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The role of entrepreneurship education in shaping self-employment intentions: a TPB-based study of Malaysian TVET students

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ABSTRACT

Entrepreneurship education prepares technical and vocational education and training (TVET) students with the competencies and entrepreneurial mindset required for future business endeavors. Guided by the theory of planned behavior (TPB), this study examines how such education shapes students' self-employment intentions (SEI). A quantitative survey was administered to 300 undergraduates at Universiti Teknikal Malaysia Melaka (UTeM), and the data were analyzed using correlation and regression methods. The results show that entrepreneurial intention is positively linked to attitude toward behavior (r=0.474), entrepreneurship education (r=0.416), subjective norms (r=0.374), and perceived behavioral control (r=0.346), with attitude identified as the most influential predictor, accounting for 22.4% of the variance. These outcomes emphasize the centrality of individual motivation and the enabling role of entrepreneurship education in cultivating entrepreneurial aspirations. The study highlights the strategic importance of embedding stronger entrepreneurship curricula in TVET institutions to enhance self-employment readiness and support national goals for workforce development and economic resilience. The findings resonate with Malaysia's National Entrepreneurship Policy 2030 and the TVET empowerment agenda, pointing to the value of initiatives such as campus incubators, seed funding, and mentorship in transforming entrepreneurial intention into tangible venture creation.

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1. INTRODUCTION

Entrepreneurship education is increasingly recognized as a key driver of economic growth, social mobility, and innovation [1], [2]. In the face of global economic uncertainty, rising youth unemployment, and the transition to knowledge-based industries, equipping individuals with entrepreneurial competencies has become increasingly crucial. Entrepreneurship education cultivates the skills, mindset, and confidence necessary to identify opportunities, take calculated risks, and establish sustainable ventures. It is pivotal in transforming job seekers into creators, contributing to long-term national development and economic resilience [3], [4].

Technical and vocational education and training (TVET) institutions are strategically positioned to advance this agenda. With a strong focus on practical, industry-relevant training, TVET institutions cultivate technical expertise while remaining aligned with labor market demands. The integration of entrepreneurship education within TVET bridges the gap between technical proficiency and business acumen [5], enabling students to succeed in existing employment sectors and pursue self-employment as a viable and empowering career path.

Entrepreneurship education within TVET settings prioritizes practical application through project-based learning, problem-solving exercises, and the cultivation of transferable skills such as creativity, adaptability, leadership, and resilience. These competencies are widely regarded as fundamental to entrepreneurial achievement [6]. Despite its importance, research examining the effectiveness of entrepreneurship education in vocational contexts remains limited. Most existing scholarship focuses on conventional academic institutions, often neglecting students' distinct needs, aspirations, and circumstances in TVET programs [7].

This present study seeks to fill an empirical and contextual gap by considering TVET students in Malaysia, which has not been accorded due regard in entrepreneurship literature. While the theory of planned behavior (TPB) has been applied widely in mainstream literature on higher education, its application in technical and vocational education remains underexplored [8], particularly in the Southeast Asian context. TPB outlines three psychological antecedents of intention: entrepreneurial attitude, subjective norms, and perceived behavioral control [9]. The current study analyses how these antecedents, shaped by formalized entrepreneurship education, shape self-employment intention (SEI) among TVET students at Universiti Teknikal Malaysia Melaka (UTeM). The findings have the potential to inform curriculum refinement, policy framework, and program delivery, and contribute toward inclusive and innovation-based entrepreneurial development.

2. LITERATURE REVIEW

2.1. Entrepreneurship education and economic development

Entrepreneurship education is widely recognized as a strategic catalyst for economic development, job creation, and innovation. Drucker emphasized that entrepreneurial capabilities could transform ideas into viable ventures, fueling structural economic transformation [10]. In emerging economies, embedding entrepreneurship education within higher education institutions is essential for stimulating inclusive growth and addressing youth unemployment.

In addition to imparting technical knowledge, entrepreneurship education fosters essential soft skills such as creativity, resilience, and problem-solving. These attributes are crucial for navigating uncertainty and identifying business opportunities, enabling graduates to contribute meaningfully to economic diversification [11]. Moreover, well-structured programs cultivate leadership abilities, adaptability, and self-efficacy, foundational for entrepreneurial success in volatile and complex environments [12].

Recognizing these multidimensional benefits, many governments have prioritized entrepreneurship education in national policy agendas. In Malaysia, for example, entrepreneurship training has been systematically embedded in higher education curricula to improve graduate employability and enhance the country's global competitiveness [13]. Internationally, organizations such as the United Nations Educational, Scientific, and Cultural Organization (UNESCO) have advocated for entrepreneurship education as a cornerstone of innovation-led and inclusive economic development [14].

2.2. Psychological determinants of entrepreneurial intention: the theory of planned behavior

Entrepreneurial intention plays a significant role as a prerequisite for entering self-employment. Entrepreneurial education in higher education has been established to considerably impact students' perceptions of entrepreneurship, such as whether they perceive it to be desirable and attainable as a career opportunity [15]. TPB offers a well-established model of the psychological processes of entrepreneurial intention. According to TPB, the intention to engage in each behavior is determined by three interrelated components: attitude toward the behavior, subjective norms, and perceived behavioral control [16]. A favorable attitude toward entrepreneurship increases the propensity to consider it a potential career opportunity. Subjective norms refer to perceived influences of significant individuals such as family, friends, and mentors, and they either facilitate or impede entrepreneurial activities. Perceived behavioral control summarizes the belief in one's capability of launching and operating a business enterprise [17].

Entrepreneurship education impacts these determinants considerably. By being introduced to entrepreneurial knowledge and learning from experience, students experience more positive attitudes toward self-employment and increase their entrepreneurial potential [16]. Besides, favorable educational conditions enforce students' perceptions of social approval, promoting subjective norms toward favoring entrepreneurship [18].

While TPB provides valuable insight into individual-level decision-making, it does not fully account for broader structural and contextual influences. Factors such as limited access to financial capital, regulatory barriers, cultural norms favoring stable employment, and institutional support mechanisms are not explicitly integrated into the model. Consequently, relying solely on TPB may present an incomplete picture, especially in vocational settings where such external variables play a significant role. Integrating complementary frameworks such as institutional theory or the entrepreneurial ecosystem perspective can provide a more comprehensive understanding of how entrepreneurial intentions are formed and sustained.

2.3. Institutional challenges and opportunities in Malaysian TVET entrepreneurship education

TVET institutions in Malaysia are crucial in aligning workforce skills with market demands. These institutions, including members of the Malaysian Technical University Network (MTUN), are designed to produce technically proficient graduates capable of engaging in entrepreneurial ventures [19]. TVET programs often incorporate applied learning approaches that are conducive to the development of practical entrepreneurial competencies. However, despite this potential, several institutional and pedagogical challenges hinder the effective implementation of entrepreneurship education. These include outdated teaching methodologies, limited interaction with entrepreneurial role models, and insufficient real-world exposure. In addition, the integration of business and technical education remains weak due to resource constraints and a lack of strategic institutional support.

Significant gaps in the existing academic literature further exacerbate these challenges. Research on entrepreneurship education has predominantly focused on traditional universities, with relatively little attention paid to the unique characteristics and needs of TVET students. As a result, the distinctive learning pathways and entrepreneurial development trajectories within vocational institutions are often overlooked. This omission is particularly critical in the Malaysian context, where TVET is central in promoting inclusive growth and tackling youth unemployment.

UTeM illustrates how these challenges can be addressed through innovative institutional practices. As a leading MTUN institution, UTeM integrates vocational training with entrepreneurship modules and industry partnerships. These efforts enhance entrepreneurial attitudes, increase self-efficacy, and prepare students for sustainable self-employment. Examining the interaction between institutional frameworks and the psychological dimensions outlined in TPB offers essential insights into the effectiveness of entrepreneurship education within vocational settings.

2.4. Towards a contextualized framework for TVET entrepreneurship

Although TPB remains one of entrepreneurship research's most widely adopted models, its limitations necessitate theoretical enhancement. The model primarily focuses on cognitive and individual-level predictors and overlooks structural, economic, and policy-related influences. For instance, TPB does not account for challenges such as limited funding opportunities, bureaucratic hurdles, or the availability of institutional support systems that significantly affect entrepreneurial outcomes [18].

To overcome these limitations, the present study proposes a contextualized framework that combines TPB with elements of institutional theory and the entrepreneurial ecosystem perspective. Institutional theory emphasizes how formal structures, norms, and organizational practices shape individual behavior. Similarly, the entrepreneurial ecosystem approach considers the role of external enablers such as networks, mentorship, access to capital, and government support in fostering entrepreneurship.

As shown in Figure 1, the proposed framework positions entrepreneurial attitude, subjective norms, and perceived behavioral control as the core psychological drivers of SEI, consistent with TPB. At the same time, it incorporates entrepreneurship education as a critical institutional factor, reflecting the specific context of Malaysian TVET. Combining psychological constructs with institutional and environmental variables offers a more comprehensive lens to understand SEI.

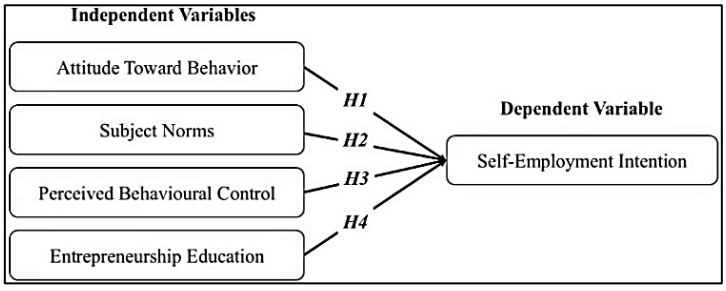

Figure 1. Research framework

3. RESEARCH METHOD

3.1. Research design and sampling procedure

This study employed a quantitative cross-sectional design to investigate the influence of entrepreneurship education, entrepreneurial attitude, subjective norms, and perceived behavioral control on SEI among students at UTeM, a TVET institution. A total of 300 students were selected using stratified random sampling. Stratification was based on faculty (engineering, technology management and technopreneurship, information technology and communication, artificial intelligence, and cyber security) and academic level (diploma and bachelor's degree). Within each stratum, respondents were randomly drawn in proportion to the overall student population to ensure representativeness across academic backgrounds. The sample size was determined based on established guidelines for social science research [20] and was considered sufficient for multivariate statistical analysis. Inclusion criteria required participants to have completed at least one semester of entrepreneurship coursework.

3.2. Instrument development and data collection

Data was collected using an online questionnaire distributed through institutional email accounts and official student platforms. The questionnaire comprised five sections: section A captured the demographic information, and sections B to E offered measures of entrepreneurial attitude, subjective norms, perceived behavioral control, entrepreneur education, and SEI. The items for measurement were adapted from established and previously validated instruments [21]–[24]. The items were on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). All responses were recorded on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). A pilot study involving 50 participants was conducted to assess clarity and reliability. Following the main data collection (n=300), reliability tests showed Cronbach's alpha ranging from 0.78 to 0.91, achieving desirable internal consistency in the construct. A summary of the measurement items and their sources is presented in Table 1.

Table 1. Constructs, items, sources, and reliability analysis of constructs (n=300)

Construct	No. of items	Example item	Source(s)	Cronbach's alpha (α)
Entrepreneurial attitude	5	"Being self-employed would be attractive to me."	[21]	0.84
Subjective norms	4	"People who are important to me think I should pursue self-employment."	[22]	0.81
Perceived behavioral control	5	"I am confident I could successfully start a business."	[23]	0.88
Entrepreneurship education	6	"The entrepreneurship course improved my understanding of business creation."	[24]	0.90
SEI	5	"I intend to start my own business in the future."	[22]	0.86

3.3. Data analysis

Data analysis was conducted on SPSS version 25. Descriptive statistics were used to present respondents' demographic profile, and Pearson correlation and multiple regression procedures were used to examine the correlation and predictive strength of study variables. Specifically, multiple linear regression was utilized to investigate the influence of independent variables on entrepreneurial intention. Before regression, diagnostic checks indicated multicollinearity was not a concern, and all variance inflation factor (VIF) measures were less than 2.5.

4. RESULTS AND DISCUSSION

This section reports the results from 300 valid questionnaires administered among undergraduate students from UTeM. The questionnaires were analyzed on SPSS version 25 using reliability testing, correlation, and regression. The analysis tested how attitudes toward behavior, subjective norms, perceived behavioral control, and entrepreneur education influence students' intentions toward self-employment.

4.1. Reliability and normality test

The instrument's reliability was established in a pilot study of 50 students. The reliability test produced a Cronbach's alpha of 0.848, significantly higher than the commonly applied threshold of 0.70, and consequently provides substantial internal consistency. The summary of results is presented in Table 2. Additionally, the skewness and kurtosis of all the variables were within the acceptability range of ±2, supporting the assumption of normality and parametric statistical analysis.

Table 2. Reliability statistics (pilot test, N=50)

Cronbach's alpha	Cronbach's alpha based on standardized items	Number of items
0.848	0.854	34

4.2. Correlation analysis

To address research objective 1, the Pearson correlation analysis investigated the strength and direction of the link between the independent and dependent variables, SEI. Table 3 shows that all independent variables are significantly and positively correlated with SEI ($p<0.01$). Attitude toward behavior exhibits the strongest association ($r=0.474$), accounting for 22.5% of the variance in SEI. This is followed by entrepreneurship education ($r=0.416$; 17.3%), subjective norms ($r=0.374$; 14.0%), and perceived behavioral control ($r=0.346$; 12.0%). These results highlight the relatively greater role of attitudinal and educational factors, and they are consistent with prior studies [25], reinforcing the explanatory power of the TPB framework in entrepreneurial intention research.

Table 3. Pearson correlation between independent variables and SEI (N=300)

Variables	Attitude	Subjective norms	Perceived behavioral control	Entrepreneurship education	Correlation with SEI (r)	R^2 (variance explained)	R^2 (%)
Attitude toward behavior	1	0.700**	0.629**	0.621**	0.474	0.225	22.5
Subjective norms	0.700**	1	0.559**	0.641**	0.374	0.173	17.3
Perceived behavioral control	0.629**	0.559**	1	0.683**	0.346	0.140	14.0
Entrepreneurship education	0.621**	0.641**	0.683**	1	0.416	0.120	12.0

**. Correlation is significant at the 0.01 level (2-tailed)

4.3. Regression analysis

To address research objective 3, a simple regression was initially conducted to identify the most significant predictor of the intention to become self-employed. The results of the multiple regression analysis are shown in Table 4, revealing that the model explained 32.4% of the variance of the intention to become self-employed ($R^2=0.324$, adjusted $R^2=0.317$, $F(4, 295)=35.35$, $p<0.001$). The attitude toward behavior was established as the most influential predictor ($\beta=0.474$, $p<0.001$), followed by entrepreneurship education ($\beta=0.416$, $p<0.001$), subjective norms ($\beta=0.374$, $p<0.001$), and perceived behavioral control ($\beta=0.346$, $p<0.001$). All predictors were statistically significant, with VIF values below 2.5, confirming that multicollinearity was not an issue.

Table 4. Multiple regression predicting self-employment (N=300)

Predictor variable	β (standardized coefficient)	SE	t-value	95% CI (β)	VIF	p-value
Attitude toward behavior	0.474	0.051	9.281	[0.374, 0.574]	2.11	<0.001
Entrepreneurship education	0.416	0.053	7.906	[0.312, 0.520]	1.89	<0.001
Subjective norms	0.374	0.054	6.970	[0.268, 0.480]	1.92	<0.001
Perceived behavioral control	0.346	0.054	6.366	[0.240, 0.452]	2.08	<0.001

Figure 2 illustrates that attitude affects entrepreneurial intention more than anything else, but subjective norms and perceived behavioral control have relatively insignificant effects. Regression analysis verifies that behavioral attitude predicts 22.4% of the variance of SEI. This finding emphasizes the central role that students' perceptions of the desirability and benefits of working for themselves play in deciding entrepreneurial ambition. The results agree with prior scholarly work that argues for the overriding role of attitudinal determinants of entrepreneurial choice [4].

4.4. Interpretation and theoretical implications

The findings confirm the applicability of the TPB in explaining entrepreneurial intention among Malaysian TVET students, with attitude toward behavior identified as the strongest predictor. This result suggests that students' personal evaluations, such as the desire for independence, self-fulfillment, and long-term financial security, exert greater influence than perceived social approval or confidence in overcoming barriers. In practical terms, this indicates that internal motivations rather than external pressures primarily drive TVET students.

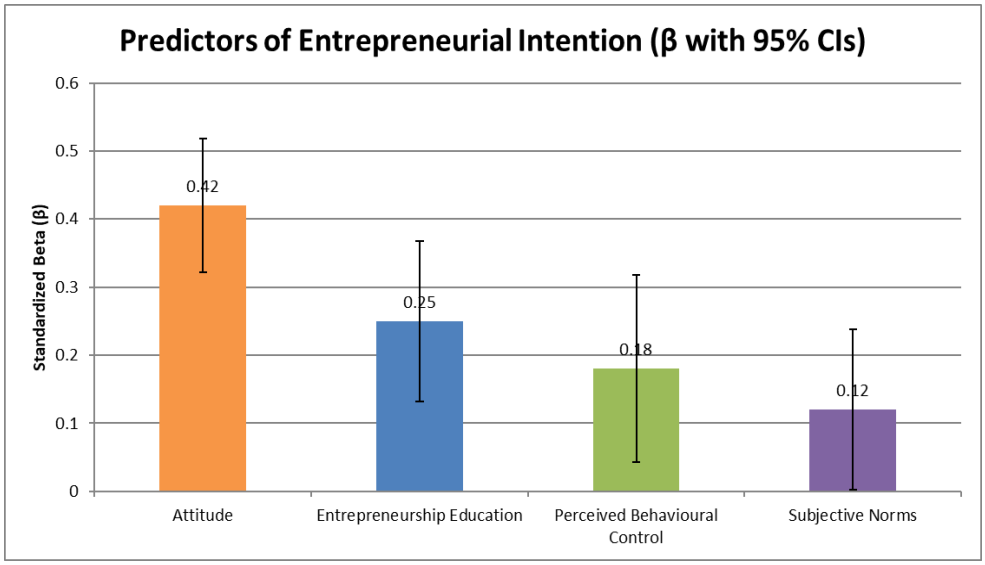

Figure 2. Standardized beta coefficients of predictors of entrepreneurial intention

The relatively weaker effects of subjective norms and perceived behavioral control highlight the role of Malaysia's socio-cultural context, where stable salaried employment is still widely regarded as more secure than entrepreneurial ventures. Limited exposure to entrepreneurial role models, family expectations favoring conventional career paths, and uncertainty about business survival may collectively reduce the impact of social influence and perceptions of feasibility. Structural barriers such as restricted access to finance, limited availability of incubator facilities, and inadequate institutional ecosystems further constrain the ability of students to translate intention into practice.

These findings show that while entrepreneurship education at UTeM has successfully enhanced positive attitudes toward self-employment, its impact on students' confidence and perceptions of support remains limited. This implies that entrepreneurship education must transmit knowledge and address external barriers by equipping students with financial literacy, problem-solving strategies, and practical exposure to entrepreneurial ecosystems. The results also align with Malaysia's National Entrepreneurship Policy 2030 and the TVET empowerment agenda, which emphasize the need to develop entrepreneurial mindsets alongside providing structural support for enterprise creation. Situating the findings within these national frameworks illustrates how the interaction of individual motivations and systemic conditions shapes entrepreneurial intentions. Therefore, integrating TPB with institutional and ecosystem perspectives can help better understand entrepreneurial behavior in the Malaysian TVET context.

4.5. Practical implications

The results of this study have several implications for educators, policymakers, and institutional leaders who aim to strengthen entrepreneurial outcomes in Malaysian TVET.

4.5.1. Curriculum development

Entrepreneurship curricula should incorporate experiential and applied learning methods such as business simulations, gamification, and startup bootcamps. These approaches help students move from abstract interest to developing practical competencies and entrepreneurial confidence.

4.5.2. Mentorship and networking

Institutions should establish peer-led mentorship programs and create platforms that connect students with local entrepreneurs, alumni, and industry partners. Such initiatives would provide role models, expand entrepreneurial networks, and counterbalance cultural preferences for stable salaried employment.

4.5.3. Institutional support and ecosystems

Beyond classroom instruction, TVET institutions should develop campus-based incubators, structured accelerator programs, and accessible micro-funding schemes. These initiatives would address systemic barriers such as financing gaps and insufficient entrepreneurial infrastructure.

4.5.4. Alignment with national strategies

Institutional initiatives should be aligned with Malaysia's National Entrepreneurship Policy 2030 and the TVET empowerment agenda. Embedding entrepreneurship education into these national development priorities will strengthen graduate employability and contribute to broader goals of innovation-driven and inclusive economic growth. These implications suggest that fostering SEI s among TVET students requires strong internal attitudes developed through education and supportive ecosystems that reduce structural barriers.

5. CONCLUSION

This study examined the influence of entrepreneurship education and TPB determinants on UTeM undergraduate students' intention for self-employment. The findings demonstrate that all TPB components were positively associated with entrepreneurial intention, with attitude emerging as the strongest predictor. This underscores the central role of personal motivation, self-confidence, and perceived desirability in shaping students' career choices.

Building on this, entrepreneurship education proved significant, although not the most dominant factor. Its contribution transforms students' interest into more concrete aspirations by providing the knowledge, skills, and exposure required for entrepreneurship. These findings suggest that while TVET students value entrepreneurial learning opportunities, their intentions remain constrained by socio-economic realities, cultural preferences for stable employment, and the limited presence of institutional mechanisms that strengthen entrepreneurial self-efficacy.

The study's analysis is restricted by several limitations that should be considered. First, although the TPB offers a valuable lens for examining individual intentions, it primarily focuses on cognitive and attitudinal dimensions and does not fully incorporate structural or contextual determinants. The model does not capture key factors such as institutional constraints, access to financing, regulatory challenges, and ecosystem support. Future research could address this gap by combining TPB with complementary frameworks, including institutional theory or the entrepreneurial ecosystem perspective, to comprehensively account for these external influences.

Second, the study's cross-sectional design renders it impossible to observe causal linkages. A longitudinal approach would be more effective in tracking how entrepreneurial intentions evolve into actual entrepreneurial behavior. Moreover, a single institution was used for the study, so the generalizability of the results is limited. Subsequent research should extend the scope to multiple TVET institutions across different Malaysian states or undertake comparative analyses across Southeast Asian countries to account for cultural and policy variations. Using mixed-method designs, incorporating interviews or focus groups, could yield more profound insights into how individual motivations interact with broader systemic conditions.

Finally, while the findings are most directly applicable to the Malaysian context, they may be transferable to other developing economies if cultural, economic, and policy contexts are carefully considered. Future investigations should therefore explore how variations in entrepreneurial ecosystems, government initiatives, and societal attitudes influence the interaction of entrepreneurship education and entrepreneurial intention in diversified contexts. From a practical perspective, several recommendations emerge. Policymakers should enhance entrepreneurship education content and strengthen the broader entrepreneurial ecosystem. Efforts could include expanding incubator programs, improving access to seed funding, creating structured mentorship initiatives, and enacting policies that reduce barriers to business creation.

At the educational level, TVET institutions should integrate experiential and applied learning strategies, including project-based modules, startup simulations, and peer-led mentoring. Collaboration with local entrepreneurial networks further enhances students' readiness for real-world challenges. Institutions are also encouraged to foster an entrepreneurial culture by involving faculty, showcasing successful alums, and developing peer support systems that validate entrepreneurial aspirations. In conclusion, this study reaffirms the relevance of TPB in vocational education while highlighting its limitations when applied in isolation. By combining innovative pedagogical approaches with supportive policy measures and institutional commitment, TVET institutions can play a central role in promoting innovation, resilience, and youth-led enterprise development in Malaysia and beyond.

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
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Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

The authors state there is no conflict of interest.

DATA AVAILABILITY

The data supporting this study's findings are available from the corresponding author, [IAJ].

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