, respectively, stand for mean, standard deviation, minimum value, maximum value, and reliability coefficients: Cronbach's alpha, Guttman's lambda-6, McDonald's omega total, and Pearson's correlation coefficient.

Validity

Altruism was expected to be associated with more prosocial behaviours, the personality trait of agreeableness, and cooperative social orientation.

The global score correlated positively with age (r = .19, p < .001), and it did not correlate with monthly income.

The correlations obtained in the study confirmed the validity of the A–N Questionnaire (Table 4). Altruism correlated positively with the occurrence of charity donations, both monetary and in kind. Moreover, the global A–N score correlated positively with agreeableness. It was the highest correlation among all the correlations with personality traits. Altruism was also positively correlated with extroversion, conscientiousness, and intellect. The differences in the significance of the correlations between personality traits and Parts 1 and 2 of the A–N Questionnaire are worth noting. Significant correlations with conscientiousness and intellect were obtained only for Part 2, indicating that these relationships result from the fact that these traits were evaluated using a common method.

Table 4. Descriptive statistics of variables in the validity study of A–N and their correlations with the two parts of A–N and global A–N (N = 388).

Variable	*M*	*SD*	*r*		
			Part 1	Part 2	Total
Charity (money)	.81	.395	.22**	.21**	.26**
Charity (things)	.51	.501	.12*	.07	.11*
Extraversion	2.95	0.857	.18**	.17**	.21**
Agreeableness	3.63	0.653	.40**	.43**	.49**
Conscientiousness	3.55	0.749	.10	.18**	.16**
Stability	2.81	0.739	.03	.03	.03
Intellect	3.52	0.685	.09	.16**	.15**
Prosocial choices	5.67	3.66	.25**	.27**	.31**
Individualist choices	2.31	3.06	–.21**	–.20**	–.24**
Competitor choices	1.02	2.18	–.14**	–.17**	–.18**

* $p < .05$, ** $p < .01$, *** $p < .001$.

The correlation of the A–N test with the nine-item triple-dominance measure of SVO also confirmed the theoretical validity of the test. The A–N score correlated positively with prosocial choices and negatively with competitive and individualistic choices. A comparison of A–N scores between SVO types showed that they were statistically different ($F[2, 315] = 15.55$; $p < .001$). Post-hoc Scheffe tests showed that the pro-social type ($n = 225$, $M = 40.60$, $SD = 6.61$) obtained significantly higher A–N scores than the individualistic type ($n = 67$, $M = 36.63$, $SD = 5.67$; $p < .001$) and the competitive type ($n = 24$, $M = 36.21$, $SD = 5.58$; $p = .006$). Individualists and competitors did not differ in the A–N score ($p = .962$).

DISCUSSION

This article presents to the English-speaking reader the A–N Questionnaire, evidence for its validity from past research, and the results of two studies in which the instrument was shortened and tested for validity.

The A–N Questionnaire is used to differentiate between individuals according to their readiness to act selflessly for the benefit of other people without the expectation of an external reward. The altruism scales found in the world literature most often do not consider the problem of the motivation of altruistic behaviours. Thus, they see any act done for the benefit of another person as an altruistic behaviour, even if the expectation of a reward has inspired it. The A–N Questionnaire has been designed to measure prosocial behaviours that exclude external rewards. We tried to reduce the social desirability bias of the scale by constructing a multi-method and partly semi-projective test.

The A–N Questionnaire has been used multiple times to measure the level of altruism, and in all those studies, it had normal score distributions. Individuals with higher A–N scores

had higher meaning in life and showed better social adjustment, better social relationships, a more positive religious attitude, and a positive religious relation to God.

In this paper, we present a shortened version of the questionnaire and results that indicate that it has satisfactory psychometric properties. A review of previous research has shown the scope of the content of "altruism" as measured by the A–N Questionnaire. Basically, it has confirmed the theoretical validity of the tool, although it has also revealed some questions that need to be clarified in future research. One such question is the unclear predictive validity of the scale. The results of previous studies also suggest that the associations between the A–N score and some altruistic behaviours may be curvilinear. To fully assess the validity of the nomological network of the construct measured by the A–N Questionnaire, one still needs to assess the relationship between the A–N score and some constructs that are vital to the understanding of altruism, such as empathy, and to analyse in-depth its relationships with social orientations and robustness to social desirability bias. Moreover, it is unknown whether the instrument is subject to cross-cultural variation.

The research results so far allow us to conclude that the short version of the A–N Questionnaire is a reliable and accurate tool for measuring the readiness to act selflessly for the benefit of other people without expecting an external reward. Thus, it can be widely employed to study the level of altruism, and it can also be used as a complementary method in the study of the typology of altruism.

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