



“Psychometric properties and factor structure of the attitudes to fertility and childbearing scale (AFCS) in a sample of polish women”

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Abstract

The study aimed to determine the psychometric properties and factor structure of the Attitudes to Fertility and Childbearing Scale (AFCS) in a Polish context. A cross-sectional self-assessment study was conducted with a total group of 748 Polish women in two studies ($n = 187$ and $n = 561$, respectively). Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA), using SEM were performed. A three-factor structure was extracted by the EFA; although it differed to that identified in the original studies, the CFA found it to be robust. The final Polish version of the AFCS consists of 26 statements, comprising three factors (*Fertility and the child as an important value*, *Child as a barrier*, and *Personal awareness and responsibility concerning having a child*), which have demonstrated satisfactory internal consistency. Although the original AFCS factor structure was not replicated, our findings demonstrate that the Polish adaptation of the Attitudes to Fertility and Childbearing Scale is a reliable and valid instrument for evaluating attitudes concerning fertility and childbearing in the Polish context.

Keywords Attitudes · Childbearing · Fertility · Factor structure · Reliability · Validity

Introduction

Research on fertility and reproductive decisions indicates that the age of first pregnancy and the birth of the first child is steadily increasing in highly-developed countries (Australian Bureau of Statistics 2012; Graham et al. 2015; Sleebos 2003; Thévenon 2010; Vujčić et al. 2017). This trend is also visible in Poland, where demographers have been warning about a decline in birthrate since the early nineties (Centrum Badań Opinii Społecznych - *Public Opinion Research Centre*, CBOS); this fall is seen as the main cause of the decreasing population of the country (CBOS 2010). Forecasts by the Polish Central Statistical Office (2008) for the years 2008–2035 suggest that the population in Poland will decline at an increasing pace. The fertility rate in Poland is currently only

1.3, which is one of the lowest in both the European Union and the world (Central Statistical Office 2017).

In Poland, the mean age of a mother at the birth of her first child rose from 27.4 years in 2014 to 27.8 in 2016 (Central Statistical Office 2017). Three studies on the reproductive decisions of Polish citizens carried out in the last seven years have shown that, despite the social and economic changes that occurred in Poland during this period, neither the percentage of women planning to have their first or subsequent child nor the determinants of reproduction, changed significantly over this time (CBOS 2010, 2013, 2017).

Reproductive plans and decisions are influenced by the age of the respondents, the presence of an existing child, and the civil status of the partner (CBOS 2010, 2013). The most common reasons given for postponing or resigning from parenthood include difficulties in reconciling family and professional roles, lack of an appropriate partner, fear of losing a job, and valuing a career higher than parenthood. Highly-educated women are less likely to declare a willingness to have children (CBOS 2010).

It has been found that the most important barriers to reproductive plans mentioned by women who do not intend to have offspring are the financial situation and the expected conflict between their professional and parental roles (CBOS 2013). In contrast, the possibility of getting help with day-to-day care

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from parents or a partner are both conducive to the decision of having a child.

Since 2015, the economic situation in Poland has improved, and a pro-family policy has been introduced supporting decisions about having first and subsequent children. Despite these changes, the percentage of women in the reproductive age group in the population who plan to have children has remained virtually unchanged (CBOS 2017). Among the sociodemographic factors affecting the decision whether to have children, the age of the mother and the number of children merit particular attention, as women without children were more likely to declare plans to have offspring than those who were already mothers. Besides, the groups of women who were most likely to declare short-term plans for starting a family were those aged 25–29 years, those living in larger cities (i.e. over 500,000 residents), those who had completed higher education, those with a positive assessment of their economic situation, those in a relationship (married or informal), and those who could count on family support in child care (CBOS 2013).

The reasons for postponing or resigning from motherhood are consistent with the data presented in world surveys. Most women express a desire to complete their education (Thalberg 2013), gain independence, and stabilize their situation on the labour market (Söderberg et al. 2015) before deciding to have a child.

The lack of a stable relationship, as well as the lack of a partner who would be a suitable candidate for a father, also plays a role in delaying decisions about the birth of a child (Söderberg et al. 2015). Other reasons include the economic situation and the lack of governmental support programs for families (Mills et al. 2011). The perceived social and moral changes that have occurred regarding motherhood also seem to be important. As Kluzowa and Slany (2004) note, this is the first time in history that women have had reproductive freedom allowing them to decide whether to include children in their lives. The development of assisted reproduction techniques has also allowed motherhood to be postponed to a later date (Kubiak-Fordecka and Wilczyński 2009). Nevertheless, late motherhood carries numerous complications associated with pregnancy and birth, such as diseases associated with pregnancy, fetal malformations, genetic diseases, and miscarriage, as well as premature births and more frequent indications for a cesarean section (Joseph et al. 2005; Astolfi and Zonta 2002; Kubiak-Fordecka and Wilczyński 2009). Hence, it is understandable that women may be reluctant to become mothers at a later age.

Other variables than just sociodemographic factors also appear to have a significant influence on reproductive decisions. Söderberg et al. (2015) recommend that predictors of postponing motherhood should be sought among the beliefs and attitudes towards fertility and motherhood. Such attitudes can be measured with the Attitudes to Fertility and Childbearing Scale (AFCS) (Söderberg et al. 2013).

The AFCS was developed for the assessment of attitudes towards fertility and childbearing (Söderberg et al. 2013). The authors report that the statements included in the AFCS were derived from two previous qualitative studies, both of which focused on the lived experience of fertility and thoughts on having children (Söderberg et al. 2011; Söderberg et al. 2012). Each statement of the AFCS is evaluated on a 5-point Likert scale, with 1 indicating “I completely disagree” and 5 “I completely agree”. The psychometric properties of the original version were evaluated among 138 Swedish women who were not yet mothers. The factor structure, investigated by principal component analysis (PCA), identified three components: *the importance of fertility for the future* (nine statements), *childbearing as a hindrance at present* (twelve statements), and *social identity* (six statements). The AFCS showed acceptable sample adequacy, factorability, and internal consistency, with the components demonstrating Cronbach’s α reliability coefficients of .901 for the *Importance of fertility for the future*; .908 for *Childbearing as a hindrance at present* and .805 for *Social identity*. The characteristics of the original AFCS and the construction process are described in more detail in Söderberg et al. (2013).

A further validation study conducted on 424 childless women in Sweden revealed a similar three-factor structure; however, the statements included in the particular factors differed slightly. The new components, which had high reliability, were renamed as follows: *Importance for the future* (Cronbach’s $\alpha = .945$); *Hindrance at present* (Cronbach’s $\alpha = .916$); and *Female identity* (Cronbach’s $\alpha = .862$) (Söderberg et al. 2013; Söderberg et al. 2015). In a Japanese adaptation study involving women and men, exploratory factor analysis (EFA) identified five factors, for which the reliability coefficients ranged from 0.77 to 0.91 (Miyata et al. 2017).

Considering the fact that a deeper understanding of the attitudes towards fertility and motherhood may help clarify the decision to have children among Polish women, there is a great need for further study in this area. Therefore, the Attitudes to Fertility and Childbearing Scale (AFCS) (Söderberg et al. 2013; Söderberg et al. 2015) has been adapted for use in the Polish context. The study aimed to validate the factor structure of the Polish version of the AFCS and to determine its psychometric properties among Polish women.

Method

Recruitment Procedure

Recruitment for participation in the study took place during two periods: from January to March 2016 (Study 1) and from June 2016 to January 2017 (Study 2). Three recruitment methods were used: a) an advertisement posted on social

media, mainly on groups devoted to women's issues, b) information about the study sent by e-mail to students of Psychology and Logopedics studying at the Lodz University, c) snowball sampling among the friends and relatives of the author and the participants. Women who responded and declared an interest in participating in the study received a paper or electronic version of the survey to complete. Both versions were identical and consisted of the demographic questions and AFCS statements. Access to the electronic version of the survey was personalized. Participants could choose whether to complete the questionnaire in an electronic or paper format.

Following the Helsinki Declaration of Human Rights (World Medical Association 2013), both the paper and electronic surveys contained all the information about the study that enabled participants to give their informed consent. In the paper version of the survey participants signed the informed consent form while in the electronic version the consent was given in accordance with the Ethics Guidelines for Internet-mediated Research (British Psychological Society 2017). As there were no socio-demographic differences between the groups recruited traditionally and via the Internet, the two groups were merged for further analyses.

The following inclusion criteria were applied: female sex, being heterosexual, 18 years of age at the time of admission to the study, and giving informed consent for participation in the study. Participation was voluntary, and each participant could withdraw participation at any time. The study protocol was approved by the Committee for Bioethics of Scientific Research at the University of Lodz (Ref. No. 6/KBBN-UŁ/II/2015).

Participants

Study 1

The first study included women aged 24 to 33 ($M = 27.38$, $SD = 2.81$). Of the 212 who volunteered to participate, 187 (response rate: 88.2%) completed a set of questionnaires. Most of these 187 respondents lived in informal relationships (47%) or were single (29%), had a university degree (53%), and assessed their financial situation as satisfactory (79%). More detailed sociodemographic characteristics of the Study 1 group are presented in Table 1. The results obtained in this study were used only to check the discriminatory power of the tool and the factor structure of the Polish language version of the AFCS.

Study 2

Of the 772 women who responded to recruitment for this study, 561 fulfilled the eligibility criteria and returned completed questionnaires (response rate: 73%). The analysis

Table 1 Socio-demographic characteristics of Study 1 ($N = 187$) and Study 2 ($N = 561$) population

	Study 1 $N = 187$	Study 2 $N = 561$
Mean age (SD)	27.4 (2.8)	25.8 (5.4)
n (%)		n (%)
Age range		
Less than 25	63 (33.7)	326 (58.1)
26–30	89 (47.6)	109 (19.4)
31–35	35 (18.7)	88 (15.7)
36 and more	NA	38 (6.2)
Civil status		
Married	43 (23.0)	123 (21.9)
Having a partner	89 (47.6)	254 (45.3)
Single	55 (29.3)	184 (32.8)
Education		
High school and low	87 (46.5)	315 (56.1)
College/university	100 (53.5)	246 (43.9)
Occupation		
Working	101 (54.0)	194 (34.6)
Studying and working	51 (27.3)	170 (30.3)
Not studying and not working	7 (3.7)	17 (3.0)
Studying and not working	28 (15.0)	180 (32.1)
Residence		
Large city	146 (78.1)	403 (71.8)
Middle size city	32 (17.1)	108 (19.3)
Country side	9 (4.8)	50 (8.9)
Financial status		
Excellent	23 (12.3)	61 (10.9)
Satisfactory	148 (79.1)	452 (80.6)
Bad	16 (8.5)	48 (8.5)
Contraceptives (hormonal and others)		
Yes	90 (48.1)	272 (48.5)
No	97 (51.9)	289 (51.5)
Having children		
Yes	28 (15.0)	79 (14.1)
No	159 (85.0)	482 (85.9)
Siblings		
Yes	136 (72.7)	416 (74.2)
No	51 (27.3)	145 (25.8)
Grown up with both parents		
Yes	152 (81.3)	447 (79.7)
No	35 (18.7)	114 (20.3)
Preferred age at first child		
20–24	1 (.5)	23 (4.1)
25–29	73 (39)	257 (45.8)
30–34	77 (41.2)	200 (35.7)
35–39	16 (8.6)	37 (6.6)
NA	20 (10.7)	44 (7.8)

revealed that the participants ranged in age from 18 to 46 years old ($M = 25.75$, $SD = 5.35$). Most respondents were aged under 25 years of age (58.1%). Less than half had a university degree (43.9%), were not in active employment (43.6%) or were in informal relationships (45.3%); a majority came from a middle-sized city (71.8%), did not have children (85.9%) and rated their financial situation as satisfactory (80.6%). More detailed sociodemographic characteristics are presented in Table 1.

Measures

Social-Demographic Data Questionnaire

The socio-demographic data collection tool was developed for the current study. Most questions were based on those used in Swedish samples (Söderberg et al. 2013; Söderberg et al. 2015); these included age (with four age ranges: <25 / $26-30$ / $31-35$ / >36), civil status (*married/having a partner / single*), having a child (*yes / no*), education level (*high school and lower / college or university*), occupation status (*working / studying and working / not studying and not working / studying and not working*), place of residence (*large city / middle-sized city / countryside*) and financial status (*excellent / satisfactory / bad*). The participants were asked about the use of contraception (*yes / no*), growing up with siblings (*yes / no*), and whether they have grown up with both parents (*yes/no*). They were also asked to indicate their preferred age to have a first child ($20-24$ / $25-29$ / $30-34$ / $35-39$). For women declaring childlessness by choice, the answers included the option: *not applicable – don't want to have children*.

The Attitudes to Fertility and Childbearing Scale (AFCS) – Polish Language Version

The translation of the Attitudes to Fertility and Childbearing Scale (AFCS) was performed using the Swedish-language version of the AFCS, consisting of 49 statements, received from the first author. Since this version did not contain the name of the tool in Swedish, the English title given in earlier publications was used (Söderberg et al. 2013; Söderberg et al. 2015). In the first stage, a bilingual translator translated the original statements from Swedish into Polish (*forward translation*). The same was done for the translation of the name of each scale. Next, a team of competent judges was formed, consisting of six women aged 24–39 (two of whom had children, two declared childlessness by choice and two who were currently trying to conceive), and a psychologist (a researcher in the field of reproductive psychology). This selection of judges was intended to provide a diverse set of views about reproductive plans and experiences, as well as higher education and substantive knowledge in the field of reproductive psychology. The judges assessed whether the

statements in the current version were semantically appropriate and understandable in the Polish cultural context. The greatest controversy was associated with the translation of the term “childbearing”, which is understood in a literal Polish translation as the process of birth (delivery/labor/parturition).

The content analysis of all statements in the questionnaire that contained this term (including the title and instructions) indicated unequivocally that they do not refer to delivery/giving birth, but to the fact of having a child (i.e. being a mother). It was therefore decided to adopt the term “having a child” for the Polish language version of the scale title, and selected items, even though the term “childbearing” proposed by the authors of the original AFCS will be used in English-language publications. After minor revisions, the statements were translated back into Swedish (*back-translation*). In the final stage, both Swedish-language versions were compared, the differences were analyzed and the Polish language version, called AFCS-PL, was finally established.

Data Analysis

As it is recommended that exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) should be used with two different sample groups in scale adaptation studies (Cabrera-Nguyen 2010), the data analysis was conducted accordingly. In Study 1, the item-total correlations and Cronbach's alpha were first calculated to determine the discriminant validity and internal consistency of each subscale. The internal consistency was measured using Cronbach's alpha coefficients with a value above .70 indicating satisfactory reliability, as suggested by Nunnally and Bernstein (1994). In accordance with Field (2009), the item-total correlation was assumed to be over .30. The suitability of data for factor analysis (FA) was assessed with Bartlett's Test of Sphericity, assumed to be statistically significant at $p \leq .05$ (Bartlett 1954), and the Kaiser–Meyer–Olkin Measure of Sampling Adequacy (KMO), whose loading is suggested as above .60 (Kaiser 1974).

Construct validity was tested using exploratory factor analysis (EFA) with the principal axis factoring (PAF) in the first step. As factors emerging from the data were expected to be correlated, a direct Oblimin rotation method was used to achieve a simpler structure for interpretation. The number of retained components was guided by Kaiser's criterion (eigenvalues >1), parallel analysis, and Cattell's scree test (Cattell 1966) with inspection of the scree plot. Initially, all components with eigenvalue >1 and statements loading above .50 were retained. These analyses were conducted with the Statistical Package for Social Sciences, SPSS 24 (IBM Corp 2016).

In Study 2, construct validity and reliability were evaluated. CFA, based on the covariance matrix and the diagonally

weighted least squares estimator, was used to confirm the hypothesized factor structure that was identified through EFA, as well as previously established models. As suggested by Schermelleh-Engell et al. (2003), the following indices were used for model fit evaluation: comparative fit index (CFI) $\geq .95$, goodness fit index (GFI) $\geq .90$, adjusted goodness fit index (AGFI) $\geq .90$, root mean square error of approximation (RMSEA) $< .08$, Tucker–Lewis Index (TLI) and the ratio between χ^2 statistical test to degrees of freedom (χ^2/df) with a value less than two or three. Also, internal consistency reliability was assessed using Cronbach's alpha coefficient and corrected total-item correlations. Both CFA and the structural equation modeling (SEM) path diagram were conducted with the R Statistical Computing Environment (R Core Team 2017). In the following analyses, the criterion $p < .05$ was used to determine whether the results were statistically significant.

Results

Study 1

Descriptive Statistics and Exploratory Factor Analysis

The mean value for the total AFCS score was 171.75 with a standard deviation of 23.74. The correlation observed between the majority of items with the overall scale exceeded the recommended threshold of .30. Therefore, statements that correlated with the overall scale score below .30 were removed (a total of eight items).

In the next step, to examine the structure of the AFCS in the Polish sample, a principal axis factoring was conducted, where a value of KMO of 0.944 was observed: a value that is considered by Kaiser as excellent (Cerny and Kaiser 1977). Bartlett's Sphericity test [$\chi^2(820) = 7297.567; p < .001$] proved to be statistically significant, which is also an indicator that the data was adequate for performing the factor analysis. Direct Oblimin rotation was performed as it was initially expected that the factors would correlate. Additionally, as Costello and Osborne (2005) and Field (2009) recommend, oblique rotation is more suitable for naturalistic data in which some correlation between components must be expected. The analysis revealed six components with eigenvalues larger than 1 (Kaiser's criterion), cumulatively explaining 66.5% of the variance. However, the parallel analysis and scree plot were slightly ambiguous and showed an obvious flattening beginning at Factor 4 (see Fig. 1). According to Furr and Bacharach (2013), the presence of an obvious flattening point suggests that the number of factors is one less than the factor number of the flattening point. This indicates the existence of a three-factor solution in the current study.

Besides, the three-factor model is closest to the original one, while the six-factor solution causes difficulties in interpretation. For this reason, the factor analysis was carried out again to extract a three-factor solution of the Polish version of the AFCS, retaining those items with factor loadings above .50 and removing those that did not reach the .50 threshold (15 items). Table 2 presents the factor loadings for this solution. The first factor had an eigenvalue of 19.3 (variance explained 47.14%), the second had an eigenvalue of 3.6 (variance explained 8.89%) and the third had an eigenvalue of 1.4 (variance explained 3.52%). These three factors explained 59.55% of the total variance. Cronbach's α exhibited acceptable internal consistency for each of the three factors: Factor 1 (eleven items) $\alpha = .98$, Factor 2 (ten items) $\alpha = .93$, Factor 3 (five items) $\alpha = .81$.

Finally, the Polish version of the instrument consisted of 26 statements. The content analysis and interpretation of the items led to the specification of the following subscales: *Fertility and the child as an important value* (Factor 1), *Child as a barrier* (Factor 2), and *Personal awareness and responsibility concerning having a child* (Factor 3).

The subscale *Fertility and the child as an important value* contains eleven statements associated with the present and future importance of being fertile and becoming a mother, both being regarded as essential parts of womanhood and the idea that having a child is an expected stage of life, e.g. *It is important for me to be able to get pregnant in the future*. High scores in this subscale indicate that the respondent wishes be able to become pregnant and look forward to having a child.

The subscale *Child as a barrier* includes ten statements which concern the perception of motherhood and giving birth in the context of their associated limitations, such as *Having*

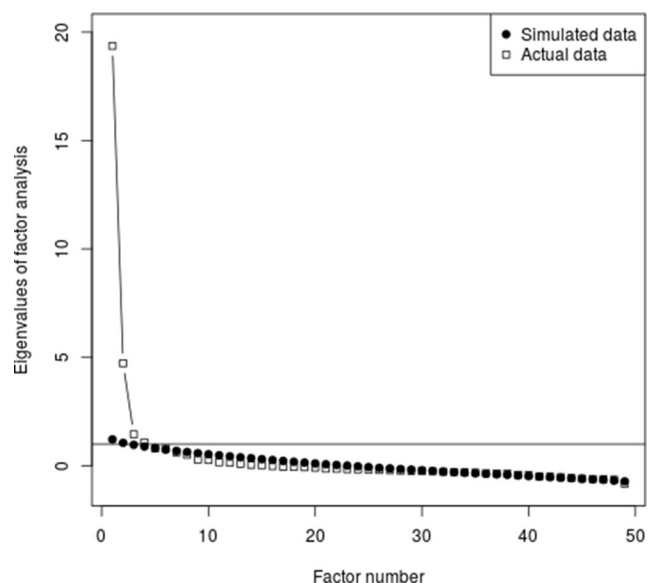


Fig. 1 Parallel analysis and scree plot of the EFA of the AFCS items ($N = 187$)

Table 2 AFCS items and factor loadings for the three-factor solution (Study 1; $N = 186$)

Item No.	Statements	Factor 1	Factor 2	Factor 3
AFCS 2	Being fertile is important for my identity as a woman	.985		
AFCS 3	Being fertile is important to my feeling of femininity	.978		
AFCS 49	Becoming a mother is important for my identity as a woman	.951		
AFCS 4	My fertility makes me feel communion with other women	.724		
AFCS 47	Having a child is an essential part of life	.689		
AFCS 46	I find it hard to imagine living a life without children	.670		
AFCS 6	Being fertile is an important part of my future life	.656		
AFCS 1	It is important for me to be fertile	.618		
AFCS 7	Being fertile is an important part of my present life	.610		
AFCS 27	Becoming a mother is important to me	.587		
AFCS 8	It is important for me to be able to get pregnant in the future	.566		
AFCS 34	Childbearing does not fit into my life right now		.790	
AFCS 33	Having children would limit my career		.750	
AFCS 32	Having children would limit my choice of job profession		.745	
AFCS 43	I do not want to take the responsibility as a mother now		.743	
AFCS 13	I want to take advantage of my freedom before I have children		.733	
AFCS 28	Having children would limit my life right now		.709	
AFCS 42	Taking responsibility for a child does not fit into my current life		.680	
AFCS 44	Being a mother would take too much of my own time		.669	
AFCS 16	I would enjoy unplanned pregnancy		-.633	
AFCS 17	I want to take advantage of freedom before I give birth to a child.		.513	
AFCS 25	As a parent, I want to have a lot of time for my child.			.666
AFCS 23	It is important for me to have a stable relationship when I have children			.585
AFCS 11	I can imagine myself having a child in the future.			.579
AFCS 45	Having children is a decision that I will make together with my partner.			.537
AFCS 12	I can imagine being pregnant and giving birth			.524

Note. The number of statements derived from the original Swedish version of the AFCS

children would limit my life right now. High scores in this subscale characterize women who are not ready to become a mother at present and regard a child as the obstacle on the way to fulfillment in other areas (education, career or social life).

The subscale *Personal awareness and responsibility concerning having a child* includes five statements which refer to the conditions that are important for informed and responsible parenting planning, such as establishing a stable

relationship, making decisions about having a child together with a partner and having the time to prepare to become a mother, e.g. *Having children is a decision that I will make together with my partner*. Women who achieve high scores in this subscale consciously plan their motherhood, make sure that it is a joint decision of both parents at the right moment in life.

Study 2

Confirmatory Factor Analysis and Internal Consistency

To determine whether the three-factor model (Model 1) would fit the Polish AFCS data ($N = 561$), confirmatory factor analysis (CFA) was employed. Since items have a 5-point Likert scale, a diagonally-weighted least squares (DWLS) estimator was used, which is suitable for variables measured on an ordinal scale (Li 2016). The CFA was performed using two three-structure models, as proposed by the original authors, as well as using two other cultural adaptations. In total, the following five models were tested by CFA:

- 1) a three-factor model based on the results of the EFA conducted in the first stage of the current study (Study 1);
- 2) a three-factor model derived from the original tool development study (Söderberg et al. 2013);
- 3) a three-factor model derived from the original tool validation study (Söderberg et al. 2015);
- 4) a four-factor model derived from the Persian adaptation of the tool (Baezzat et al. 2017), in which four dimensions were distinguished (*Children as the base of life*, *Child as a barrier*, *Postpone the fertility to future*, *Fertility after the fulfillment of preconditions*);
- 5) a five-factor model derived from the Japanese adaptation of the tool (Miyata et al. 2017), in which five dimensions were distinguished (*Personal development*, *Restrictedness*, *Avoidance of responsibility*, *Social Identity*, *Importance*).

Table 3 presents the goodness-of-fit indicators of models with a different factor structure.

The results indicate the best fits to be Model 1 and Model 2; therefore, the SEM analysis most closely reconstructs the factor structure of the 2013 model (Söderberg et al. 2013) and the model based on the sample of Polish women (Table 4). However, of these, Model 1 was more favourable as despite it being characterized by slightly weaker adjustment, it was based on the results of a factor analysis conducted previously with the participation of Polish women. The other models did not exceed either Model 1 or Model 2 in terms of goodness-of-fit indices.

The Polish version of the AFCS contained three factors that achieved satisfactory internal consistency, i.e. their

Cronbach's alpha coefficients varied from .75 to .95. Pearson's correlation coefficients between factors are statistically significant ($p < .01$) and ranged from $-.37$ to $.69$ (see Table 4). As expected, the correlations between factors confirm the validity of the tool: women who reported a greater desire to be fertile and give birth, tended to plan for motherhood more consciously ($r = .69$; $p < .01$) and perceived having a child at that moment as less of an obstacle ($r = -.43$; $p < .01$).

Discussion

The present study evaluates the factor structure and psychometric properties of the Polish version of the Attitudes to Fertility and Childbearing Scale (AFCS). The results confirm that the Polish AFCS has a three-factor structure; however, the structure differs from that of the original version. The greatest difference relates to the third factor extracted in the Polish study. Despite some differences between the factors *Fertility and the child as an important value* and *Child as a barrier* in the Polish study and their counterparts in the original Swedish study, the two factors are generally similar; however, the third factor, named *Personal awareness and responsibility concerning having a child*, focuses on completely different aspects.

In studies with Swedish women, the perception of having a child as an aspect of social identification was associated with the third factor, *female/social identity*, two important aspects of which were the significance of being fertile and to feel communion with other women. Meanwhile, in studies involving Polish women, these items appear only as part of a different, more general dimension (i.e. Factor 1). This may be accounted for by the cultural differences in expectations related to the fulfillment of social roles by women and men in Poland: women have demonstrated that they should be treated equally with men at different levels, and by doing so, avoid falling into the trap of family and fertility values being closely identified with gender. Indeed, a recent study of Polish women indicates a strong belief that a woman can be fulfilled and feel satisfied without being a wife or a mother (Grabowska et al. 2017). However, such a belief reduces the likelihood of deciding to have an offspring. As Kluzowa and Slany (2004) noted, while childless women were once stigmatized, considered socially "useless" and excluded in some way from social life, career issues have since then acquired more central importance for family life, and partnerships without children have become more widely accepted. Such a change in social expectations towards women could have influenced the perception of fertility issues by Polish women as an aspect of their female identity.

In the Polish version of the AFCS, the third factor consists of items that indicate a deliberate and thoughtful approach to parenting planning. This aspect has been emphasized by the

Table 3 Goodness-of-Fit Indicators of Models with different factor structure (Study 2; N = 561)

Model	structure	χ^2	df	χ^2/df	CFI	RMSEA [90% CI]	AGFI	TLI	GFI
Model 1 (Polish sample, EFA loading above .50)	3-factor	1255.469	296	4.24145	.970	.076 [.072, .082]	.970	.969	.974
Model 2 (original Swedish adaptation)	3-factor	1004.04	321	3.12785	.977	.062 [.058, .066]	.974	.975	.978
Model 3 (original Swedish validation)	3-factor	868.903	186	4.671522	.972	.081 [.076, .087]	.971	.969	.977
Model 4 (Persian adaptation)	4-factor	1039.341	183	5.679459	.954	.092 [.087, .097]	.958	.948	.967
Model 5 (Japanese adaptation)	5-factor	1240.461	265	4.680985	.950	.081 [.077, .086]	.950	.943	.959

Note. CFI - *Comparative Fit Index*; RMSEA - *Root Mean Square Error of Approximation*; AGFI - *Adjusted Goodness of Fit Index*; TLI - *Tucker-Lewis Index*; GFI - *Goodness of Fit Index*

results of surveys conducted in recent years in Poland. For example, women asked about the “ideal moment” to give birth to a child most often emphasize that age alone does not matter as much as the fact of having adequate economic security (good, permanent job, good housing) and the psychological maturity for the role of a parent (CBOS 2017). It seems that these opinions were reflected in Factor 3 of the Polish version of the AFCS. Polish sociologists often emphasize that financial considerations play a crucial role when deciding to have children; for example, some participants of Polish studies have declared that “they would very often like to have children but cannot afford them” (Owsiejczyk 2008-2009, p. 170). However, some participants may use economic factors to justify other more deeply-held beliefs. A qualitative study with Polish women found the most widely-reported justifications for postponing parenthood to be the need to establish a partnership in a marriage what is a requirement for having children or to acquire the mental maturity and readiness to take on the role of a parent (Mynarska 2011). The participants declared that a well-paid, stable job and housing are prerequisites to having a child (Mynarska 2011).

Since the naming of the subscale is subjective, our choices may require some justification. The titles proposed for the subscales are based partly on the analysis of the content of particular items included in the subscale, and partly on the names of the scales from the original research (Söderberg et al. 2013; Söderberg et al. 2015). For example, *Fertility and the child as an important value* include items that refer to the issue of having a child at present or in the future and the perception of motherhood from the perspective of identification with other women. Hence a common general name has been proposed, which indicates what value the fertility and children have for a woman, regardless of her stage of life. A similar situation occurred in the case of choosing the name for *the Child as a barrier*. It was decided to emphasize that this factor is used to assess whether fertility and being a mother is a widespread obstacle to achieving life goals, irrespective of the stage of life.

The selection of the name for the last subscale in the Polish language version of the AFCS, *Personal awareness and*

responsibility concerning having a child, was the most difficult one. This scale seems to be the most culturally embedded. Its statements highlight the individual and socio-economic conditions required to give birth to a child. Hence, despite a satisfactory match between the structures of the Polish and Swedish model, it was decided to adopt a model that would better represent the Polish context.

At this point, it is important to note the other changes resulting from cultural differences which were introduced in the Polish study, these being age and parity of participants. The women taking part in the Swedish study were 20–30 years of age and not mothers (Söderberg et al. 2013). The Polish study included women aged over 30 years old, and about 15% of the total number of respondents had children. These changes were motivated by the fact that in the public debate in Poland, the discussion concerning the motivation to have children and attitudes towards female fertility not only affects women at reproductive age without any childbirth experience but also those who already have children, regardless of their age. Therefore, it was decided to include the voices of both groups in the adaptation of the tool to better suit the AFCS to Polish conditions. However, this inconsistency in group formation may have influenced the differences obtained between the Polish version and the original. It is worth noting that changes to the inclusion criteria were also made in the adaptation studies performed on the Japanese version of the AFCS and the groups even included men (Miyata et al. 2017). Besides, while the women in the Polish study were also asked to give their preferred age limits for the birth of their first child, as in the original study, a “not applicable” option was also included in the question, which was not present in the Swedish studies. This was added following the comments of respondents participating in a pilot Polish study.

Study Limitations and Implications for Further Research

Despite the good psychometric values of AFCS-PL, this study has certain limitations that should be taken into consideration, both in the context of commentary on the obtained results and

Table 4 Intercorrelations between factors (subscales), reliability coefficients and descriptive statistics (Study 2; N = 561)

Variable	Factor 1 Subscale - <i>fertility and the child as an important value</i>	Factor 2 Subscale - <i>child as a barrier</i>	Factor 3 Subscale - <i>personal awareness and responsibility concerning having a child</i>
Factor 1	.95		
Factor 2	-.43**	.85	
Factor 3	.69**	-.36**	.75
Range of possible scores	11–55	11–55	5–25
<i>M</i>	37.69	32.16	21.27
<i>SD</i>	12.48	9.19	3.73

Note. Entries on the main diagonal are Cronbach's alpha

** $p < .01$

regarding further work aimed at better understanding women's attitudes towards fertility and childbearing. First, the questionnaire was administered as both a traditional paper version and an online survey. The particular limitation associated with online surveys as a recruitment and research method is its inherent sample bias: those who, for various reasons, do not have access to the Internet, are not users of social media or are unable to use information technology fluently cannot take part (Andrews et al. 2003). With this in mind, it is difficult to say whether the fact that the majority of participants live in large, more technologically-advanced agglomerations may have resulted from the range of local recruitment, or the use of an online survey. On the other hand, it may have been advantageous to have the option of completing a survey of such a controversial and emotional nature topic online. Callegaro et al. (2015) recommend that the survey should be completed in a safe place, at a selected time and without pressure resulting from the interviewer's presence; this has been found to increase the response rates and reduce the risk of social desirability bias (Phillips and Clancy 1972).

Secondly, although sexual orientation may affect attitudes towards motherhood and may have an influence on fertility decisions, the present study only involved heterosexual participants. A recent Polish study involving homo-, hetero-, and bisexual women (Cieślak et al. 2017) identified significant differences between participants in their attitudes concerning motherhood, as measured with the Childbearing Questionnaire by Miller 1995. For example, becoming a mother is more highly evaluated by bisexual women than others; homosexual women are more likely to recognize the more undesirable conditions of motherhood than bi- and heterosexual ones, and the highest motivation for having children has been observed among heterosexual women. Thus, further research is needed to verify the applicability of the Polish version of the AFCS for women with different sexual orientations.

Thirdly, to test the psychometric properties and factor structure identified in the current study, future studies should aim to recruit more diverse groups of participants, including general samples of varying sociodemographic backgrounds, as well as some clinical samples, such as women experiencing fertility difficulties, those who miscarried or women with illnesses influencing sexual and reproductive health i.e. vulvodynia.

Fourthly, the current study had a cross-sectional design. Future longitudinal research is recommended to further validate the Polish version of the AFCS, including the test-retest reliability of longitudinal invariance of the factor structure. Finally, our study did not examine whether the Polish language version of the AFCS was psychometrically equivalent to the original Swedish language version, thus further validation studies should test the psychometric equivalence between the two versions using a sample of a bilingual individual.

Conclusions

The Polish version of the AFCS has good psychometric properties and is a reliable and valid tool. Although more research is needed to strengthen validation of the AFCS-PL, current findings suggest that this tool is a reasonably comprehensive instrument for assessing the factors that may affect the decision to have children or not among Polish women. The AFCS-PL may prove to be a useful tool for researchers interested in identifying the personal enablers and hindrances of being a mother, and for family policy decision-makers.

Compliance with Ethical Standards

Conflict of Interests On behalf of all authors, the corresponding author states that there is no conflict of interest.

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References

- Andrews, D., Nonnecke, B., & Preece, J. (2003). Electronic survey methodology: A case study in reaching hard-to-involve internet users. *International Journal of Human-Computer Interaction*, 16(2), 185–210. https://doi.org/10.1207/S15327590IJHC1602_04.
- Astolfi, P., & Zonta, L. (2002). Delayed maternity and risk at delivery. *Paediatric and Perinatal Epidemiology*, 6, 67–72.
- Australian Bureau of Statistics. (2012). *Births 2011*. Canberra: Australian Bureau of Statistics.
- Baezzat, F., Marzbani, Y., Ahmadi Ghazlojog, A., Karimi, A., & Azarnioshan, B. (2017). A study of psychometric properties of Persian version of attitudes toward fertility and childbearing scale. *The Journal of Urmia Nursing and Midwifery Faculty*, 15(1), 37–47.
- Bartlett, M. S. (1954). A note on the multiplying factors for various chi square approximations. *Journal of the Royal Statistical Society*, 16, 296–298.
- British Psychological Society. (2017). Ethics Guidelines for Internet-mediated Research. NF206/04.2017. Leicester: Author. Available at: <https://www.bps.org.uk/sites/bps.org.uk/files/Policy/Policy%20-%20Files/Ethics%20Guidelines%20for%20Internet-mediated%20Research%20%282017%29.pdf> [12.07.19].
- Cabrera-Nguyen, P. (2010). Author guidelines for reporting scale development and validation results in the journal of the Society for Social Work and Research. *Journal of the Society for Social Work and Research*, 1, 99–103.
- Callegaro, M., Lozar Manfreda, K., & Vehovar, V. (2015). *Web survey methodology*. London: Sage Publications.
- Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, 1, 245–276.
- CBOS. (2010). Reproductive attitudes in Poland [in polish]. Research report no. BS/4/2010, January 2010. Warsaw: Public opinion research Centre. Available at: https://www.cbos.pl/SPISKOM.POL/2010/K_004_10.PDF [12.07.19].
- CBOS. (2013). *Attitudes to childbearing of Polish women*. Research report no. BS/29/2013, march 2013. Warsaw: Public opinion research Centre. Available at: https://www.cbos.pl/EN/publications/reports/2013/029_13.pdf [12.07.19].
- CBOS. (2017). Procreation plans of women. Research report no. 117/2017, October 2017. Warsaw: Public opinion research Centre. Available at: https://www.cbos.pl/EN/publications/reports/2017/117_17.pdf [12.07.19].
- Central Statistical Office. (2008). *Demographic yearbook of Poland*. Warsaw: Central Statistical Office.
- Central Statistical Office. (2017). *Demographic yearbook of Poland*. Warsaw: Central Statistical Office.
- Cerny, B., & Kaiser, H. (1977). A study of a measure of sampling adequacy for factor-analytic correlation matrices. *Multivariate Behavioral Research*, 12(1), 43–47. <https://doi.org/10.1207/s15327906mbr1201>.
- Cieślak, A., Kozieł, E., Szpoton, K., Ścisłewska, K., & Kossakowska, K. (2017). Women's sexual orientation and their attitudes towards motherhood [in polish]. *Polish Sexology*, 15(2), 43–50.
- Core Team, R. (2017). R: A language and environment for statistical computing. In *R Foundation for statistical computing*. Vienna: Austria. URL <https://www.R-project.org/>.
- Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation*, 10(7), 1–9. <https://doi.org/10.7275/jyj1-4868>.
- Field, A. (2009). *Discovering statistics using SPSS*. London: SAGE Publications.
- Furr, R. M., & Bacharach, V. R. (2013). *Psychometrics. An introduction* (2nd ed.). Thousand Oaks, CA: SAGE.
- Grabowska, M., Omyła-Rudzka, M., & Roguska, B. (2017). *500 plus family. The situation of Polish families and the assessment of family policy* [in polish]. *Opinie i diagnozy nr 37*. Warsaw: CBOS.
- Graham, M., Smith, S., & Shield, M. (2015). Women's attitudes towards children and motherhood: A predictor of future childlessness? *Journal of Social Inclusion*, 6(2), 5–18.
- IBM Corp. (2016). *IBM SPSS statistics for windows, version 24.0*. Armonk, NY: IBM Corp. (Released 2016).
- Joseph, K. S., Allen, A. C., Dodds, L., Turner, L. A., Scott, H., & Liston, R. (2005). The perinatal effects of delayed childbearing. *Obstetrics and Gynecology*, 105, 1410–1418. <https://doi.org/10.1097/01.AOG.0000163256.83313.36>.
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39, 32–36.
- Kluzowa, K., & Slany, K. (2004). *Transformations of the procreative function in the family* [in polish]. In B. Mierzwiński & E. Dybowska (Eds.), *The face of the contemporary polish family*. Krakow.
- Kubiak-Fortecka, A., & Wilczyński, J. (2009). Pregnancy and delivery in women over 35 years old. *Menopausal Review*, 2, 67–71.
- Li, C. H. (2016). Confirmatory factor analysis with ordinal data: Comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Method*, 48(3), 936–949. <https://doi.org/10.3758/s13428-015-0619-7>.
- Miller, W. (1995). Childbearing motivation and its measurement. *Journal of Biosocial Science*, 27(4), 473–487. <https://doi.org/10.1017/S0021932000023087>.
- Mills, M., Rindfuss, R., McDonald, P., & te Velde, E. (2011). Why do people postpone parenthood? Reasons and social policy incentives. *Human Reproductive Update*, 17, 848–860.
- Miyata, M., Matsukawa, T., Suzuki, Y., Yokoyama, K., & Takeda, S. (2017). Psychometric properties of Japanese version of the attitudes towards fertility and childbearing scale (AFCS). *British Journal of Medicine & Medical Research*, 19(7), 1–12. <https://doi.org/10.9734/BJMMR/2017/30723>.
- Mynarska, M. (2011). When to have a child? A qualitative study of postponement of childbearing [in polish]. *Social Psychological Bulletin*, 6, 226–240.
- Nunnally, J., & Bernstein, I. (1994). *Psychometric theory* (3rd ed.). New-York: McGraw-Hill.
- Owsiejczyk, A. (2008-2009). Factors that influence young people's attitudes towards procreation. [in polish]. *Młodzież a rodzina. Roczniki socjologii rodziny*, XIX, 159-172.
- Phillips, D., & Clancy, K. (1972). Some effects of "social desirability" in survey studies. *American Journal of Sociology*, 77(5), 921–940.
- Schermelleh-Engell, K., Moosbrugger, H., & Müller, H. (2003). Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research Online*, 8(2), 23–74.

- Sleeboos, J. (2003). Low fertility rates in OECD countries: Facts and policy responses. OECD.
- Söderberg, M., Lundgren, I., Olsson, P., & Christensson, K. (2011). A burden and a blessing young Swedish women's experience of fertility. A study among women lacking experience of pregnancy and parenthood. *Health Care Women International*, *32*, 402–419.
- Söderberg, M., Christensson, K., & Lundgren, I. (2012). A project for future life-Swedish women's thoughts on childbearing lacking experience of giving birth and parenthood. *International Journal of Qualitative Studies on Health Well-being*, *7*, 17318. <https://doi.org/10.3402/qhw.v7i0.17318>.
- Söderberg, M., Lundgren, I., Christensson, K., & Hildingsson, I. (2013). Attitudes toward fertility and childbearing scale: An assessment of a new instrument for women who are not yet mothers in Sweden. *BMC Pregnancy Childbirth*, *13*, 197. Available at: <http://www.biomedcentral.com/1471-2393/13/197> [12.07.19].
- Söderberg, M., Christensson, K., & Lundgren, I. i Hildingsson, I. (2015). Women's attitudes towards fertility and childbearing – A study based on a national sample of Swedish women validating the attitudes to fertility and childbearing scale (AFCS). *Sexual & Reproductive Healthcare*, *6*, 54–58.
- Thalberg, S. (2013). First Education, then Children? A Qualitative Study of Students' Childbearing Attitudes and Intentions. Stockholm University Linnaeus Centre on social policy and family dynamics in Europe, SPaDE, 2013, 7. Available at: http://www.su.se/polopoly_fs/1.152116.1382346007!/menu/standard/file/WP_2013_7.pdf [12.07.19].
- Thévenon, O. (2010). Fertility in OECD countries: An assessment of macro-level trends and policy responses. Work package 2: Macro perspective on fertility trends and institutional context. Available at: <http://vidrepro.oeaw.ac.at/wp-content/uploads/Macro-trends.pdf> [12.07.19].
- Vujčić, I., Radičević, T., Dubljanin, E., Maksimović, N., & Grujičić, S. (2017). Serbian medical students' fertility awareness and attitudes towards future parenthood. *The European Journal of Contraception & Reproductive Health Care*, *22*(4), 291–297. <https://doi.org/10.1080/13625187.2017.1368478>.
- World Medical Association. (2013). Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. *JAMA*, *310*(20), 2191–2194. <https://doi.org/10.1001/jama.2013.281053>.

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