



**Research Publishing
Academy (RPA)**
London, United Kingdom (UK)

JIBM

Journal of International Business and Management (JIBM)
Journal Homepage: <https://rpajournals.com/jibm>

Justifications for Adopting Mediation and Moderation Variables in Quantitative Research: What, Why and When to Use

Faraj Mazyed Faraj Aldaihani^a
Md Asadul Islam^b
Dalal Khaled Aldaihani^b
Universiti Putra Malaysia, Malaysia^a
Sunway University, Malaysia^c
Ministry of Health, Kuwait^d

Abstract

Justifying the adoption of mediation and moderation variables in quantitative research is often challenging, particularly when addressing reviewers' and examiners' critiques. These variables are widely applied across various disciplines, including business, management, marketing, finance, accounting, tourism, and hospitality, as well as in broader social sciences. However, early-career researchers often struggle to understand their theoretical and practical implications, leading to difficulties in effectively integrating them into their studies. This article provides a structured discussion on the conceptual distinctions between moderation and mediation, their theoretical justifications, and the methodological approaches for testing them. We explain why researchers should consider these variables, when they are appropriate, and how they can be applied to strengthen research findings. Furthermore, we highlight common misconceptions and challenges associated with their use, offering guidance on selecting the most suitable analytical techniques. By synthesising existing literature and best practices, this paper aims to serve as a valuable resource for researchers seeking to enhance the rigour and relevance of their quantitative studies. The insights presented will help scholars design robust theoretical frameworks, improve hypothesis development, and effectively address potential methodological concerns in academic research.

Keywords: Mediation, Moderation, Variables, Quantitative Research, Social science

Corresponding Author*
DOI: <https://doi.org/10.37227/JIBM-2025-02-7038>

Introduction

Quantitative research aims to establish relationships between variables, often assuming direct causal links (Gelo, Braakmann & Benetka, 2008; Saunders, Lewis and Thornhill, 2019). However, real-world phenomena are rarely simple, and relationships between variables are often influenced by underlying mechanisms or conditional factors (Edwards & Lambert, 2007; Wang & Preacher, 2015; Igartua & Hayes, 2021). To address this complexity, researchers incorporate mediation and moderation variables, which enhance the depth and accuracy of statistical models. Hence, both mediation and moderation variables in

quantitative research, particularly in business, management, marketing, finance, accounting, tourism, and hospitality and social sciences related disciplines are very significant. While these variables are widely used, many early-career researchers struggle to justify their inclusion, often facing challenges when responding to reviewers' and examiners' critiques. Therefore, many early career researchers feel stress when they work on these variables or ask regarding these variables during their research journey, especially in conducting research for empirical papers and preparing a thesis. Moreover, sometimes they include these variables in their research papers with the misconception that mediation and moderation serve the same purpose (Fiedler, Schott & Meiser, 2011; Aguinis, Edwards & Bradley, 2017). Moreover, sometimes it is thought that identifying a mediation effect confirms a causal relationship that is completely wrong. Furthermore, there is a misconception of that if a mediation or moderation effect is statistically always significant, it automatically validates their hypothesis that is not right. Apart from these are also some more misconceptions on why, when and how to use mediation and moderation variables. However, these issues are rarely mentioned in a paper in the current literature to entertain different researchers, especially early career researchers.

Given the above, we believe that an integrated paper with clear understanding of what, when and why to use moderation and mediation variables is essential for early career researchers in developing their knowledge on these variables so that they can conduct research developing robustness of the theoretical frameworks and strengthening empirical findings. Hence, this study firstly outlines what mediation and moderation variables are. Secondly, this paper provides arguments on why both mediation and moderation variables are important. Thirdly, this study presents insights on when a researcher should use mediation and moderation variables. Fourthly, the study provides explanations on how to analyse the collected empirical data of the studies with the mediation and moderation variables. Overall, by synthesising theoretical foundations, methodological advancements, and best practices, this paper seeks to equip researchers with the necessary knowledge to strengthen their quantitative analyses and effectively respond to methodological concerns raised in the peer-review process.

Mediation Variable

What is a mediation variable?

Mediation occurs when an intermediary variable explains the process through which an independent variable influences a dependent variable. In other words, a mediator helps clarify *how* or *why* a particular effect occurs (Baron & Kenny, 1986; Preacher & Hayes, 2008; Fiedler et al., 2011). For example, in organisational behaviour research, employee engagement can mediate the relationship between transformational leadership and job performance, meaning that transformational leadership enhances employee engagement, which in turn improves performance. In this regard, if anyone finds that the relationship between transformational leadership enhances job performance is vague, inconsistent or unclear based on his or her exploration in current literature, he or she can examine a mediator (i.e., employee engagement) to see how this relationship between the independent (i.e., transformational leaders) and dependent (i.e., job performance) variables was interpreted and became more logical.

Therefore, mediators are crucial for advancing theoretical understanding because they reveal underlying mechanisms rather than merely establishing direct relationships. Without mediation analysis, researchers may overlook the true explanatory pathway in a model (Hayes, 2018). Statistical approaches such as the Sobel test, bootstrapping, and

structural equation modelling (SEM) help test mediation effects, with bootstrapping becoming the preferred method due to its robustness in small samples (Preacher & Hayes, 2008).

Furthermore, a mediator can function as multiple variable types: a dependent variable (second dependent) and an independent variable in models where it is both an outcome of the independent variable and a predictor of the final dependent variable. In mediation analysis, the mediator is first treated as a dependent variable influenced by the independent variable before serving as an explanatory variable for the dependent variable (Baron & Kenny, 1986). This is common in sequential mediation models, where multiple mediators form a causal chain (Hayes, 2018). For instance, ethical leadership may enhance psychological safety (mediator as DV), which then boosts employee engagement (mediator as IV), ultimately improving job performance.

Why and When to Use a Mediation Variable

There are different situations and reasons for using mediation variables in the research. Firstly, when a researcher is trying to explain *how or why* an independent variable (IV) affects a dependent variable (DV) should employ a mediation variable. When the relationship between an IV and DV is unclear, inconsistent or theoretically predicted to be working through an intermediary variable, a mediation variable is very helpful (Baron & Kenny, 1986; Preacher & Hayes, 2008). Because, incorporating a mediator in those relationships helps researchers find the fundamental causes of a relationship, by offering more theoretical, pragmatic and practical understanding.

Moreover, a mediation variable is important when a researcher is examining causal mechanisms in social science i.e., organisational, psychological, and behavioural research. In leadership studies, for instance, transformational leadership might not directly increase job performance in all contexts (i.e., industry or country) or among all organisational settings but rather improve staff engagement (mediator), which might in turn improve performance. Another example can be in the case of marketing studies, where brand trust may not directly translate customer loyalty but rather shapes perceived value, which subsequently can promote customer loyalty (Hayes, 2018). These arguments showcase how a mediation variable can clarify the mechanism of an impact occurrence.

Furthermore, using mediation is also very important when a direct relationship seems weak or inconsistent in several settings for example, industry or country. Some studies in the current literature reveal, for example, that job autonomy has a relationship with job satisfaction in some sectors but no other sectors. In this regard, a mediation analysis incorporating intrinsic motivation could show that autonomy increases intrinsic motivation, which ultimately raises job satisfaction and helps to explain why the connection differs across settings (Preacher & Hayes, 2008).

Mediation is also extensively employed in intervention and policy research to ascertain why a project is successful. A leadership development programme i.e., training might, for example, help to lower staff turnover intentions by raising job satisfaction, therefore addressing the real cause—not only retention (MacKinnon, 2008). Identifying these channels helps managers, practitioners, businesses and government officials to create more focused initiatives.

Misconceptions regarding mediation variables

However, mediation analysis is often misinterpreted. A common mistake is assuming that mediation inherently establishes causality. However, causality can only be inferred when

supported by a strong theoretical framework, longitudinal data, or experimental designs (Zhao, Lynch, & Chen, 2010). Therefore, while a mediator can enhance analytical depth, researchers must justify its role with sound theoretical reasoning and appropriate methodological techniques. Moreover, some researchers assume that identifying a mediation effect confirms a causal relationship. However, mediation analysis alone does not establish causality unless supported by a strong theoretical foundation and appropriate research design, such as longitudinal data or experimental manipulation (Hayes, 2018). Cross-sectional studies with mediation analysis may only suggest associations, not definitive causal pathways.

Researchers often assume that both the direct and indirect effects in a mediation model must be always statistically significant for mediation to exist. It might not always exist due to complex social, organisational, and economic contexts. However, it is important to know that independent variables do not always necessarily have a positive relationship with the dependent variable unless there is an intervening variable i.e., a mediation. The relationships between independent and dependent variables can be found different in terms of differences in the respondents, industries and contexts i.e., countries etc. Hence, a mediating variable in the relationship between the dependent and independent variable may translate the influence of the independent variable into an outcome that would not occur directly. The presence of a mediator helps explain how or why an independent variable affects a dependent variable by providing a mechanism through which the effect occurs (Baron & Kenny, 1986). Without mediation, the relationship between the independent and dependent variables may appear weak, inconsistent, or even non-existent due to contextual differences, such as industry-specific factors, cultural variations, or demographic influences (Hayes, 2018). Therefore, mediation analysis is essential for uncovering hidden causal pathways and offering deeper theoretical insights into complex relationships.

Some researchers believe that all mediation models follow the Baron and Kenny (1986) Approach that is completely right. In this regard, while the causal steps approach by Baron and Kenny (1986) was widely used, modern statistical methods such as bootstrapping and structural equation modelling (SEM) provide more accurate and robust mediation analyses (Hayes, 2018). Relying solely on the Baron and Kenny approach without considering newer methods may lead to biased results.

Moderation Variable

What is a moderation variable?

A moderation variable is a factor that influences the strength or direction of the relationship between an independent variable (IV) and a dependent variable (DV). Unlike a mediation variable, which clarifies the nature (how) or cause (why) of an effect, a moderator determines when or under what circumstances the effect occurs (Baron & Kenny, 1986). Moderators are crucial in organisational behaviour, management studies, psychology, social science related studies since these enable researchers to grasp variability in connections.

Moderators can either increase, reduce, or reverse the IV's influence on the DV (Aguinis, 2004). In the context of social science research specifically in leadership research, for example, communicative competence may regulate the association between transformational leadership and psychological empowerment, therefore strengthening the effect of leadership for those with high communicative competence. This is in line with the view that a moderator can function as a contingency factor, which shapes results in complicated systems (Frazier et al., 2004).

A moderator can be categorical or continuous. In this regard, categorical moderators, such as organisational type or gender create interaction influences by dividing data into groups. Continuous moderators, like emotional intelligence or job experience, introduce variability across a spectrum (Hayes, 2018). The statistical analysis of moderation typically includes interaction terms in regression models, such as structural equation modelling (SEM) or hierarchical multiple regression.

Understanding moderation is crucial because relationships in social sciences are rarely uniform. For example, the effect of work stress on job performance may depend on resilience levels. If resilience is high, stress may have a weaker negative impact on performance, demonstrating a buffering effect (Cohen & Wills, 1985). By identifying moderators, researchers provide richer insights into theoretical models and practical interventions in workplace settings. In social sciences, relationships are rarely homogeneous thus understanding a moderation variable is crucial. For instance, the influence of workplace fun on job performance may rely on resilience levels. If resilience is high, workplace fun may have a stronger and positive influence on job performance outlining a buffering influence (Cohen & Wills, 1985). By identifying moderators and examining these in a theoretical model, researchers can provide more richer insights to be useful for future research and practice.

Why and When to Use a moderation Variable

Moderation is needed when a theory suggests that the effect of an independent variable (IV) on a dependent variable (DV) changes depending on an external factor. For example, transformational leadership may positively influence employee engagement, but the strength of this relationship could depend on employee psychological empowerment (Frazier et al., 2004). If empowerment is high, leadership may have a stronger impact on engagement, while if it is low, the effect might weaken. Moreover, if previous studies provide conflicting results, a moderation effect may explain these inconsistencies. For instance, some studies find that job stress negatively impacts performance, while others find no effect. A potential moderator, such as emotional intelligence, may clarify this inconsistency by showing that individuals with high emotional intelligence handle stress better (Cohen & Wills, 1985).

Furthermore, moderators help establish the boundary conditions of an effect. In organisational research, the effectiveness of leadership styles may depend on organisational culture. Servant leadership might enhance job satisfaction in collaborative cultures but have little effect in highly hierarchical environments (Aguinis, 2004). Identifying such conditions makes theoretical models more precise. Moreover, a moderation variable is used in statistical analyses when interaction effects are expected. In hierarchical regression analysis or structural equation modelling (SEM), a significant interaction term indicates moderation (Hayes, 2018). For example, if the interaction between workload and resilience significantly predicts burnout, it suggests that resilience moderates the relationship between workload and burnout. In applied research, moderators guide targeted interventions. If training effectiveness depends on employees' prior experience, then experience is a moderator. Companies can use this insight to tailor training programmes, making interventions more efficient and cost-effective (Edwards & Lambert, 2007).

Moderating variables help us see beyond what is happening between two variables by seeing why it is happening or isn't happening. Without a moderator, an observed relationship may appear weaker or stronger than it actually is, leading to misleading conclusions (Hayes, 2018). Hence, a moderating variable is important to interpret results of an existing relationship between IV and DV. In this regard, investigating the influence of a

moderator is crucial for capturing contextual and individual differences, leading to a more nuanced understanding of the relationships between variables such as employee performance, leadership effectiveness, and organisational change (Frazier et al., 2004). Moreover, a moderation variable allows researchers to build on existing theories. For instance, the Job Demands-Resources (JD-R) model explains how job demands lead to burnout. By introducing social support as a moderator, a researcher can show that high or low social support weakens/increases the negative impact of job demands, refining the original model (Bakker & Demerouti, 2007). Moreover, practitioners can use moderators to tailor strategies. For example, understanding that flexible work arrangements improve performance only for employees with high self-discipline helps in designing workplace policies that maximise productivity (Cohen & Wills, 1985). Furthermore, human and organisational behaviours are rarely straightforward, making it essential to account for moderating variables to better capture the complexity of these relationships

Misconceptions regarding moderation variables

Moderation variables play a crucial role in research by identifying conditions that influence the strength or direction of a relationship i.e., relationship between IV and DV. However, several misconceptions exist regarding their use and interpretation. One common misconception is that moderators always weaken relationships. This is not right because while some moderators buffer or reduce an effect (e.g., social support reducing the impact of stress on burnout), others can strengthen or even reverse the relationship (Hayes, 2018). For example, transformational leadership may have a greater impact on job performance when employees have high psychological empowerment.

Another misunderstanding is that moderation and mediation are interchangeable. Mediation explains *why* an effect occurs by introducing an intermediary variable, whereas moderation clarifies *when* or *under what conditions* an effect is stronger or weaker (Baron & Kenny, 1986). Confusing these two concepts can lead to flawed theoretical models. Moreover, another misconception is that moderators must always be categorical (e.g., gender, education level). In reality, continuous variables such as emotional intelligence or job experience can also act as moderators, influencing relationships along a spectrum (Aguinis, 2004).

Concluding Remarks

Although we believe that this paper has a number of strengths, this paper is not out of limitations. The researchers have mentioned all the arguments in a succinct manner, which is a significant limitation. Therefore, we recommend that the readers should use the insights with careful consideration. However, future scholars can elaborate the arguments in this paper with more insights and justifications. Moreover, the arguments mentioned here could be explained from different perspectives that could be entertained by the scholars in their future studies.

References

- Aguinis, H. (2004). *Regression analysis for categorical moderators*. Guilford Press.
- Aguinis, H., Edwards, J. R., & Bradley, K. J. (2017). Improving our understanding of moderation and mediation in strategic management research. *Organizational research methods*, 20(4), 665-685.

- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173–1182.
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98(2), 310–357.
- Edwards, J. R., & Lambert, L. S. (2007). Methods for integrating moderation and mediation: a general analytical framework using moderated path analysis. *Psychological Methods*, 12(1), 1–22.
- Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, 51(1), 115–134.
- Fiedler, K., Schott, M., & Meiser, T. (2011). What mediation analysis can (not) do. *Journal of Experimental Social Psychology*, 47(6), 1231–1236.
- Gelo, O., Braakmann, D., & Benetka, G. (2008). Quantitative and qualitative research: Beyond the debate. *Integrative Psychological and Behavioral Science*, 42(9), 266–290.
- Hayes, A. F. (2018). Introduction to mediation, moderation, and conditional process analysis (2nd ed.). Guilford Press.
- Igartua, J. J., & Hayes, A. F. (2021). Mediation, moderation, and conditional process analysis: Concepts, computations, and some common confusions. *The Spanish journal of psychology*, 24, e49.
- Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40(3), 879–891.
- Saunders, M.N.K., Lewis, P. and Thornhill, A. (2019) Research Methods for Business Students. 8th Edition, Pearson, New York.
- Wang, L., & Preacher, K. J. (2015). Moderated mediation analysis using Bayesian methods. *Structural Equation Modeling: A Multidisciplinary Journal*, 22(2), 249–263.
- Zhao, X., Lynch Jr, J. G., & Chen, Q. (2010). Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *Journal of Consumer Research*, 37(2), 197–206.