Scientific Research Publishing

Health, 2023, 15, 746-757
https://www.scirp.org/journal/health
ISSN Online: 1949-5005
ISSN Print: 1949-4998

Cognitive and Psychosocial Accessibility to Modern Contraception: Subscales Validation

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How to cite this paper: Zan, L.M. and Rossier, C. (2023) Cognitive and Psychosocial Accessibility to Modern Contraception: Subscales Validation. *Health*, **15**, 746-757.
https://doi.org/10.4236/health.2023.157047

Received: June 10, 2023
Accepted: July 21, 2023
Published: July 24, 2023

Abstract

While studies have examined physical access to services, cognitive and psychosocial barriers to contraceptive use have received less attention, despite their impact on access. Research shows that fours main dimensions exist under the broad concept of cognitive and psychosocial access. This study aims to validate the construction of these dimensions and measure the relation between them and their links with modern contraceptive use. We utilized a questionnaire module to collect 15 questions measuring these dimensions through the 6th round of the Performance monitoring and accountability 2020 (PMA2020) survey in Burkina in 2019. We employed the scale validation technique to choose appropriate measures (observable indicators or items) for constructing each latent dimension (unobservable) in our study. The items consisted of questions that utilized a 5-point Likert scale or dichotomous responses to capture various psychosocial aspects. To assess the validity, reliability, convergence, and divergence of the latent dimensions and items, we utilized the *validscale* command in Stata. The validation process confirmed the reliability of all the dimensions. Contraceptive approval is more aligned with birth spacing rather than birth limiting, reflecting prevailing social perceptions. Women's contraceptive agency was found to be more associated with their ability to discuss and negotiate with their partners rather than independent decision-making. Correlations between dimensions were generally weak, but the levels of knowledge, agency, and approval of contraception are positively correlated with contraceptive use and intention to use. Giving women more decision-making power and providing information to address side-effect concerns can enhance contraceptive approval.

Keywords

Cognitive Dimensions, Psychosocial Dimensions, Contraception, Intention to Use, Side Effects

1. Background

In sub-Saharan Africa, four out of five women with unintended pregnancies also had an unmet need for contraception [1]. Despite the increase of physical accessibility to contraception, there are various barriers on both the supply and demand sides that contribute to the low uptake of contraception in LMICs [2]. Access to family planning (FP) has gained international recognition as a means for individuals to freely decide on the number and spacing of their children. While it was not initially emphasized in the Millennium Development Goals (MDGs), efforts such as the FP2020 initiative aimed to expand FP access to millions of women in poverty-stricken countries. The Sustainable Development Goals (SDGs) further stress the importance of universal access to sexual and reproductive health care services, including FP. Accessibility of FP involves providing medically approved contraceptive methods to individuals expressing a desire to avoid pregnancy, while considering supply and demand-side obstacles.

Access to contraceptive services is measured by the ease with which individuals seeking to avoid pregnancy can obtain a suitable contraceptive method, addressing both supply-side barriers and demand-side factors like personal preferences. Research has highlighted the importance of service availability in contraceptive use, with limited physical access leading to reliance on less efficient methods. However, cognitive and psychosocial obstacles, such as misinformation, opposition, and fear, also hinder contraceptive use. Understanding and addressing these barriers are particularly crucial in regions like sub-Saharan Africa with low contraceptive prevalence and unmet needs and where efforts are focusing on physical access. Although, evidence suggest that cognitive and psychosocial aspects have significant impact on contraceptive access, particularly when contraceptive methods are readily available [3]. Earlier findings also show that lack of knowledge, fear of side effects are the princial reason for nonuse on top of geograhic access [4].

Scholarly literature has presented three frameworks that consider various dimensions of access to contraception [5] [6] [7], including cognitive accessibility, psychosocial accessibility, geographic accessibility, service availability/quality, administrative accommodation, and affordability. The cognitive and psychosocial dimensions of accessibility have been relatively overlooked. A recent paper found that these cognitive and psychosocial dimensions are composed of four main subscales and collected question to measure them [8]. These authors also used we used frameworks developed to understand the concept of attitude [9] [10] [11] [12]. Based on that previous study which outlined a comprehensive framework of cognitive and psychosocial accessibility, this study aims to advance in the measurement by delving into the validation of the sub-dimension. Finally, the study will show the links between these dimensions and the use of a modern contraceptive.

2. Material and Methods

We incorporated the selected questions into the 6th round of the PMA2020

questionnaire in Burkina Faso, conducted between December 2018 and January 2019 [13]. The data were collected from 2763 households (with a 98.4% response rate) and 3329 women (with a 97.7% response rate) in 83 enumeration areas [14].

To validate the measurement scales, we employed the scale validation technique, which involves selecting observable indicators or items to construct each latent dimension. The items included 5-point Likert scale or dichotomous responses, aiming to capture various psychosocial dimensions. We used the "validscale" command in Stata to test the validity, reliability, convergence, and divergence of the latent dimensions and items [15]. This command combines classical test theory (CTT) and structural equation modeling (SEM) to conduct confirmatory factor analysis (CFA). For SEM, the module provides estimations using maximum likelihood, maximum likelihood with missing values, and asymptotic distribution-free approaches. Since the maximum likelihood approach is not suitable for CFA with categorical items, we employed weighted least squares (WLS), also known as asymptotic distribution-free (ADF), in Amos [16]. However, WLS may not perform well with small samples or complex models. Based on standard criteria, our sample size is sufficiently large to ensure a good fit with the ADF method.

Internal consistency, indicating the extent to which a set of items measures the same content, was assessed using Cronbach's coefficient alpha, ranging from 0 to 1. Generally, a coefficient above 0.7 is considered acceptable, while a coefficient below 0.5 is deemed unacceptable [17] [18]. The "validscale" command offers three options for computing item composition (unweighted mean, unweighted sum, or standardization between 0 and 100). It also allows for the computation of dimension scores using other complex methods and their incorporation into the command.

We generated the dimensions using the "compscore (sum)" option, which adds the values of non-missing codes to compute the dimension scores. After creating the scores, "validscale" tests their consistency with the items used. All items measuring the same dimension are included in the code, grouped using the partition option of "validscale". The results provide the Cronbach's scale reliability coefficient alpha and Loevinger's H scalability coefficient for each dimension. The code also calculates an iterative Loevinger's Hj for each item j in the dimension and displays the minimum value and the corresponding item. If this value is below a specified threshold, we can decide to remove the item to enhance consistency among the remaining items and the dimension. We repeat this iteration until the Cronbach's alpha exceeds 0.7 or Loevinger's H exceeds 0.3. Additionally, we compute Ferguson's delta, which indicates the scale discrimination index [19] of the items.

3. Results

We examined the distribution of scores for all dimensions and depicted the relationships between items using biplots. The biplots allowed us to visualize the

correlations between items within the same dimension. Since not all questions were asked to all respondents, certain dimensions were only available for specific categories of women.

3.1. Validation of Dimensions

To construct each dimension, we treated each question and its corresponding response as separate items for validation. For questions with multiple response options (knowledge of methods, knowledge about side effects, and fear of side effects), we transformed each response into individual items. The validation results for the two dimensions based on Likert scale responses are presented in Table 1.

The first two dimensions, the number of known contraceptive methods and the number of feared side effects, did not require validation. The dimension of contraceptive knowledge was determined by the number of modern methods known, encompassing all 13 modern methods in the questionnaire (n = 3329; 100.0%). While we did not construct a dimension specifically for side effects, we utilized the questions related to side effects to adjust the fear of side effects dimension. The fear of specific side effects was only assessed among those who were aware of those side effects. To measure the level of fear of side effects, we calculated the proportion of feared side effects relative to the known side effects. Women who were unfamiliar with the side effects were considered to have no fear of side effects, thus assigned a value of 0. This dimension included all women who were aware of any contraceptive methods (n = 3247; 97.5%) (Table 1).

Contraceptive approval was evaluated using five questions, of which three were deemed fitting for this dimension. The two excluded items assessed the respondent's perception of their partner's approval (question AC2) and the respondent's approval of family planning use by individuals not in committed relationships (question AC3). These items tapped into different constructs and were inconsistent with the dimension, resulting in a decrease in Cronbach's alpha. The reduced set of three variables prevented Cronbach's alpha from reaching 0.7. However, considering the high values of H (0.45) and Delta (0.90) surpassing the respective thresholds, a Cronbach's alpha of 0.65 was deemed acceptable. This dimension included all women who were aware of at least one contraceptive method (n = 3247; 97.5%).

For contraceptive agency, seven questions were used, but two items (AFC1 and AFC5) did not align with this dimension. The first item addressed the respondent's

Table 1. Validity and reliability tests on constructed latent dimensions.

Dimensions	N	Number of items kept	Cronbach's alpha (≥0.7)	Loevinger's H (≥0.3)	Ferguson's delta (≥0.9)
Family planning approval	3247	3	0.65	0.45	0.90
Contraceptive agency	2191	5	0.71	0.38	0.95

Data are from the PMA2020 round 6 survey in Burkina Faso conducted in 2018/2019.

ability to prevent pregnancy independently without considering the impact on their relationship with their partner. The second item explored the decision to use family planning regardless of the partner's opinion. These questions explicitly referred to another dimension. However, since the item related to negotiation for stopping childbearing (AFC4) aligned with the dimension, we concluded that the decision to prevent pregnancy does not solely rest within women's sphere of ability. Most items in this dimension pertained to women in relationships, with only two involving all respondents. Consequently, we computed the agency dimension solely for married women who were knowledgeable about contraception (n = 2191; 65.8%).

After validating the dimensions, we further examined the contributions of items in constructing each dimension. Using the Stata biplot command incorporated into validscale, we generated two graphs (**Figure 1**) that illustrate the

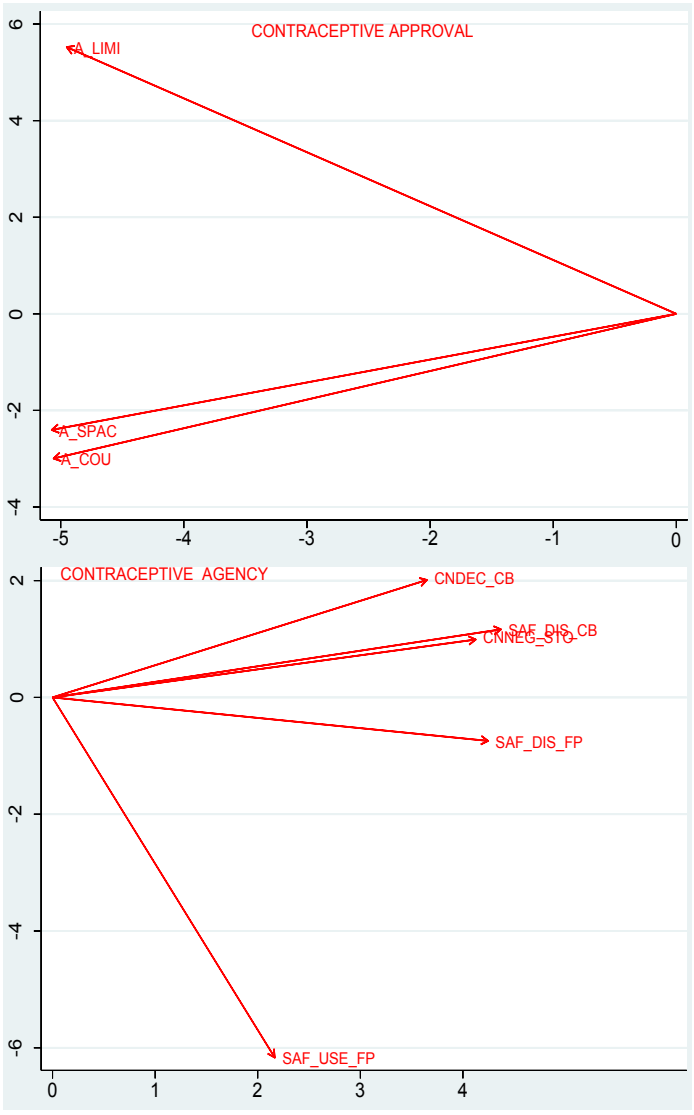

Figure 1. Correlations between items in the same dimension. Data sources: PMA2020 round 6 survey in Burkina Faso conducted in 2018/2019.

relationships between items within each dimension. The angle between the arrows in the biplots approximates the correlations between the items or scores. The approval items reflected different aspects of contraception approval, with greater correlation observed between the approval of family planning use for spacing (A_SPAC) and by couples (A_COUP) compared to limiting childbearing (A_LIMI). Regarding agency, items related to discussing (SAF_DIS_CB and SAF_DIS_FP) and negotiating childbearing (CNDES_CB and CNNEG_STO) and family planning exhibited stronger correlations. However, the item concerning the ability to decide on family planning use alone "without considering what one's partner thinks" (SAF_USE_FP) appeared distinct from the other four items, indicating that the action component of the agency dimension was not as prominent as the components of discussion and negotiation, which displayed close associations.

3.2. Links between Dimensions

In Table 2, the diagonal numbers represent the sample sizes corresponding to each variable. Without assuming anything about fear of side effects, the fear of side effects dimension (limited to those who knew at least one side effect) had the smallest sample size. The same applied to the agency dimension, where three out of the five questions were applicable only to married women. Consequently, the correlation calculation between these two dimensions utilized only half of the total sample (married women who knew at least one side effect). When assuming that women unaware of side effects had no fear of them, more samples were available, but the relationship directions appeared counterintuitive compared to the findings in the first part of the table.

The initial results indicated that fear of side effects exhibited negative and significant correlations with contraceptive knowledge (−0.1189), contraceptive approval (−0.0874), and contraceptive agency (−0.0947). The highest negative correlation was observed between fear and knowledge, indicating that contraceptive knowledge accounted for nearly 12% of the fear of side effects, albeit a relatively weak relationship.

However, positive correlations were observed between contraceptive knowledge, approval, and agency. These positive correlations imply that these dimensions increase and decrease together. The highest correlation coefficient was found between contraceptive agency and approval (0.37). Significant correlations were also present between contraceptive knowledge and approval (0.24), as well as between contraceptive agency and knowledge.

Figure 2 and Figure 3 depict factor analyses illustrating the relationships between dimensions and contraceptive use and intention to use. Orthogonal rotation varimax was employed as the dimensions were not highly correlated, except for approval and agency. This rotation facilitated easier interpretation of the solution. The unrotated versions of the graphs are provided in the annex (Figure 2 and Figure 3). In the first graph, the two axes accounted for nearly 90% of the

Table 2. Correlations between the four dimensions, modern contraceptive use, and FP message hearing.

	Modern contraceptive use	Contraceptive Knowledge	Fear of SE	FP* approval	FP agency	Heard of FP message
Without the assumption "no knowledge of SE implies no fear of SE"						
Modern contraceptive use	1 3329					
Contraceptive knowledge	0.205* 3329	1 3329				
Fear of side effects	−0.048 2036	−0.1189* 2036	1 2036			
Contraceptive approval	0.190* 3247	0.2362* 3247	−0.0874* 2036	1 3247		
Contraceptive agency	0.117* 2191	0.1721* 2191	−0.0947* 1459	0.374* 2191	1 2191	
Heard of FP message	0.107* 3329	0.241* 3329	−0.071 2036	0.023 3247	0.046 2191	1 3329
With the assumption "no knowledge of SE implies no fear of SE"						
Modern contraceptive use	1 3329					
Contraceptive knowledge	0.205* 3329	1 3329				
Fear of side effects	0.073* 3247	0.175* 3247	1 3247			
Contraceptive approval	0.190* 3247	0.2362* 3247	−0.051 3247	1 3247		
Contraceptive agency	0.117* 2191	0.1721* 2191	−0.037 2191	0.374* 2191	1 2191	
Heard of FP message	0.107* 3329	0.241* 3329	−0.028 3247	0.023 3247	0.046 2191	1 3329

Notes: *FP = Family planning; SE = Side effect; Data are from the PMA2020 round 6 survey in Burkina Faso conducted in 2018/2019.

variation. The X-axis was primarily driven by agency and approval, which received higher scores. These two dimensions were closely related to intention. Contraceptive knowledge obtained a lower score on the X-axis but was influential on the Y-axis, with a score close to 0.4. Contraceptive knowledge appeared in opposition to fear of side effects, which received a higher (albeit negative) score on the Y-axis compared to the X-axis.

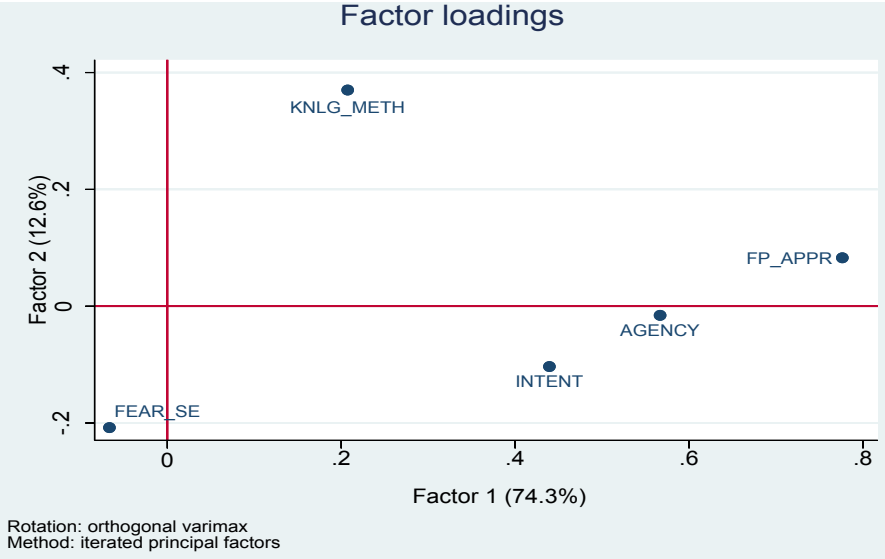

Figure 2. Link between dimensions and intention to use contraception.

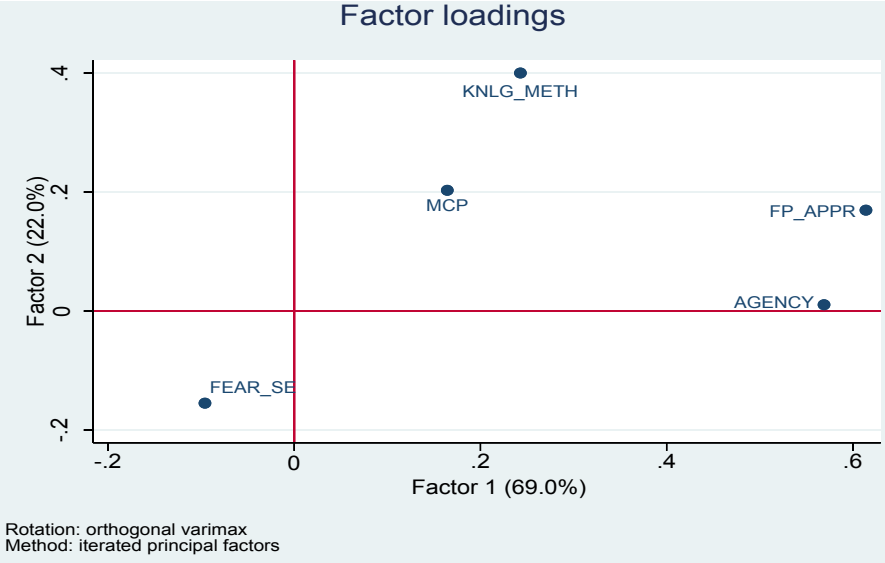

Figure 3. Link between dimensions and contraceptive use.

Overall, agency, knowledge of methods, and approval dimensions exhibited positive relationships with each other. In contrast, fear of side effects displayed a weak negative correlation with FP approval, contraceptive knowledge, and contraceptive agency.

4. Discussion

The validation process for most sub-dimensions was straightforward, with only one or two items needing to be removed as they tapped into different constructs. The Cronbach's alpha coefficient and other indicators facilitated the validation of the four dimensions, including two that were based on item counts. In the process, we considered only fears expressed by those who were aware of the cor-

responding side effects. Instead of simply counting the feared side effects, we calculated the proportion of feared side effects among the known side effects. This adjustment allowed for comparisons between individuals with different levels of knowledge. Additionally, to increase the sample size, we assumed that women who were unaware of any side effects also had no fear of them. In multivariate regressions, we included a dichotomous variable that took a value of 1 if the woman was unaware of any side effects and 0 if she was aware of any.

The results indicate that in Burkina Faso, there is greater common approval of contraceptives for birth spacing rather than birth limiting. This finding is consistent with the prevailing trend among women in tropical Africa [20]. The persistence of this pattern suggests that social perceptions of fertility regulation have not changed significantly, and most women are still not inclined towards birth limiting practices. This reluctance to seek birth limiting solutions appears to be related to women's limited ability to do so. The item concerning the ability to prevent pregnancy or use family planning without concerns about its impact on their relationship did not fit into the women's contraceptive agency dimension. We concluded that the consistent aspect of women's contraceptive agency is more related to their ability to discuss and negotiate childbearing or contraceptive use with their partners rather than their ability to make independent decisions. The only decision item that aligned with women's agency was the ability to delay the next birth after having given birth at least once.

The fear of side effects has been found to discourage contraceptive use, while knowledge about contraception and intention to use it are also hindered by concerns about side effects. These findings align with previous research indicating that fear of side effects often stems from misinformation about family planning [21]. Additionally, other factors associated with the fear of side effects can impede the adoption of modern contraceptives [22]. Some studies have demonstrated that the prolonged delay in fertility resumption after discontinuing contraception negatively affects the utilization and continuation of contraception [23]. This impact is particularly disheartening in societies where the value placed on having children is higher.

Several limitations were encountered in this study, primarily related to the available data and the variables studied. Most variables did not apply to the entire sample, which introduces the possibility of selection effects influencing some relationships. Moreover, caution should be exercised in interpreting certain relationships, as they may be bidirectional, with contraceptive use and approval influencing each other. Social desirability bias may also lead users to report higher levels of contraceptive approval, and the same bias may affect non-users, who may be more inclined to claim unawareness of methods or side effects. Furthermore, including the level of knowledge about methods and side effects could have enhanced the measurement of that dimension. However, the information we collected on side effects awareness was used to adjust the measurement of fear related to side effects. Although most correlations between our dimensions

were weak, they generally aligned with intuition and expectations. Notably, fear of side effects exhibited an opposite trend compared to the other three dimensions (knowledge, approval, and agency). While we cannot draw definitive conclusions as correlation does not imply causation, following an intervention logic, we can infer that increasing levels of approval, knowledge, and agency may lead to a decrease in fear of side effects, or vice versa.

5. Conclusion

This research aimed to validate the cognitive and psychosocial subscales identified in the recent literature. It used the data collected using a comprehensive set of questions on cognitive and psychosocial barriers to contraceptive integrated to the Round 6 of the Performance Monitoring and Accountability 2020 (PMA2020) survey in Burkina Faso. After making minimal simplifications to further refine the module, we were able to validate a set of 40 items that, in our opinion, effectively measure the various dimensions of cognitive and psychosocial challenges experienced by all women or women in committed relationships. Despite a few limitations, this study demonstrates that our defined and validated dimensions effectively capture most of the characteristics present in the context. However, it also reveals that the concept of birth limitation is not adequately integrated into women's endorsement and control over contraception, particularly among married women. This indicates a reluctance among women and couples to limit childbirth. The opinions of partners play a significant role in the decision-making processes of most women, especially when it comes to pregnancy prevention and contraceptive usage. While our analysis is primarily descriptive, it implies that empowering women with greater decision-making authority regarding contraception and childbearing will enhance their control and endorsement of contraceptives. Furthermore, providing more information that addresses concerns about side effects has the potential to improve the level of approval for contraception.

Acknowledgements

This research, conducted as part of a Ph.D. study, received support from the Swiss Confederation under Grant 2017.750. The collection and analysis of cognitive and psychosocial data were supported by the West African Health Organization (WAHO) through the grant with reference number FM/TEND/AP/PROGRAMME DEMSAN/2018/009/bk.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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