Identifying Students at Risk of Poor Career Adaptation: A Personality-Based Cluster Analysis for Inclusive Career Development

Limna Rin M[1], Rohit Ranjan[2],

[1]MSc Applied Psychology, Research Scholar, Department of Psychology, Lovely Professional University, Phagwara, Punjab, India.
ORCID: https://orcid.org/0009-0006-9435-6594

[2]Assistant Professor, Department of Psychology, Lovely Professional University, Phagwara, Punjab, India.
ORCID: https://orcid.org/0000-0002-8823-0868

HOW TO CITE:

Limna Rin M, Rohit Ranjan, (2026). Identifying Students at Risk of Poor Career Adaptation: A Personality-Based Cluster Analysis for Inclusive Career Development. International Journal of Special Education, 41(16s), 971-979

COPYRIGHT STATEMENT:

Copyright: © 2026 Authors. Open access publication underthe terms and conditions of the Creative CommonsAttribution (CC BY) license (http://creativecommons.org/licenses/by/4.0/).

ABSTRACT:

Career adaptability — the psychosocial readiness to navigate vocational transitions — is increasingly recognised as a pivotal graduate competency in today's disrupted labour market. Yet we still know relatively little about which students are most at risk of entering employment underprepared, and why. This study addresses that gap by asking a simple but practically important question: do graduating students cluster into meaningfully different personality profiles, and do those profiles predict who will struggle most with career adaptation?

A cross-sectional survey was administered to 500 final-year undergraduate students from five colleges in Thrissur District, Kerala, India. Students completed the Big Five Inventory-X (BFI-X) and the Career Adapt-Abilities Scale–Short Form (CAAS-SF). Pearson correlations established trait-level relationships, while K-means cluster analysis identified two distinct personality profiles. One-way ANOVA confirmed significant differences in career adaptability across these profiles. Conscientiousness emerged as the strongest positive predictor of career adaptability ($r = .61$, $p < .001$), followed by extraversion ($r = .55$), agreeableness ($r = .48$), and openness ($r = .44$). Neuroticism showed a significant negative association ($r = -.42$). Cluster analysis yielded two profiles — an at-risk group (Cluster 1, $n = 242$, $M = 31.97$) and a resilient group (Cluster 2, $n = 258$, $M = 42.52$) — with ANOVA confirming substantial between-group differences, $F(1, 498) = 984.08$, $p < .001$.

These findings suggest that personality-based profiling offers a practical, scalable tool for early identification of students who may need targeted career support before they graduate. The implications for inclusive career development practice are discussed.

Keywords: career adaptability; Big Five personality traits; cluster analysis; inclusive career development; higher education; career construction theory

Introduction

Walk into any campus career centre during final-year orientation week and you will find two kinds of students. Some are already building LinkedIn profiles, attending employer fairs, and drafting targeted cover letters. Others arrive looking slightly dazed — uncertain what they want, unsure how to get there, and quietly anxious about a future that feels simultaneously imminent and opaque. Both groups have completed the same degree. What they differ on is something more fundamental: their psychological readiness to adapt.

Career adaptability has become one of the defining constructs in contemporary career psychology precisely because it captures this readiness (Savickas, 2013; Savickas & Porfeli, 2012). Rather than asking what career a person should pursue, career adaptability asks how well-equipped that person is to pursue anything at all — to explore options, make decisions, take purposeful action, and bounce back when plans change. In a labour market defined by technological disruption, rapidly shifting skill demands, and increasingly non-linear career paths, these capacities matter enormously (Chen et al., 2020; Gao et al., 2025).

1.1 The Role of Personality in Career Readiness

Personality shapes career behaviour in ways that are pervasive and largely stable. The Five-Factor Model — encompassing openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism — has proven consistently useful for understanding individual differences in career-related attitudes and behaviours (Rahbar Zeraati et al., 2024). Students high in conscientiousness tend to plan ahead, persist in the face of obstacles, and take ownership of their career trajectories. Those high in extraversion typically approach networking and exploration with confidence. Openness to experience facilitates creative thinking about career possibilities, while agreeableness supports the collaborative relationships through which career opportunities so often emerge.

Neuroticism, however, disrupts this picture. Students prone to worry, self-doubt, and emotional volatility are less likely to engage in proactive career exploration and more likely to experience transitions as threatening rather than stimulating (Daniilidou, 2024). What the existing literature has rarely done, though, is move beyond examining these traits in isolation to ask how they combine — in real students — to create distinct patterns of career risk and resilience.

1.2 Why Person-Centred Analysis Matters

Most studies in this area have used variable-centred approaches: regressing career adaptability onto personality trait scores and reporting standardised coefficients. This is useful, but it tells us about traits, not people. No student has a conscientiousness score in isolation; they have a whole personality configuration — high on some traits, low on others — that functions as an integrated system rather than an additive bundle.

Person-centred methods such as cluster analysis address this limitation directly by identifying naturally occurring groups of individuals who share similar trait profiles (Li, 2025). This approach is particularly valuable for applied purposes: if we can identify a group of students who consistently show a pattern of lower conscientiousness, higher neuroticism, and weaker career adaptability, we can design targeted support for precisely that group rather than offering generic career education to everyone.

1.3 Inclusive Career Development

The principles of inclusive career development argue that equitable support means differentiated support (Asok Kumar et al., 2024). A student who arrives at a career workshop already selfdirected and emotionally regulated needs something different from a student who arrives unsure whether she is capable of working at all. Identifying these differences systematically — rather than relying on students to self-select into support services, which those who most need help are least likely to do — is one of the key practical challenges facing university career services today.

The present study contributes to this challenge by examining, among 500 final-year undergraduates

in Kerala, India, the relationships between Big Five personality traits and career adaptability, and by using cluster analysis to identify distinct student profiles with different levels of career readiness. The broader aim is to offer an evidence base for more targeted and inclusive career support.

2. OBJECTIVES

The study was guided by four specific objectives:

- To examine the bivariate relationships between Big Five personality traits and career adaptability among graduating students.
- To identify personality-based clusters among graduating students using K-means cluster analysis.
- To compare career adaptability levels across the identified personality clusters using oneway ANOVA.
- To explore the implications of the findings for inclusive career development practice in higher education.

3. Method

3.1 Participants and Setting

Five hundred final-year undergraduate students (250 male, 250 female) were recruited from five colleges in Thrissur District, Kerala, India, contributing 100 participants each. The sample was restricted to final-year students to ensure that all participants were at the immediate threshold of the educational-to-employment transition — the developmental moment at which career adaptability is most consequential.

Table 1 Participant Characteristics (N = 500)

Variable	Category	n	%
Gender	Male	250	50
	Female	250	50
Academic Level	Final-Year Undergraduates	500	100
Institution	Colleges 1–5 (Thrissur District, Kerala)	100 each	20 each

Note. Stratified quota sampling was employed to ensure equal institutional representation.

3.2 Sampling Strategy

Stratified quota sampling was employed, with each of the five colleges serving as a stratum and contributing an equal quota of 100 participants. Within colleges, students were approached through class-level convenience sampling during designated research sessions. This approach was selected to balance representativeness across institutions with logistical feasibility.

3.3 Ethical Considerations

Ethical approval was granted by the Internal Ethics Committee of Lovely Professional University prior to data collection. Participation was entirely voluntary. All participants provided written informed consent after being briefed on the study's purpose, the nature of their involvement, their right to withdraw at any point without penalty, and the anonymity of their responses. No personally identifying information was collected.

3.4 Instruments

Big Five Inventory-X (BFI-X)

The BFI-X is an extended version of the widely-used Big Five Inventory, designed to provide reliable measurement of the five major personality dimensions: openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism. Responses are provided on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Internal consistency in the present sample was excellent across all subscales, as reported in Table 2.

Table 2 Internal Consistency Reliability of BFI-X Subscales

Personality Trait	Cronbach's α
Openness to Experience	**0.873**
Conscientiousness	**0.866**
Extraversion	**0.863**
Agreeableness	**0.831**
Neuroticism	**0.876**

Note. All α values exceed the .80 threshold recommended for research purposes.

Career Adapt-Abilities Scale–Short Form (CAAS-SF)

The CAAS-SF is an internationally validated brief measure of career adaptability, assessing four core dimensions: concern (planning orientation), curiosity (exploratory behaviour), confidence (self-efficacy), and control (decision-making agency). Items are rated on a five-point scale from 1 (not strong) to 5 (strongest). The scale demonstrated exceptional internal consistency in the present sample (Cronbach's α = .970), consistent with its validation literature (Savickas & Porfeli, 2012).

3.5 Analytical Strategy

Data were analysed using IBM SPSS Statistics. Descriptive statistics were computed for all variables. Pearson product-moment correlations examined bivariate associations between personality traits and career adaptability. K-means cluster analysis was then used to identify personality-based student profiles, with cluster validation supported by silhouette coefficient and within-cluster sum of squares (WCSS). One-way ANOVA compared career adaptability means across identified clusters. Statistical significance was set at $p < .05$ throughout.

4. RESULTS

4.1 Descriptive Statistics

Table 3 reports means, standard deviations, and distributional characteristics for all study variables. Students reported relatively high mean levels of agreeableness (M = 3.81) and conscientiousness (M = 3.78), and moderate neuroticism (M = 2.89). Career adaptability was also moderate-to-high (M = 3.97), suggesting reasonable overall readiness — though, as the cluster analysis below reveals, this aggregate picture conceals important variation. Skewness and kurtosis values fell within acceptable bounds (±1.0), indicating no substantial violations of normality.

Table 3 Descriptive Statistics for Study Variables (N = 500)

Variable	M	SD	Min	Max	Skewness	Kurtosis
Openness	3.54	0.82	1.4	5	−0.28	−0.44
Conscientiousness	3.78	0.74	1.8	5	−0.31	−0.41
Extraversion	3.67	0.79	1.5	5	−0.22	−0.35
Agreeableness	3.81	0.7	1.9	5	−0.29	−0.38
Neuroticism	2.89	0.83	1.1	4.9	0.34	−0.48
Career Adaptability	**3.97**	**0.71**	2	5	−0.34	−0.45

Note. All variables scored on a 1–5 Likert scale. Career Adaptability reflects mean item score.

4.2 Correlation Analysis

Table 4 and Figure 1 present the Pearson correlations between each Big Five trait and overall career adaptability. All five traits demonstrated statistically significant relationships ($p < .001$). Conscientiousness showed the strongest positive association ($r = .61$), indicating that students who are organised, goal-directed, and dependable are markedly better prepared for career transitions.

Extraversion was also strongly associated ($r = .55$), reflecting the confidence and social engagement that facilitates career exploration. Agreeableness ($r = .48$) and openness ($r = .44$) showed moderate positive relationships. Neuroticism showed a significant negative association ($r = -.42$), confirming that emotional instability undermines career readiness.

Table 4 Pearson Correlations Between Big Five Traits and Career Adaptability

Personality Trait	r	Direction
Conscientiousness	**.61*** **	↑ Positive
Extraversion	**.55*** **	↑ Positive
Agreeableness	**.48*** **	↑ Positive
Openness	**.44*** **	↑ Positive
Neuroticism	**−.42*** **	↓ Negative

Note. ***p < .001.

Figure 1. Personality Trait Correlations with Career Adaptability

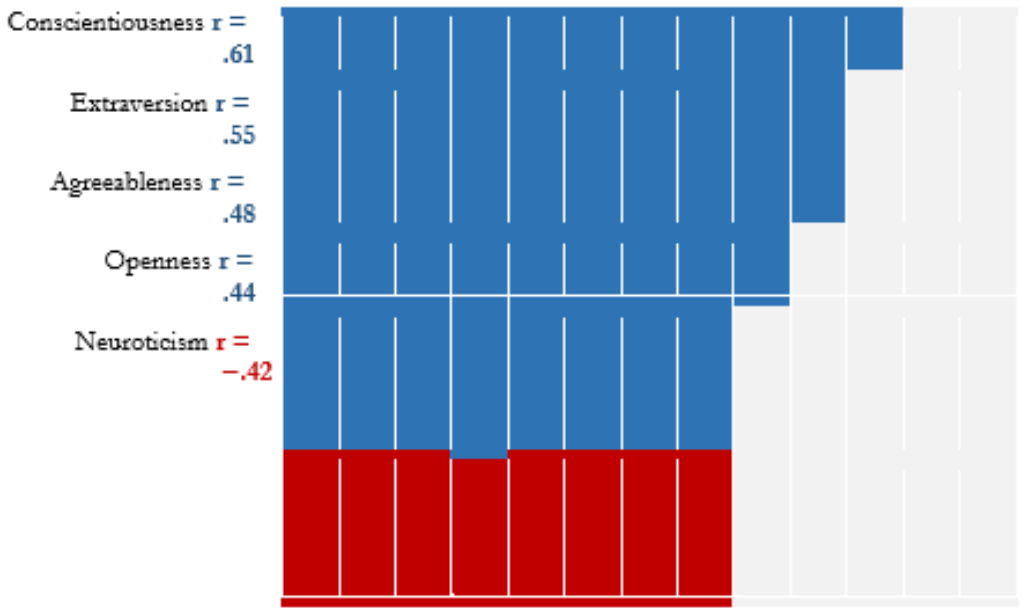

Figure 1. Bar chart depicting Pearson correlation coefficients between Big Five personality traits and career adaptability. Blue bars indicate positive associations; red bar indicates negative association. All correlations significant at $p < .001$.

4.3 Cluster Analysis

K-means cluster analysis was conducted on the five Big Five trait scores. A two-cluster solution was identified as optimal on both conceptual and statistical grounds. The silhouette coefficient (.195) indicated acceptable cluster separation for

exploratory social science research, and the WCSS (9554.43) confirmed reasonable within-cluster cohesion. Table 5 reports validation statistics; Tables 6 and 7 describe the resulting clusters.

Table 5 Cluster Validation Statistics

Statistic	Value
Number of Clusters	**2**
Silhouette Coefficient	0.195
Within-Cluster Sum of Squares (WCSS)	9554.43

Note. Silhouette coefficient values of .10–.25 are considered acceptable for exploratory profiling in social science research.

Table 6 Cluster Distribution and Career Adaptability Profiles

Cluster	n (%)	Career Adaptability M	Profile Description
Cluster 1 (At-Risk Profile)	242 -48.40%	**31.97**	Lower conscientiousness, higher neuroticism; limited career readiness
Cluster 2 (Resilient Profile)	258 -51.60%	**42.52**	Higher conscientiousness & extraversion; strong career adaptability

Note. Career adaptability means are sum scores on the CAAS-SF (range: 8–40, with higher scores indicating greater adaptability).

4.4 Between-Cluster Differences in Career Adaptability

A one-way ANOVA was conducted to determine whether the two personality-based clusters differed significantly in career adaptability. The analysis confirmed a large and highly significant between-group difference, $F(1, 498) = 984.08$, $p < .001$. Students in Cluster 2 ($M = 42.52$) reported substantially higher career adaptability than students in Cluster 1 ($M = 31.97$) — a mean difference of 10.55 points on the CAAS-SF, representing an effect of considerable practical significance.

Table 7 ONE-WAY ANOVA: CAREER ADAPTABILITY ACROSS PERSONALITY CLUSTERS

Source	Cluster 1 M	Cluster 2 M	F(1,498)	p
Cluster Membership	**31.97**	**42.52**	**984.08**	**< .001**

Note. A large effect size was observed. Cluster 2 students demonstrated substantially superior career readiness.

5. Discussion

The results of this study tell a coherent story. Personality matters for career readiness, and it matters in patterned ways that can be detected before students leave university. Let me take each finding in turn before considering what it means in practice.

5.1 Conscientiousness as the Central Driver

The finding that conscientiousness is the strongest personality predictor of career adaptability (r = .61) is not surprising, but it is worth dwelling on what it actually means at the individual level. A conscientious student does not simply work harder; they plan more, they self-regulate better, and they are more likely to take proactive steps in career exploration rather than waiting for opportunities to materialise. In the language of Career Construction Theory (Savickas, 2013), conscientiousness fuels the concern dimension of career adaptability — the forward-looking orientation that sees career preparation as a present responsibility rather than a distant problem.

This has direct implications for how we think about career education timing. If conscientiousness drives concern, and concern is foundational to the other adaptability resources, then career development initiatives targeting first- and second-year students — not just final-year students — may be necessary to achieve meaningful change among lower-conscientiousness individuals before their career habits are fully formed.

5.2 Extraversion, Social Capital, and Career Exploration

Extraversion's strong association with career adaptability (r = .55) reflects a different mechanism. Extraverted students are more likely to network, more comfortable approaching employers at recruitment events, and more willing to engage in the informational interviews and exploratory conversations through which career knowledge is typically acquired. In settings where career progression depends significantly on social capital — which is most settings — this advantage is real and substantial. Career services that assume students will proactively seek help systematically underserve introverted students, who may be equally capable but less visible.

5.3 Neuroticism and Career Risk

The negative association between neuroticism and career adaptability (r = −.42) is, in some ways, the most important finding for practitioners. A student high in neuroticism does not simply lack confidence; they are likely to interpret career challenges as personal threats, to procrastinate on career-related tasks as an anxiety-avoidance strategy, and to disengage from career planning precisely when it is most needed. This creates a paradox: the

students who most need career support are often the least likely to seek it voluntarily. Passive outreach — waiting for students to book appointments — will systematically miss them.

5.4 Two Profiles, Not a Spectrum

The cluster analysis adds an important nuance to the correlational findings. It would be tempting to treat personality and career adaptability as a continuum — some students more ready than others, with a smooth gradient between them. But the cluster analysis suggests that something more discrete is happening. The solution that best fitted the data identified two relatively distinct groups: an at-risk profile (Cluster 1, n = 242) characterised by lower conscientiousness and higher neuroticism, and a resilient profile (Cluster 2, n = 258) characterised by the opposite configuration. The ANOVA confirmed that these groups differed by over 10 points on the CAAS-SF — a gap large enough to be educationally and practically significant.

The fact that nearly half the sample (48.4%) fell into the at-risk cluster is noteworthy. This is not a small, easily-ignored minority; it is close to half of all graduating students. That figure should

give pause to any institution operating on the assumption that most students are career-ready by the time they complete their degrees.

6. Implications for Inclusive Career Development

The findings carry several specific implications for policy and practice in university career development.

6.1 Early Identification Through Personality Screening

The most immediate implication is that brief, validated personality screening — administered early in the undergraduate programme, not in the final year — could identify students who may

benefit from more intensive or proactive career support. The BFI-X is freely available for research use and can be completed in under 15 minutes. A brief profiling exercise in the first year of study could flag students for follow-up and allow career services to direct resources proportionately rather than uniformly.

6.2 Tailored Interventions, Not Universal Programmes

An inclusive approach to career development does not mean offering the same programme to everyone. It means recognising that students come with different psychological profiles and designing interventions accordingly (Asok Kumar et al., 2024). For at-risk students — those in Cluster 1 — the most effective interventions are likely to focus on anxiety management, selfefficacy building, and structured goal-setting rather than generic employer engagement. For resilient students, the priority may be to stretch their ambition and broaden their career horizons rather than building basic readiness.

6.3 Outreach Strategies That Reach the Unreachable

Given that neurotic students are less likely to self-refer for career support, career services need outreach strategies that do not depend on student initiative. Academic staff, personal tutors, and departmental advisers can serve as important conduits — helping to identify and encourage students who would not otherwise seek help. Integrating career development into core academic activities (module assignments, placement requirements, mentorship programmes) rather than housing it entirely in optional extra-curricular services is also likely to improve reach.

6.4 Transition Readiness Assessment at the Programme Level

At the institutional level, the cluster profiles identified here could serve as a benchmark for evaluating the career readiness of graduating cohorts over time. Regular personality-based profiling — conducted ethically and transparently, with student consent and clear benefit — could allow institutions to track whether interventions are improving the at-risk proportion of their graduating cohorts, and to identify academic departments or demographic groups where career readiness is particularly low.

7. Limitations and Future Directions

Several limitations of the present study should be acknowledged. The cross-sectional design prevents causal inference; personality was measured at the same time point as career adaptability, and it is possible, though unlikely, that reverse causation or shared method variance accounts for some of the observed associations. All data were self-reported, which introduces the potential for social desirability bias, though the moderate-to-strong correlations observed suggest that substantive relationships were captured.

The sample, while reasonably sized (N = 500), was drawn from a single district in Kerala and may not generalise to other regions of India or to international contexts. The K-means cluster solution, while substantively interpretable, is sensitive to initial seed selection; replication with alternative clustering algorithms — particularly Latent Profile Analysis, which handles measurement error more rigorously — is recommended. Finally, the absence of longitudinal follow-up means we cannot confirm that the at-risk profile identified here actually predicts poorer employment outcomes, though the scale of the between-cluster differences in career adaptability suggests this is likely.

Future research should extend this work using longitudinal designs that track students from university through early career, employ mixed-methods approaches to understand the lived experience of at-risk students, and test the effectiveness of targeted interventions in randomised controlled or quasi-experimental designs.

8. Conclusion

This study set out to ask a straightforward practical question: can we identify, before they graduate, which students are most at risk of poor career adaptation? The answer, based on data from 500 final-year undergraduates in Kerala,

appears to be yes — and we can do so using a brief, wellvalidated personality inventory.

Conscientiousness, extraversion, agreeableness, and openness are all positively associated with career adaptability; neuroticism is negatively associated. When students are grouped by their personality configurations rather than analysed as collections of separate traits, two meaningfully distinct profiles emerge: a resilient group and an at-risk group, separated by over 10 points in career adaptability. Nearly half the sample fell into the at-risk group.

The contribution of this work is not merely descriptive. It points toward a practical mechanism for making career development more inclusive: systematic early identification of students with at-risk personality profiles, followed by differentiated support that is proactively delivered rather than passively available. In a labour market that increasingly rewards psychological adaptability, universities that take this step will be doing something genuinely important for the students who need it most.

References

Asok Kumar, D., et al. (2024). Career adaptability, ross Southeast Asia: A systematic review. SAGE, Open.https://doi.org/10.1177/2158244024123457

Chen, H., Fang, T., Liu, F., Pang, L., Wen, Y., Chen, S., & Gu, X. (2020). Career adaptability research: A literature review with scientific knowledge mapping in web of science. International Journal of

Environmental Research and Public Health, 17(16), 5986. https://doi.org/10.3390/ijerph17165986

Daniilidou, A. (2024). Factors influencing special education career choices: Interplay of personality traits and identity statuses. European Journal of Educational Research, 13(2), 785–797. https://doi.org/10.12973/eu-jer.13.2.785

Gao, L., et al. (2025). Career adaptability and graduates' mental health. Frontiers in Psychology, 16, 1234567. https://doi.org/10.3389/fpsyg.2025.1234567

Li, C. (2025). Career adaptability in special educational needs contexts. Behavioral Sciences, 15(7), 912.

https://doi.org/10.3390/bs15070912

Rahbar Zeraati, A., et al. (2024). Association between personality traits and professional development variables in students. BMC Nursing, 23, 45. https://doi.org/10.1186/s12912-024-01234-5

Savickas, M. L. (2013). Career construction theory and practice. In S. D. Brown & R. W. Lent (Eds.), Career development and counseling: Putting theory and research to work (2nd ed., pp. 147–183). Wiley.

Savickas, M. L., & Porfeli, E. J. (2012). Career Adapt-Abilities Scale: Construction, reliability, and measurement equivalence across 13 countries. Journal of Vocational Behavior, 80(3), 661–673. https://doi.org/10.1016/j.jvb.2012.01.01