

Psychometric properties of the Polish adaptation of the Blood Donation Ambivalence Survey

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Key words: blood donors, Polish adaptation, blood donation ambivalence.

Abstract

Introduction: Ambivalence toward blood donation – defined as the coexistence of conflicting positive and negative attitudes – has emerged as a critical psychological barrier to sustained donor engagement. Despite its relevance, validated tools to assess this construct remain limited in non-English-speaking populations and particularly in Polish language.

Aim of the research: The present study aimed to adapt and validate the Polish version of the Blood Donation Ambivalence Survey (BDAS) and compare levels of commitment and indecision among active, former, and non-donors.

Material and methods: The study sample consisted of 665 Polish adults, randomly split into two subsamples. Exploratory and confirmatory factor analyses were conducted to evaluate the scale's structural validity. Internal consistency was assessed using Cronbach's α and McDonald's ω . External validity was examined via correlations with fear of donation, affect, self-efficacy, and Theory of Planned Behaviour constructs.

Results: The Polish BDAS replicated the original two-factor structure – Commitment and Indecision – with satisfactory model fit indices and strong internal consistency (α and $\omega > 0.80$). It demonstrated significant associations with related psychological constructs and invariance across genders. Donor status was significantly associated with ambivalence dimensions: active donors reported the highest commitment and lowest indecision.

Conclusions: The Polish BDAS is a reliable and valid tool for assessing blood donation ambivalence. It holds promise for both research and intervention targeting donor motivation and retention.

Introduction

Blood donation is vital for modern healthcare, yet many people remain reluctant or inconsistent in donating. One key psychological barrier is ambivalence – the coexistence of positive and negative attitudes toward donation [1]. In the context of blood donation, ambivalence manifests as a simultaneous desire to contribute altruistically and apprehension related to needles, pain, health concerns, or institutional mistrust [2].

Recent studies have conceptualised blood donation ambivalence as a dual-factor construct comprising both commitment and indecision. Fox *et al.* [2] developed and validated the Blood Donation Ambivalence Survey, identifying that while higher levels of commitment positively correlate with self-efficacy and donation intentions, elevated indecision is closely linked to anxiety, negative affect, and lower likelihood of future donations. Building upon this model, contemporary research emphasises the emotional and cognitive underpinnings of ambivalence. Balaskas *et al.* [3] demonstrated that donation-related anxiety mediates the relationship between ambivalence and donation intentions through emotional arousal, ultimately re-

ducing willingness to donate. These findings highlight how affective discomfort can tip the scale toward inaction even in individuals with favourable attitudes toward donation. Research on long-term donor behaviour remains a niche, particularly in Poland, where demographic trends such as ageing of the population increase the need for stable donor recruitment [4, 5].

Long-term behavioural research on blood donation remains limited, leaving critical gaps in the literature. This under-representation is especially pressing in Poland, where an ageing population intensifies the demand for a sustainable donor pool. Accordingly, blood donation constitutes a distinct and important research niche within public health and psychology. Clarifying the traits that impede donation motivation is therefore essential for engaging non-donors who may hesitate precisely because of unresolved ambivalence.

Aim of the research

This study aims to adapt the Blood Donor Ambivalence Scale (BDAS) [2] into Polish language and compare commitment and indecision across active, former, and non-donors.

Material and methods

Original tool

The Blood Donation Ambivalence Survey (BDAS) is a psychometric tool developed by Fox *et al.* [2] to assess conflicting attitudes toward blood donation. It captures both commitment to donating and indecision, providing insight into donor motivation and barriers. The BDAS consists of six items, validated through factor analyses on two samples ($N = 396$ and $N = 241$). Two factors were identified: Commitment (three items), linked to self-efficacy and donation intention, and Indecision (three items), associated with anxiety and negative affect. Items are rated on a 7-point Likert scale (1 = 'not at all true' to 7 = 'very true'), allowing precise ambivalence measurement. The BDAS demonstrates good reliability and construct validity, with the commitment subscale correlating positively with donation intention, and the indecision subscale correlating with psychological barriers like fear and doubt. BDAS helps better understand ambivalence in both donors and non-donors.

Participants

The present study included 665 participants from various regions of Poland. Of these, 446 (67.1%) were women, 215 (32.3%) were men, and 4 (0.6%) identified as "other", including non-binary or asexual individuals. The participants' ages ranged widely, with a mean age of 27.31 years ($SD = 10.90$).

Regarding the place of residence, 224 (33.7%) participants lived in large cities (population > 100,000), 98 (14.7%) participants resided in small towns (population < 20,000), 89 (13.4%) participants were from medium-sized towns (population between 20,000 and 100,000), and 254 (38.2%) participants lived in rural areas.

In terms of educational and professional status, the sample included 246 non-working students (37%), 221 full-time employees (33.2%), 88 working students (13.2%), 57 adult high school students (8.6%), 16 unemployed individuals (2.4%), 23 prison service officers (3.5%), and 7 retirees (1.1%).

Among the respondents, 89 individuals (13.4%) were regular voluntary blood donors, 70 individuals (10.5%) had donated blood in the past but had ceased for various reasons, while 506 individuals (76.1%) were non-donors.

Measures used

To evaluate the external consistency of the adapted instrument, four measures were used: (1) the Blood Donation Fears Inventory (BDFI/ISPOK), (2) the Positive and Negative Affect Schedule (PANAS/SUPIN C20), (3) the Generalised Self-Efficacy Scale (GSES), and (4) the Common Metrics for Donation Attitude, Subjective Norm, Perceived Behavioural Control, and Intention for the Blood Donation Context.

1. The Blood Donation Fears Inventory [6, 7] is an 18-item scale measuring fear in four areas: syncopal symptoms, blood/needles, social evaluation, and health screen results. Respondents rate anxiety on a 5-point scale (1 – not at all afraid or anxious; 5 – extremely afraid or anxious). Reliability in this study: $\alpha = 0.97$; $\omega = 0.97$.
2. The Positive and Negative Affect Schedule (PANAS) [8, 9] is a 20-item scale assessing positive and negative affect on a 5-point scale (1 – very slightly or not at all; 5 – extremely). It captures two broad emotional dimensions. Reliability in this study: $\alpha = 0.83$; $\omega = 0.85$.
3. The Generalised Self-Efficacy Scale [10, 11] is a 10-item scale evaluating an individual's general belief in their ability to handle various challenging demands and novel situations effectively. Reliability: $\alpha = 0.91$; $\omega = 0.91$.
4. Common Metrics for Donation Attitude, Subjective Norm, Perceived Behavioural Control, and Intention for the Blood Donation Context [12, 13]; [trans. Kosowski, in review] include scales developed specifically to measure key constructs from the Theory of Planned Behaviour (TPB) within blood donation research. This instrument comprises 21 items evaluated on a 7-point Likert scale (1 – strongly disagree; 2 – strongly agree). Reliability: $\alpha = 0.90$; $\omega = 0.91$.

Translation procedure

Initially, the corresponding author, Christopher France, was contacted for permission to conduct validation and adaptation studies. Permission was granted.

The presented instrument was translated independently by four professionals: two psychology researchers and two professional English translators. The translated version was then back-translated by a second professional translator to ensure compatibility with the original version. The translations provided by psychologists and professional translators turned out to be consistent. The final translation is shown in Table 1.

Data collection procedure

The survey was conducted remotely using the Google Forms service. Before the study commenced, participants were required to confirm their familiarity with the nature and rules of participation, confirm that they had reached the age of majority, and provide their informed consent. The data were collected between early December 2024 and the end of January 2025. Completing the questionnaires took approximately 15 minutes. Participants gave their consent by selecting the appropriate option at the beginning of the survey and were informed that they could withdraw from the study at any point by closing the questionnaire, which would result in their responses not being recorded.

Table 1. Exploratory factor analysis, using ‘Promax’ rotation with final Polish translation of the original items from BDAS

No.	Original item	Polish translation	Factor loadings		Communality
			1	2	
1	I am sure that I will donate blood in the future.	Jestem pewien(a), że w przyszłości oddam krew.	0.91		0.20
2	I really want to donate blood even though other people can do it.	Naprawdę chcę oddać krew, mimo że inni ludzie również mogą to zrobić.	0.93		0.09
3	My decision about donating blood reflects what is important to me.	Moja decyzja o oddaniu krwi odzwierciedla to, co jest dla mnie ważne.	0.79		0.37
4	I have mixed feelings about donating blood.	Mam mieszane uczucia odnośnie oddawania krwi.		0.74	0.42
5	I have a hard time deciding whether I will donate blood.	Trudno mi podjąć decyzję, czy oddać krew.		0.80	0.37
6	I might change my mind about donating blood.	Być może zmienię zdanie na temat oddawania krwi.		0.66	0.57

$KMO = 0.72$; $\chi^2 = 923.31$; $df = 15$; $p = 3.61e-187 = 3.61 \times 10^{-187}$. *KMO* – Kaiser–Meyer–Olkin measure; *df* – degrees of freedom.

Methodology

The survey was completed by individuals aged 18 years and older. To comply with the assumption of not conducting excessive calculations on a single sample [14, 15], the sample counted 665 individuals and was randomly divided into two groups ($N = n_1 + n_2$; $n_1 = 300$; $n_2 = 365$) for the calculation of the factor structure of the Polish version of the BDAS.

Statistical analysis

The required statistical analyses were performed using Jamovi 2.0 software (2022). Exploratory factor analysis and reliability analysis were conducted using

the Jamovi macro factor. Confirmatory factor analysis was conducted using the SEM macro [16]. Pearson’s r correlation coefficients were calculated using the Regression macro.

Results

Factor structure

Exploratory factor analysis

An exploratory factor analysis with “Promax” rotation was performed on the first subgroup ($n_1 = 300$). Considering the Kaiser criterion and the scree plot, the resulting factor structure, consistent with the original

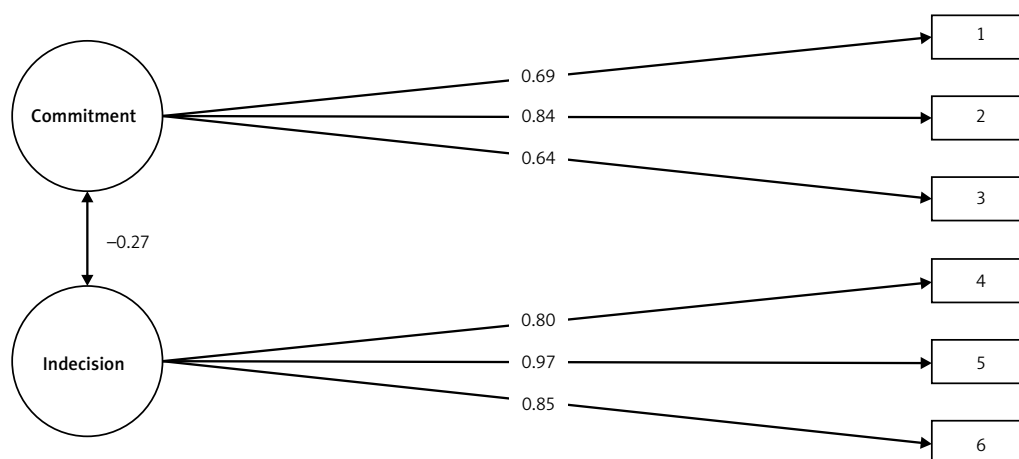


Figure 1. Model of confirmatory factor analysis of the subscales with correlations and corresponding items with beta weights for the Polish adaptation of the BDAS. Double-headed arrows indicate the correlations between the subscales. Single-headed arrows indicate the factor loadings for each item with its subscale

version, revealed two factors: (1) Commitment and (2) Indecision. The used model was adequately fitted to the data (RMSEA = 0.08, 90% CI [0.03; 0.14], TLI = 0.97, $\chi^2 = 12.13$, $df = 4$; $p = 0.02$). The results are shown in Table 1.

Confirmatory factor analysis

A confirmatory factor analysis was performed on the second subgroup ($n_2 = 365$; $\chi^2 = 28.40$; $df = 8$; $p < 0.001$). The goodness-of-fit indicators revealed that the model with two factors included was adequately fitted to the data: RMSEA = 0.098; CFI = 0.99; TLI = 0.98; SRMR = 0.05; AIC = 8199.51; 90% CI [0.02; 0.10]. The results (with beta weights) are shown in Figure 1.

Reliability analysis

In the next step, the reliability of the Polish version of the Blood Donation Ambivalence Survey was assessed with two indicators – Cronbach's α and McDonald's ω . Reliability coefficients of Polish adaptation and from the original version are shown in Table 2.

External consistency

The next step was to evaluate the external consistency of the Polish version of the Blood Donation Ambivalence Survey.

Blood donation fear, affective experience, self-efficacy, and blood donation ambivalence

In the following step, Pearson's r correlation coefficients were calculated for the BDFI, PANAS, and the Polish version of the BDAS scale. Pearson's r correlations (Table 3) showed significant positive links between blood donation fears and indecision, as well as between positive experience, self-efficacy, and commitment. Negative correlations appeared between fears and commitment, and between self-efficacy and indecision.

Blood donation ambivalence and the theory of planned behaviour

The next step was to calculate Pearson's r correlation coefficients for the Theory of Planned Behaviour metrics for the blood donation context and the Polish version of the BDAS scale. Pearson's r correlations (Table 4) showed positive links between TPB variables

(e.g. attitudes, norms, self-efficacy, intention) and commitment, as well as between controllability and indecision. Negative correlations emerged between TPB variables and indecision.

Measurement invariance across gender

A multi-group confirmatory factor analysis was conducted to examine measurement invariance across gender. The configural and metric models demonstrated good fit (CFI = 0.990; RMSEA = 0.054), and the scalar model was marginally acceptable ($\Delta CFI = 0.002$; $p = 0.055$). These results indicate that the BDAS can be interpreted consistently across men and women.

Blood donation ambivalence and blood donor status

In addition, a one-way analysis of variance (ANOVA) was conducted to examine whether blood donor status was associated with differences in commitment and indecision. Participants were categorised into three groups: active donors ($n = 89$), former donors ($n = 70$), and individuals who had never donated blood ($n = 506$). Given that the assumptions of homogeneity of variances and normality were violated for both dependent variables (Levene's tests $p < 0.01$; Shapiro-Wilk tests $p < 0.001$), Welch's ANOVA and Games-Howell post hoc tests were employed.

Analysis showed significant differences in commitment, $F(2, 157.47) = 98.47$, $p < 0.001$, and indecision, $F(2, 142.00) = 30.43$, $p < 0.001$, across donor status groups. Active donors reported the highest commitment and lowest indecision, followed by former donors, with non-donors scoring lowest on commitment and highest on indecision. Games-Howell post hoc tests confirmed that all group differences were statistically significant ($p < 0.05$). Figure 2 presents boxplots illustrating between-group differences in commitment and indecision.

Discussion

The present study aimed to adapt and validate the Polish version of the Blood Donation Ambivalence Survey (BDAS), originally developed by Fox *et al.*, within a culturally relevant sample of Polish adults. The results support a two-factor structure of the scale – Commitment and Indecision – consistent with the original tool. The Polish adaptation demonstrated sat-

Table 2. The internal consistency of BDAS in the Polish adaptation compared to the original version

Scale	M	SD	Polish version		Original version	
			α	ω	α_1	α_2
Commitment	4.49	1.86	0.91	0.91	0.85	0.84
Indecision	2.78	1.51	0.76	0.77	0.86	0.85

M – mean, SD – standard deviation, α – Cronbach's alpha, ω – McDonald's omega, α_1 – Study 1; α_2 – Study 2.

Table 3. Pearson's *r* correlation coefficients for the Blood Donation Fears Inventory, PANAS, GSES, and the Polish version of the BDAS

No.	Scale	1	2	3	4	5	6	7	8	9	10
1	Fear of syncope symptoms	—									
2	Fear of blood and needles	00.68 ***	—								
3	Fear of social evaluation	00.77 ***	00.59 ***	—							
4	Fear of health screen results	00.42 ***	00.33 ***	00.38 ***	—						
5	General fear of donating blood	0.89 ***	00.82 ***	00.84 ***	00.66 ***	—					
6	Positive experience	−0.14 ***	−0.11 **	−0.12 **	−0.10 **	−0.14 ***	—				
7	Negative experience	00.20 ***	00.20 ***	00.23 ***	00.21 ***	00.26 ***	−0.16 ***	—			
8	Generalised self-efficacy	−0.21 ***	−0.21 ***	−0.14 ***	−0.06 ***	−0.20 ***	0.23 ***	−0.10 **	—		
9	Commitment	−0.20 ***	−0.23 ***	−0.15 ***	−0.01 ***	−0.19 ***	00.14 ***	−0.02 ***	00.41 ***	—	
10	Indecision	00.32 ***	00.30 ***	00.27 ***	00.14 ***	00.32 ***	−0.07 ***	00.04 ***	−0.22 ***	−0.24 ***	—

p* < 0.05, *p* < 0.01, ****p* < 0.001.

Table 4. Pearson's correlation coefficients for the Common Metrics for Donation Attitude, Subjective Norm, Perceived Behavioural Control, and Intention for the Blood Donation Context and the Polish version of the Blood Donation Ambivalence Survey

No.	Scale/subscale	1	2	3	4	5	6	7	8	9	10	11	12
1	Cognitive attitude	—											
2	Affective attitude	0.48 ***	—										
3	General attitude	0.85 ***	0.87 ***	—									
4	Injunctive norms	00.27 ***	00.43 ***	00.41 ***	—								
5	Descriptive norms	00.08 ***	00.24 ***	00.18 ***	00.58 ***	—							
6	General subjective norms	00.19 ***	00.37 ***	00.33 ***	00.88 ***	00.89 ***	—						
7	Self-efficacy	00.32 ***	00.57 ***	00.52 ***	00.52 ***	00.33 ***	00.48 ***	—					
8	Controllability	−0.00 ***	00.03 ***	00.01 ***	00.10 **	00.07 ***	00.10 *	00.20 ***	—				
9	Perceived behavioural control	00.18 ***	00.35 ***	00.31 ***	00.38 ***	00.24 ***	00.35 ***	00.73 ***	00.82 ***	—			
10	Intention	00.22 ***	00.39 ***	00.36 ***	00.53 ***	00.38 ***	00.51 ***	00.76 ***	00.33 ***	00.68 ***	—		
11	Commitment	00.47 ***	00.52 ***	00.58 ***	00.45 ***	00.23 ***	00.38 ***	00.57 ***	−0.04 ***	00.30 ***	00.51 ***	—	
12	Indecision	−0.21 ***	−0.36 ***	−0.33 ***	−0.21 ***	−0.08 *	−0.16 ***	−0.38 ***	00.10 *	−0.16 ***	−0.20 ***	−0.24 ***	—

p* < 0.05, *p* < 0.01, ****p* < 0.001.

isfactory internal consistency and external construct validity, aligning well with established psychological constructs such as self-efficacy, affect, and the Theory of Planned Behaviour (TPB).

The internal reliability coefficients for both subscales were above the commonly accepted threshold of 0.80, suggesting strong internal consistency. This is in line with recent psychometric work on donation-related scales, such as the self-regulation of blood donation scale, which also confirmed multidimensional structures reflecting motivational variance among donors [17].

Furthermore, the Polish BDAS exhibited expected correlations with other measures. Higher levels of indecision were associated with donation-related fears and negative affect, echoing findings from studies exploring psychological ambivalence in contexts beyond blood donation. For example, Hyde and Masser [18] demonstrated that ambivalence plays a critical role in decisions around novel donation contexts such as stool donation, where the perceived personal cost increases inner conflict despite pro-social intent. These parallels reinforce the BDAS's theoretical foundation and cross-contextual relevance.

In terms of external validity, the Polish BDAS correlated significantly with TPB constructs – attitudes, subjective norms, perceived behavioural control, and intention – which are well-established predictors of blood donation behaviour. These findings are in line with studies [19] highlighting that donation behaviour among university students is largely predicted by attitudes and informational barriers, emphasising the need for more effective engagement strategies.

Another notable finding is the positive correlation between commitment and generalised self-efficacy. This aligns with the self-determination theory perspective, which posits that autonomous motivation and perceived competence foster sustained prosocial behaviours, such as blood donation [17]. It also aligns with educational interventions that increase knowledge and reduce personal barriers to donation [20].

Moreover, the Polish version of the BDAS demonstrated configural and metric measurement invariance across genders, supporting the applicability of the scale to both men and women. The marginally acceptable scalar invariance suggests that group comparisons are meaningful, although subtle differences in item interpretation may exist.

Recent studies support our findings: active donors show high commitment and low indecision, while non-donors are more ambivalent and less motivated [2, 21]. Former donors typically fall in between, showing moderate commitment and ambivalence – consistent with research linking strong identity and low ambivalence to sustained prosocial behaviour [22–24].

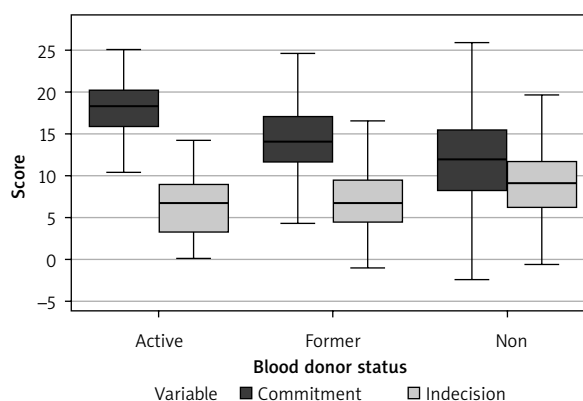


Figure 2. Distribution of commitment and indecision by blood donor status

Interestingly, our results also align with emerging behavioural economics research suggesting that prosocial donors are more sensitive to fairness norms, which may influence commitment to blood donation in moral terms rather than simply affective comfort [25]. This sensitivity may underlie a more deeply internalised moral norm that protects donor identity and justifies commitment even in the presence of occasional doubts or fears.

Limitations of the present study include its cross-sectional design, which prevents causal inference, and reliance on self-reported data, which may be influenced by social desirability bias.

Additionally, data collection was conducted remotely via an online survey platform. Remote data collection was conducted via an online survey platform, which may raise concerns about attention or distractions; however, studies show it provides data quality comparable to paper-based methods [26, 27], with added benefits of cost-effectiveness, broader reach, and reduced response biases in sensitive topics due to increased privacy and anonymity [27].

Future research should explore blood donation ambivalence in younger populations, especially high school students, to support educational campaigns. Measuring ambivalence may also help monitor commitment among active donors. Future studies could include mediation/moderation analyses and examine links with traits like hardiness, the Light/Dark Triad, generosity, and resources as per Hobfoll's theory.

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Ethical approval

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Conflict of interest

The author declares no conflict of interest.

References

- Priester JR, Petty RE. The gradual threshold model of ambivalence: relating the positive and negative bases of attitudes to subjective ambivalence. *J Pers Soc Psychol.* 1996; 71(3): 431-439.
- Fox KR, Himawan LK, France CR. The Blood Donation Ambivalence Survey: measuring conflicting attitudes about giving blood. *Transf Med.* 2018; 28(3): 193-199.
- Balaskas S, Koutroumani M, Rigou M. The mediating role of emotional arousal and donation anxiety on blood donation intentions: expanding on the theory of planned behavior. *Behav Sci.* 2024; 14(3): 242.
- Kosowski P. Voluntary blood donation in Poland – about the need for social Research on barriers and disadvantages. In: *СОЦІОЛОГІЯ-СОЦІАЛЬНА РОБОТА ТА СОЦІАЛЬНЕ ЗАБЕЗПЕЧЕННЯ: РЕГУЛЮВАННЯ СОЦІАЛЬНИХ ПРОБЛЕМ.* 2023. p. 50.
- Adamczyk MD. Starzenie się społeczeństwa polskiego wyzwaniem dla zrównoważonego rozwoju. *Zeszyty Naukowe Organizacja i Zarządzanie, Politechnika Śląska.* 2017; 106: 105-113.
- Kowalsky JM, France CR, France JL, Whitehouse EA, Himawan LK. Blood donation fears inventory: development and validation of a measure of fear specific to the blood donation setting. *Transf Apheresis Sci.* 2014; 51(2): 146-151.
- Kosowski P. The Polish adaptation of the blood donation fears inventory. *Transf Apheresis Sci.* 2024; 63(1): 103865.
- Watson D, Clark LA, Tellegen A. Development and validation of brief measures of positive and negative affect: the PANAS scales. *J Pers Soc Psychol.* 1988; 54(6): 1063-1070.
- Brzozowski P, Watson DB, Clark LA. Skala uczuć pozytywnych i negatywnych SUPIN: polska adaptacja skali PANAS Davida Watsona i Lee Ann Clark. *Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego* 2010.
- Schwarzer R, Jerusalem M. Generalized Self-Efficacy Scale. In: Weinman J, Wright S, Johnston M, editors. *Measures in health psychology: a user's portfolio. Causal and control beliefs.* Windsor: NFER-Nelson; 1995. p. 35-37.
- Juczyński Z. Narzędzia pomiaru w promocji i psychologii zdrowia. Vol. 188. *Pracownia Testów Psychologicznych Polskiego Towarzystwa Psychologicznego* 2001.
- France JL, Kowalsky JM, France CR, McGlone ST, Himawan LK, Kessler DA, Shaz BH. Development of common metrics for donation attitude, subjective norm, perceived behavioral control, and intention for the blood donation context. *Transfusion (Paris).* 2014; 54(3pt2): 839-847.
- Kosowski P. Polish adaptation of measures of attitudes, subjective norms, perceived behavioral control, and intentions based on the Theory of Planned Behavior in the context of blood donation. *Polish Psychological Forum.* 2025; 30(3). doi:10.34767/PFP.2025.03.03.
- Van Prooijen JW, Van Der Kloot WA. Confirmatory analysis of exploratively obtained factor structures. *Educ Psychol Meas.* 2001; 61(5): 777-792.
- The Jamovi Project. 2022.
- Gallucci M, Jentschke S. SEMlj: jamovi SEM analysis [jamovi module]. 2021 [cited 2025 Mar 15]. Available from: <https://semlj.github.io/>
- Kermani FR, Kafi-Abad SA, Maghsudlu M, Hosseini KM, Mohammadali F, MohammadJafari A. Development and validation of the self-regulation of blood donation scale for blood donors. *Hematol Transfus Cell Ther.* 2024; 46: S299-S305.
- Hyde MK, Masser BM. Eligible blood donors' decisions about donating stool for fecal microbiota transplantation: does ambivalence play a role? *Transfusion (Paris).* 2021; 61(2): 474-483.
- Padilla-Garrido N, Fernández-Herrera MD, Aguado-Correa F, Rabadán-Martín I. Motivators, barriers and communication channels for blood donation in relation to students at a university in Spain. *Transf Apheresis Sci.* 2021; 60(6): 103270.
- Fernández de la Iglesia JC, Martínez-Santos AE, Rodríguez-González R, Cebreiro B, Fernández-Morante C, Casal-Otero L. Service-learning to improve attitudes towards blood donation among university students. *Health Educ J.* 2020; 79(7): 812-825.
- Edwards AR, Masser BM, Barlow FK. Psychological ownership and identity motives in blood donation. *Vox Sang.* 2023; 118(8): 616-623.
- Saltzmann C, Boenigk S. On consciousness of the decision to discontinue blood donation: intention to return and effective recovery activities. *Transf Med.* 2022; 32(3): 193-209.
- Handy F, Cnaan RA. The role of social anxiety in volunteering. *Nonprofit Manag Leadersh.* 2007; 18(1): 41-58.
- Vecina ML, Chacón F. Dropout predictors for volunteers in non-profit organizations: a 7-year survival analysis. *Rev Mex Psicol.* 2017; 34(1): 13-23.
- Ferguson E, Lawrence C. It is only fair: blood donors are more sensitive to violations of fairness norms than non-donors – converging psychometric and ultimatum game evidence. *Vox Sang.* 2018; 113(3): 242-250.
- Weigold A, Weigold IK, Russell EJ. Examination of the equivalence of self-report survey-based paper-and-pencil and internet data collection methods. *Psychol Methods.* 2013; 18(1): 53.
- Boas TC, Christenson DP, Glick DM. Recruiting large online samples in the United States and India: Facebook, Mechanical Turk, and Qualtrics. *Pol Sci Res Methods.* 2020; 8(2): 232-250.

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