

A Rasch Analysis of The Indonesian Version of Proactive Personality Scale

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Abstract

Proactive personality reflects an individual's tendency to initiate change and influence the environment, particularly in organizational contexts. This study aimed to examine the psychometric properties of the Indonesian version of the Proactive Personality Scale (PPS) using Rasch measurement modeling. A cross-sectional survey design was employed involving 307 employees from various organizations in Indonesia (40.4% male, 59.6% female; $M = 32.46$, $SD = 8.38$), recruited through convenience sampling. The instrument was translated and culturally adapted in accordance with International Test Commission (ITC) guidelines. Data were analyzed using the Rasch Rating Scale Model with Winsteps, applying Joint Maximum Likelihood Estimation to evaluate dimensionality, item fit, reliability and rating scale functioning. The Rasch model explained 44.1% of the variance, supporting the unidimensional assumption. The results suggest adequate person separation and stable item calibration and indicate good internal consistency (Cronbach's $\alpha = 0.81$), acceptable person reliability (0.77), also excellent item reliability (0.98). However, rating scale analysis revealed suboptimal functioning in lower response categories, indicating that collapsing categories may improve measurement precision. Overall, the Indonesian PPS demonstrates acceptable psychometric properties for research and organizational assessment purposes. Nevertheless, refinement of the response format and further validation using more diverse samples are recommended to enhance measurement precision and generalizability.

Keywords: proactive personality, Rasch analysis, reliability, test adaptation, validity

Abstrak

Kepribadian proaktif mencerminkan kecenderungan individu menginisiasi perubahan dan memengaruhi lingkungan, khususnya dalam konteks organisasi. Penelitian ini bertujuan menguji properti psikometris Proactive Personality Scale (PPS) versi Indonesia menggunakan pemodelan Rasch. Desain survei cross-sectional melibatkan 307 karyawan berbagai organisasi di Indonesia (40,4% pria, 59,6% wanita; $M = 32,46$, $SD = 8,38$) via convenience sampling. Instrumen diadaptasi sesuai pedoman International Test Commission (ITC). Data dianalisis via Rasch Rating Scale Model (Winsteps) dengan Joint Maximum Likelihood Estimation guna mengevaluasi dimensionalitas, item fit, reliabilitas, dan fungsi skala. Hasil menunjukkan bahwa Model Rasch menjelaskan 44,1% varians, sehingga mendukung asumsi unidimensionalitas. Hasil menandakan separasi individu memadai serta kalibrasi item stabil. Konsistensi internal baik ($\alpha = 0,81$), reliabilitas individu adekuat (0,77), dan reliabilitas item sangat baik (0,98). Namun, analisis skala mengungkap fungsi suboptimal pada kategori respons rendah, mengindikasikan penggabungan kategori dapat meningkatkan presisi pengukuran. Kesimpulannya, PPS versi Indonesia memiliki properti psikometris layak untuk riset dan asesmen organisasi. Perbaikan format respons dan validasi lanjut pada sampel beragam disarankan guna meningkatkan presisi serta generalisasi hasil.

Kata Kunci: adaptasi tes, analisis Rasch, kepribadian proaktif, reliabilitas, validitas

Introduction

Research on proactive personality has been gaining attention for more than twenty years (Crant & Jiang, 2017). Previous studies have revealed that proactive personality plays a significant role in the sustainability of an individual's career, even from the time they begin their careers (Zhang et al., 2023a). A proactive personality has been described to influence individual career success (Turban et al., 2017; Yang & Chau, 2016). Proactive personality is believed to have an influence on work engagement because proactive personality is an individual's willingness to get involved and take the initiative to identify or contribute to various situations (Ingarianti et al., 2024). Moreover, a proactive personality can enhance leadership capabilities. Proactive leaders are more likely to engage in taking charge behaviors, which can enhance their promotability and leadership capabilities (Zhang et al., 2023b). However, few related measurement tools have been developed in Indonesia.

Proactive personality is described by Thomas S. Bateman and J. Michael Crant (Crant & Jiang, 2017) as a relatively stable disposition characterized by a tendency to take initiative and create positive change in one's environment. This personality trait involves self-initiated efforts to bring changes, being future-oriented, self-starting, and having change-oriented behavior. Employees with these traits often suggest new methods for completing tasks, propose innovative ideas, and demonstrate initiative in their roles. Empirical findings generally indicate a positive correlation between proactive personality and consequences in organizations such as enhanced performance, tolerance to stress over job demands, and greater participation within the organization (Seibert et al., 2001).

Proactive personality is a relatively stable tendency to influence changes in the environment. Individuals are relatively not constrained by situational forces that might influence environmental change. The specific actions associated with a proactive personality include looking for opportunities, demonstrating initiative, being active, and encouraging change when encountering obstacles that may be found in the workplace. A fundamental aspect of proactive behavior is the notion that individuals actively instigate changes in the environment and encourage others to do so (Crant & Jiang, 2017). Proactive personality has an impact on positive behaviors in organizations such as the emergence of innovative behaviors (Kong & Li, 2018), organizational citizenship behavior (Liguori et al., 2013).

Sukmajati & Suharnomo (2022) explains that having a proactive personality can predict performance and creativity, enabling individuals to devise innovative solutions, contribute to organizational development, and enhance career satisfaction by exerting greater control over their professional growth. In a dynamic work environment, proactive individuals adapt more quickly and view change as an opportunity rather than a threat. Employees with proactive personalities tend to foster a more productive, collaborative, and innovative work atmosphere. (Viratasya & Kadiyono, 2024). Proactive personalities are also said to play a crucial role in enhancing the performance of both individuals and organizations. The existence of proper measurements can help identify behaviors that can make a positive contribution. Additionally, measuring proactive personality can offer insights into how an individual is likely to respond to challenges, opportunities, and changes.

The assessment of proactive personality through the proactive personality scale (PPS) was initiated by Bateman and Crant in 1989. They began by compiling an initial set of 50 items, which was eventually refined to a final unidimensional form consisting of 17 items. PPS is at a single *factor loading*, with an average of Chronbach's alpha values = .88. Seibert et al. (1999) created a short version with 10 items selected based on the highest *loading factor* which becomes the most widely used scale by researchers. Measurements on 48 samples showed an average of Chronbach's alpha values = .86.

The majority of studies use the English version of the proactive personality scale, although it has also been translated into other languages, such as Chinese (Zhou & Shi, 2009), Belgian (Pringels & Claes, 2001), Italian (Trifiletti & Capozza, 2009), Turkish (Erdogan & Bauer, 2005), Argentine (Salessi & Omar, 2021). Studies in some countries report that this scale is unidimensional. To validate the scale, the majority of researchers use the classical test theory (CTT) approach known as Confirmatory Factor

Analysis (CFA) which has been criticized for its discriminatory tendencies, sample-dependent item difficulty and this assumption for all respondents having the same measurement error (Alagumalai & Curtis, 2005).

Viratasya & Kadiyono (2024) also adapt the Indonesian version of the proactive personality scale (PPS) measurement tool for employees. The adaptation of the 17 items PPS is carried out by (Viratasya & Kadiyono, 2024) using the Classical Test Theory (CTT) framework. However, this approach has notable limitations, such as treating Likert-type scores as interval data and not evaluating items individually. The article also does not report more advanced analyses, such as item-level evaluations (e.g., item fit, discrimination indices, or differential item functioning [DIF] across subgroups). These limitations emphasize the need for further validation, for example through Rasch modeling, which allows for a more rigorous examination of item fit, ensures that response categories function logically, and produces interval-based logit scores suitable for accurate parametric statistical analyses. In addition, the article does not address measurement invariance across groups (e.g., gender or organizational context), leaving open the possibility of bias.

Referring to the previous study, they tested the adapted proactive personality based on the CTT approach, but applied it to the 17-item version of the PPS scale. This study, however, employed the 10-item version of the PPS-10 developed by (Seibert et al., 1999). This version was selected to balance measurement efficiency and respondent burden, as the survey also included several other constructs. The PPS-10 has demonstrated high internal consistency (Cronbach's $\alpha > .80$) and strong correlations with the original 17-item scale developed by Bateman & Crant (1993). Cross-cultural studies have further supported its unidimensionality and reliability (Claes et al., 2005), making it suitable for use in organizational research in Indonesia. Nevertheless, the PPS-10 covers a narrower range of items compared to the 17-item version. To address this limitation, the present study employed additional validation using the Rasch model to assess item fit, category functioning, and Differential Item Functioning (DIF). This approach ensures that the Indonesian adaptation of the PPS-10 retains psychometric equivalence within the cultural context, thereby providing valid, reliable, and internationally comparable measurement outcomes.

Rasch is valuable for validating the adaptation of PPS in Indonesia as it provides a robust framework for assessing the quality of items and their ability to measure latent traits. It allows a detailed analysis of item properties like item discrimination and difficulty. This is essential to guarantee that the intended latent trait (PPS) is reliably measured by each PPS item across various trait (Bortolotti et al., 2013; Teye-Kwadjo & de Bruin, 2022). IRT effective in detecting differential item functioning (DIF) which occurs when items perform differently across various subgroups (e.g. gender, cultural background), to ensure there is no measurement bias in the PPS (Teye-Kwadjo & de Bruin, 2022). The adaptation of the PPS in Indonesia can benefit from IRT as it entails rigorous testing and validation processes, including factor analysis and IRT-based evaluations, which can confirm the scale's structure and functionality (Ridho, 2024).

Currently, no research has utilized Rasch analysis to investigate the PPS within Indonesian context. While PPS demonstrates strong performance in Cronbach's alpha analysis, it is essential to confirm these results using IRT. The advantage of Rasch analysis lies in its ability to bridge this gap by offering a comprehensive overview of psychometric attributes, including dimensionality, rating scale functioning, item properties, person responses, reliability, and differential item functioning (DIF).

One of the advantages of the Rasch model is its ability to predict missing data, resulting in more accurate outcomes compared to other statistical models that treat missing data as a value of 0. When a significant percentage of data is missing, it can lead to unsatisfactory results from the measuring tool. If the data fits the Rasch model, the mean square value is expected to be 1.0, while the Z-standardized values should be 0.0. Boone et al. (2014) suggest checking the suitability of items that do not meet certain criteria. These criteria include the *Point Measure Correlation* (x): $0.4 < x < 0.85$, *Outfit Mean Square* (y): $0.5 < y < 1.5$, and *Outfit Z Standard* (z): $-2.0 < z < +2.0$. If an item fails to meet these three criteria, it is deemed a misfit item,

indicating that it does not accurately measure the intended characteristic or trait. However, if not all criteria can be met, the primary focus should be on the outfit mean square (Sumintono & Widhiarso, 2014).

This study aims to adapt and validate the Proactive Personality Scale (PPS) for the Indonesian context using the 10-item version and employing Rasch analysis, a measurement approach grounded in Item Response Theory (IRT). Given Indonesia's unique socio-cultural and organizational characteristics, the availability of a valid and reliable instrument is essential to accurately assess proactive personality in workplace settings. Ensuring cultural relevance in measurement is critical to capturing respondents' true tendencies and minimizing potential bias in interpretation.

Despite the growing use of the PPS in Indonesian research, several methodological limitations remain evident. Most prior validation studies have relied primarily on Classical Test Theory (CTT), which is limited in its capacity to evaluate item-level performance, assess measurement invariance, and produce interval-level measurement properties. In addition, existing studies provide limited psychometric evidence regarding rating scale functioning and the presence of potential item bias across demographic groups.

To address these limitations, the present study applies the Rasch measurement model to provide a more rigorous and comprehensive validation of the Indonesian version of the PPS. This approach enables detailed examination of key psychometric properties, including item fit, dimensionality, rating scale functioning, and Differential Item Functioning (DIF). By doing so, this study contributes to the development of a more robust, precise, and contextually appropriate measurement of proactive personality in Indonesian organizational settings.

Methods

The study employed a quantitative survey to validate the measurement instrument through Rasch model. The research design consisted of several steps: adaptation of PPS, data collection, and psychometric validation to enhance methodological rigor and transparency, this study adopts a Rasch measurement framework that enables invariant measurement and detailed item-level diagnostics. The use of the Rating Scale Model (RSM) is justified by the uniform response format across all items, while the application of Joint Maximum Likelihood Estimation (JMLE) ensures simultaneous estimation of item difficulty and person ability on a common logit scale. This approach provides stronger measurement precision compared to traditional methods and supports the replicability of the analysis.

Participant and procedures

The study initially included 326 participants. After the data screening process, outliers were removed using the mean-square (MNSQ) outfit criterion of > 2.00 , resulting in a final sample of 307 respondents. Participants ranged in age from 21 to 61 years ($M=32.46$, $SD=8.38$), with 40.4% male and 59.6% female. The sample size of 307 respondents is deemed sufficient for Rasch analysis. According to Bond & Fox (2015) and Boone et al. (2014), a minimum of 200 participants is recommended to ensure reliable parameter estimation. The participants were employees from various companies throughout Indonesia. Data were collected online using a Google Form that included the study instruments. A convenience sampling technique was employed, targeting accessible working professionals across different organizational sectors. Before participating, all respondents were informed of the study's objectives and provided electronic informed consent to ensure voluntary and ethical participation.

Instrument

The PPS consists of 10 items that are used to measure proactive personality. This scale was developed by The Proactive Personality Scale-short version (Seibert et al., 1999). The Indonesian version of PPS was

adapted following the International Test Commission (ITC,2016) guidelines. First, formal permission was obtained from the original author via a personal message on Research Gate. During the pre-condition stage, the construct definition and contextual relevance to Indonesian organizational settings were reviewed. The translation process involved forward translation by two independent bilingual psychologists fluent in English and Indonesian. Then, two translated versions were compared and synthesized. Following this step, a professional bilingual translator, unaware of the original scale, back-translated this version into English. All discrepancies between the original and back-translated versions were discussed and resolved by the research team. An expert panel consisting of two industrial-organizational psychologists, one cross-cultural psychologist, evaluated item clarity, cultural appropriateness, and response format suitability. At this stage, the response scale was adjusted from the original 7-point Likert format to a 5-point Likert scale (1=strongly disagree to 5=strongly agree). This modification aimed to improve the clarity and consistency of responses in the Indonesian organizational survey. A small-scale pilot test involving 10 employees was conducted to assess clarity, comprehensibility, and response interpretation. This phase served as a cognitive pre-test rather than a psychometric evaluation. Participants reported that the instructions and response categories were clear, and no significant wording changes were necessary. Afterward, the finalized instrument was used in the main study sample. Although the pilot sample was small, it was considered adequate for assessing qualitative clarity before large-scale administration.

Table 1. Result of Adaptation Process

No.	Original Item	Adaptation (Indonesian Version)
1.	I am constantly on the lookout for new ways to improve my life	Saya selalu mencari cara baru untuk meningkatkan kualitas hidup saya
2.	No matter what condition I have been, I have contributed to constructive changes	Apapun kondisi saya, saya telah berperan untuk perubahan yang konstruktif
3.	Nothing is more exciting than seeing my ideas come to life	Tidak ada yang lebih menarik selain melihat ide saya menjadi kenyataan.
4.	If I see something I don't like, I will fix it	Jika saya melihat sesuatu yang tidak saya sukai, saya akan memperbaikinya.
5.	No matter how big the odds are, if I believe in something I will make it happen	Tidak peduli seberapa besar peluangnya, jika saya meyakini sesuatu saya akan mewujudkannya
6.	I love being a champion for my ideas, even against others' opposition	Saya senang jika ide saya menjadi yang terbaik, meskipun ide tersebut berseberangan dengan ide orang lain.
7.	I excel at identifying opportunities	Saya dapat mengidentifikasi adanya peluang dengan cepat.
8.	I am always looking for better ways to do things	Saya selalu mencari cara yang lebih baik untuk mengerjakan. Sesuatu
9.	If I believe in an idea, no obstacle will prevent me from making it happen	Jika saya yakin pada sebuah gagasan, tidak akan ada yang dapat menghalangi saya untuk mewujudkannya

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| 10. I can spot a good opportunity long before others can | Saya dapat melihat peluang baik, jauh sebelum orang lain dapat melihatnya. |
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Data analysis

The Rasch model estimates the interaction between person ability and item difficulty on a common logit scale (Bond & Fox, 2015). Unlike Classical Test Theory, the Rasch model provides detailed item-level diagnostics, evaluates rating scale functioning, and enables invariant measurement across different samples. Since all items used a Likert-type response format, the Rating Scale Model (RSM) was applied. The RSM assumes a uniform category structure across items and is appropriate when response categories are consistent throughout the instrument. The analysis consist measurement model, item and person fit, reliability, dimensionality and category functioning. Data analysis was conducted using the Winsteps 3.73 software (Linacre, 2011). The estimation procedure employed Joint Maximum Likelihood Estimation (JMLE), which simultaneously estimates person ability and item difficulty parameters on a common logit scale.

Results and Discussion

The psychometric evaluation in this study was conducted comprehensively to assess multiple aspects of measurement quality, including reliability, item fit, dimensionality, rating scale functioning, and measurement invariance through Differential Item Functioning (DIF). This multi-faceted approach ensures a more robust evaluation of the PPS compared to conventional validation techniques.

Descriptive Statistics

Table 1 shows that the proactive personality scale item varies with the average of the item being 0.00 and the standard deviation approaching the value of 1 logit (0.67). The person reliability coefficient (0.77) reflects acceptable consistency in respondents' ability estimates, whereas the item reliability coefficient (0.98) demonstrates outstanding stability of item difficulty calibrations, indicating a high level of measurement precision (Bond & Fox, 2015; Boone et al., 2014). Furthermore, the strong interaction between persons and items is supported by the Cronbach's alpha value of 0.81, which suggests good internal consistency.

Tabel 2. Summary Statistics

	<i>Person</i>	<i>Items</i>
N	307	10
Measures (logit)		
<i>Mean</i>	1.72	0.00
<i>Standar deviation (SD)</i>	1.30	0.67
<i>Standard error (SE)</i>	0.07	0.22
Outfit Mean Square		
<i>Mean</i>	1.03	1.03
<i>SD</i>	0.89	0.24
Separation	1.84	6.58
Reliability	0.77	0.98
Alpha Cronbach		0.81
Chi-Square		5535.08**
Raw variance explain by measure		44.1%

**p<0.01, source: table created by authors

Dimensionality and local independence

Dimensionality and local independence were used as assumption checks for the data fit to Rasch model analysis. The proactive personality scale has a good measurement of unidimensionality by meeting the requirements above 40% (44.1%) (Sumintono & Widhiarso, 2014). This means that these items are effectively able to measure proactive personalities. The *mean-square outfit* value between the person and the item is 1.03, supported by a significant chi-square level indicating that the data fit the model (Bond & Fox, 2015). The range of standardized residual correlations for all items are between -0.33 to 0.34, which is considered as low dependency according to Linacre (2011), thus the responses of all items are fairly independent of each other responses.

Item Fit Statistic

Tabel 3. Item Properties for the Indonesia PPS

Item	Logit	SE	MNSQ	PTME
9	1.08	0.08	1.18	0.62
10	0.92	0.08	1.04	0.63
6	0.58	0.09	1.3	0.55
7	0.36	0.9	0.8	0.65
3	-0.05	0.09	1.56	0.55
5	-0.32	0.1	0.93	0.64
2	-0.47	0.1	0.75	0.65
4	-0.5	0.1	1.06	0.57
8	-0.55	0.1	0.78	0.59
1	-1.04	0.1	0.92	0.59

source: Personal data

Based on the psychometric attribute shown (Table 3), the PPS met the required measurement criteria. Most items demonstrated acceptable fit statistics within the recommended range (Outfit MNSQ= 0.5-1.5). However, item 3 showed a slightly elevated Outfit MNSQ (1.56), marginally exceeding the upper threshold. Given that, the deviation was minimal, and other indicators, including Point Measure Correlation and Infit Statistics, remained within acceptable limits, thus, the item was retained for further analysis.

Rating scale analysis

Tabel 4. Category Probabilities

Respon Category	Frequency	Presentage	Average Measure	Outfit MNSQ	Step
1 (Strongly disagree)	30	1	-0.10	2.62	NONE
2 (Disagree)	128	4	-0.24	1.05	-2.06
3 (Neutral)	647	21	+0.59	0.93	-1.42
4 (Agree)	1555	51	+1.73	0.94	+0.31
5 (Strongly agree)	710	23	+3.16	0.95	+3.17

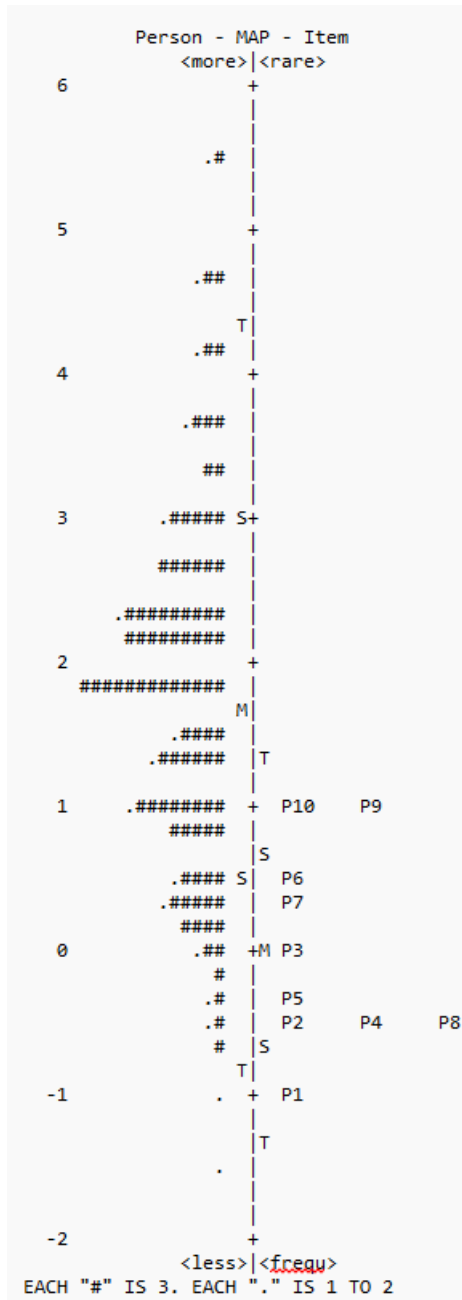
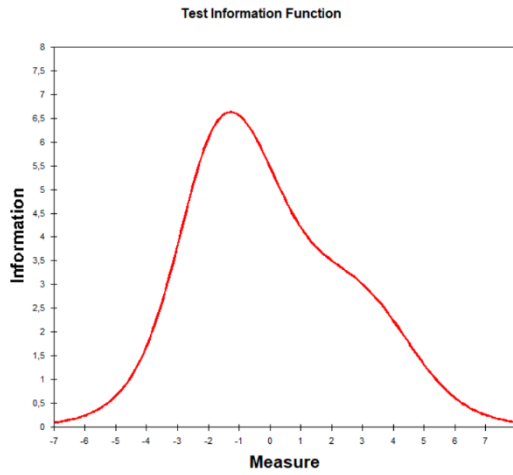
Source: *summary of category structure*

The rating scale is ranged from 1 (strongly disagree) to 5 (strongly agree). The estimated thresholds for the five-point scale were -1.10 , -0.24 , $+0.59$, $+1.73$, and $+3.16$, indicating properly ordered categories. As shown in Table 4, the observed average measures increased monotonically with higher rating categories, progressing from -0.10 to $+3.16$. However, a decline of score between rating categories 1 and 2 indicates that it is necessary to consider simplifying the choice of answers. This issue was further supported by the MNSQ outfit value being above the limit value of 2.62.

Wright Map

Wright Map was used to visualize the specific location of the items and person separated by logit value. The map shows that many items were on -1 to $+1$ logit compared to distribution of the person ability from -1 to $+6$ logit, which means that the items are suitable to measure a person with low to moderate proactive personality. The Wright Map shows a person distribution centered significantly higher (approx. $+2$ logits) than the item distribution (centered around $0-1$ logits). This indicates a ceiling effect where the current sample cannot distinguish individuals with high levels of proactive personality. This suggests that the items capture routine proactive behaviors but yet to capture high-stakes or extreme proactivity behaviors.

The Test Information Function (TIF) was examined to determine the range of the latent trait where the instrument provides the highest measurement precision. The TIF peaks at approximately -1.2 logits, reaching a maximum information value of 6.6. This indicates that the scale is mathematically most reliable at measuring individuals with slightly below-average levels of proactive personality. As the person measure increases toward the sample's actual mean (2 logits), the information curve drops significantly.



Differential Item Functioning Analysis

The detection of item bias by gender, education level, and type of organization for the proactive personality scale is presented in Table 5. The results indicate that Item 3 exhibits gender bias. However, at the level of education and type of organization, there is no bias. Item 3 showed a DIF contrast of -0.44 logits with a Welch t statistic of -2.29 ($p = .0226$). The negative contrast indicates that at the same level of proactive personality, the item was significantly easier for men compared to women.

Tabel 5. *Differential Item Functioning PPS*

Item	Probability		
	Gender	Level of Education	Type of Organization
1	.6692	.3321	.3463
2	.6034	.7153	.8620
3	.0227	.3444	.1492
4	.4755	.5953	.5254
5	.0716	.7924	.3249
6	.1426	.6562	.5006
7	.3312	.9194	.9500
8	.1850	.4016	.5095
9	.1347	.9331	.0773
10	.7598	.0554	.4589

Source: Personal data

Discussion

The present study seeks to validate the Proactive Personality Scale (PPS) using the Rasch measurement model and contributes to the literature by providing a more comprehensive and rigorous psychometric evaluation of the Indonesian version of the instrument. The findings overall support the psychometric adequacy of the adapted scale, as indicated by satisfactory reliability indices for both persons and items, suggesting that the instrument effectively distinguishes individuals across varying levels of proactive personality. However, beyond confirming adequacy, the application of Rasch modeling allows for a deeper examination of how the construct is operationalized and functions within a specific cultural and organizational context.

In contrast to prior studies in the Indonesian context, which have predominantly relied on Classical Test Theory (CTT), this study advances the validation process by offering a more granular and theory-driven evaluation of measurement properties. While CTT-based approaches typically emphasize internal consistency and factor structure, they are limited in assessing item-level functioning, measurement invariance, and the transformation of ordinal data into interval-level measures (Christensen & Ammentorp, 2024; Verdú-Soriano et al., 2024). Rasch modeling, by comparison, enables invariant measurement and provides a more precise understanding of both item difficulty and person ability, thereby strengthening construct validity and measurement precision. This is consistent with recent developments in psychometric research emphasizing the superiority of Rasch approaches in producing interval-level measurement and ensuring robustness across contexts (Akram et al., 2025; Ifdil et al., 2024).

The evidence of unidimensionality, with 44.1% of the variance explained, supports the theoretical assumption that proactive personality is characterized by a dominant latent trait. However, the remaining unexplained variance suggests the possibility of minor secondary dimensions, indicating that proactive personality may not be entirely homogeneous. From a theoretical perspective, this aligns with recent findings that psychological constructs may exhibit contextual variability depending on situational and cultural influences (Saputra et al., 2023).

Importantly, the Rasch analysis revealed nuanced measurement issues that would likely remain undetected under CTT frameworks. For instance, the marginal misfit observed in Item 3 highlights potential variability in how respondents interpret expressions of personal enthusiasm within organizational contexts. Rather than indicating a measurement failure, this misfit may reflect subtle socio-cultural differences in the expression of proactive behavior. Recent literature suggests that minor misfit should be interpreted cautiously within its theoretical and contextual background rather than treated as purely statistical anomalies (Gage & Nisly, 2022).

The high item reliability (0.98) indicates strong stability of the item difficulty hierarchy, suggesting that the PPS items are well distributed along the proactive personality continuum and are likely to maintain their relative ordering across comparable samples. This supports the structural robustness of the construct in the Indonesian organizational context. Meanwhile, the person reliability value (0.77) suggests that the scale distinguishes respondents into approximately two or three strata of proactive personality levels. Although this level of discrimination is acceptable for research purposes, it also indicates that the instrument may have limited precision when applied in high-stakes individual assessment contexts (Bond & Fox, 2015).

In terms of rating scale functioning, although the five response categories exhibited ordered thresholds and logical progression, the observed irregularity between the lowest categories indicates that respondents may experience difficulty distinguishing between similar response options. This finding is consistent with recent psychometric evidence showing that poorly functioning categories can reduce measurement precision and should be empirically evaluated rather than assumed effective (Asamoah et al., 2025). Consequently, simplifying the response format may improve category functioning and enhance overall measurement accuracy.

The Wright Map further supports the construct validity of the scale by illustrating the alignment between person abilities and item difficulties on a common logit scale (Bond & Fox, 2015). This visualization provides important insights into how well the items target the distribution of respondents' proactive personality levels. However, the observed distribution suggests a potential ceiling effect, indicating that the current set of items is more effective in capturing low to moderate levels of proactive personality but less sensitive to higher levels of the trait. This limitation is consistent with recent Rasch-based studies emphasizing the importance of item targeting to ensure measurement precision across the full latent continuum (Suherman, Yuliani, & Prabowo, 2025). More specifically, the Wright Map reveals that the scale has limited ability to distinguish individuals with high levels of proactive personality from one another. The easiest item to endorse is P1 ("I always want to seek new ways to increase my quality of life"), which may reflect general self-improvement tendencies rather than core proactive personality characteristics, and therefore can be endorsed at relatively high levels by most respondents. In contrast, the most difficult items to endorse are P9 ("If I am sure of an idea, nobody is able to prevent me from doing it") and P10 ("I can see a good opportunity far before others could see it"). These items require respondents to evaluate themselves in comparison to others, which introduces additional cognitive and social judgment demands. As a result, such items may be perceived as more difficult to agree with, not only due to their content but also due to potential influences of social comparison and self-evaluation bias. Taken together, this pattern suggests that while the PPS captures general proactive tendencies effectively, it may require further refinement to better represent more advanced or high-level expressions of proactive personality, particularly in organizational contexts where such behaviors may manifest in more complex and strategic forms.

Additionally, the Differential Item Functioning (DIF) analysis revealed potential gender-related bias in Item 3. This finding indicates that respondents with equivalent levels of proactive personality may respond differently depending on gender, likely reflecting broader socio-cultural influences. Recent Rasch-based research emphasizes that DIF analysis is essential to ensure fairness, measurement invariance, and cross-group comparability, particularly in organizational and cross-cultural settings (Zeileis, Strobl, Wickelmaier, & Komboz, 2024).

Taken together, these findings reinforce the added value of Rasch analysis as a complementary approach to traditional validation methods. By enabling a more detailed and diagnostic evaluation of measurement instruments, Rasch modeling allows researchers to identify subtle sources of bias, category dysfunction, and measurement imprecision that may not be detected using conventional approaches. As highlighted in recent literature, Rasch modeling plays a critical role in advancing psychometric practices by supporting the development of more precise, fair, and contextually appropriate measurement tools (Verdú-Soriano et al., 2024).

From a practical perspective, the findings suggest that the Indonesian version of the PPS can be used as a useful tool for assessing proactive behavior tendencies in organizational contexts and may inform employee development and selection processes. However, several limitations should be acknowledged. The use of self-report measures may introduce common method bias (Podsakoff et al., 2003, 2012), and the cross-sectional design limits causal interpretation. Future research is encouraged to employ longitudinal designs, incorporate multi-method approaches, and involve more diverse samples to further strengthen the generalizability and robustness of the findings.

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