UNIVERSIDADE FEDERAL DE MINAS GERAIS

FACULDADE DE CIÊNCIAS ECONÔMICAS

CENTRO DE PÓS-GRADUAÇÃO E PESQUISAS EM ADMINISTRAÇÃO

CLÁUDIO LUCAS VIEIRA BATISTA

Authentic assessment in higher education: an extended replication

Belo Horizonte

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Authentic assessment in higher education: an extended replication

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Dissertation presented to the Centro de Pós-Graduação e Pesquisas em Administração of Universidade Federal de Minas Gerais as a requirement to obtain the title of Master of Science in Business Administration.

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ATA DE DEFESA DE DISSERTAÇÃO

ATA DA DEFESA DE DISSERTAÇÃO DE MESTRADO EM ADMINISTRAÇÃO do Senhor **CLAUDIO LUCAS VIEIRA BATISTA**, REGISTRO Nº 728/2021. No dia 04 de junho de 2021, às 9:00 horas, reuniu-se remotamente, por videoconferência, a Comissão Examinadora de Dissertação, indicada pelo Colegiado do Centro de Pós-Graduação e Pesquisas em Administração do CEPEAD, em 27 de maio de 2021, para julgar o trabalho final intitulado "*Authentic assessment in higher education: an extended replication*", requisito para a obtenção do **Grau de Mestre em Administração,** linha de pesquisa: Estratégia, Marketing e Inovação. Abrindo a sessão, o Senhor Presidente da Comissão, Prof. Dr. Ricardo Teixeira Veiga, após dar conhecimento aos presentes o teor das Normas Regulamentares do Trabalho Final, passou a palavra ao candidato para apresentação de seu trabalho. Seguiu-se a arguição pelos examinadores com a respectiva defesa do candidato. Logo após, a Comissão se reuniu sem a presença do candidato e do público, para julgamento e expedição do seguinte resultado final:

(X) APROVAÇÃO

( ) REPROVAÇÃO

O resultado final foi comunicado publicamente ao candidato pelo Senhor Presidente da Comissão. Nada mais havendo a tratar, o Senhor Presidente encerrou a reunião e lavrou a presente ATA, que será assinada por todos os membros participantes da Comissão Examinadora. Belo Horizonte, 04 de junho de 2021.

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I dedicate this thesis to all the scholars whose prior research helped to enrich mine.

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"Life itself is an endless sequence of flukes and coincidences leading to some successes, some failures, some embarrassments, and some pleasures. We shall never really know the fortune and misfortune milestones along our roads-not-taken."
Joseph Mazur

RESUMO

Os métodos pelos quais as instituições de ensino superior qualificam seus alunos podem estar em desacordo com as expectativas dos futuros empregadores, que valorizam cada vez mais os empregados com maior prática profissional ou que demonstram possuir um amplo espectro de competências, não apenas um diploma. O estudo da avaliação autêntica envolvendo comportamento de promoção e satisfação emerge dessa diferença entre a força de trabalho que as empresas esperam e o que as universidades oferecem. Esta pesquisa replicou e ampliou o estudo de James e Casidy (2018), que avaliou o efeito da autenticidade das avaliações sobre o comportamento de promoção de um curso de graduação de uma escola de negócios. Foi assumido que este efeito é mediado pela satisfação do aluno e que a relação entre autenticidade e satisfação é moderada pela orientação para a carreira profissional. A parte da extensão refere-se à inclusão de uma segunda variável moderadora, o traço psicológico da competitividade. Realizamos outra análise condicional com nova coleta de dados. Pretendemos enriquecer a pesquisa de referência, desafiando as hipóteses e revisitando a literatura, não tentando provar que está certo ou errado, mas aumentando a confiabilidade do estudo. A amostra total é de 129 entrevistados, 50% homens, 49% mulheres e 1% não-binários. A idade média dos participantes é de 25 anos, dos quais, 62% estão na faixa etária entre 17 e 25 anos. Ainda, 83% da população é formada por alunos de universidades públicas, 17% são alunos de escolas privadas. Todos eles são graduandos em administração de empresas. Usamos o aplicativo *Google Forms* para aplicar o questionário. Houve aleatorização para a escolha entre os dois cenários de avaliação, mais e menos autênticos. Entre as 129 observações, o $N_{não\ autêntico} = 64$ e o $N_{autêntico} = 65$. Os resultados validaram todas as hipóteses do estudo central, ou seja, a avaliação autêntica está positivamente relacionada à satisfação do aluno e à atitude de promoção. A satisfação do aluno mediou a relação entre as avaliações autênticas e o comportamento de promoção. Os efeitos da avaliação autêntica são mais fortes entre os alunos com níveis mais elevados de ambição profissional do que entre os menos ambiciosos. Esse efeito não foi estatisticamente significativo com a moderação da competitividade. Com base nos resultados, o autor recomenda mais replicação de trabalhos, mas como experimentos que podem colaborar para critérios de confiabilidade no processo de pesquisa em ciências humanas, particularmente em Marketing.

Palavras-chave: Avaliação autêntica. Ensino superior. Comportamento de promoção. Satisfação.

ABSTRACT

The methods by which higher education institutions qualify their students may be at odds with the expectations of future employers who increasingly value employees with greater professional practice or demonstrate a wide range of skills, not only a diploma degree. The study of authentic assessment on satisfaction and promotion behavior emerges from this difference between the workforce companies expectations and what universities render as content and practices. This research replicated and extended James and Casidy's (2018) study, which evaluated the effect of the authenticity of assessments on promotion behavior towards a course by undergraduate students of a business school. It was assumed that this effect is mediated by student satisfaction and that the relationship between authenticity and satisfaction is moderated by career ambition. The extension part refers to the attachment of a second moderator variable, the psychological trait of competitiveness. We carried out another conditional analysis with different data collection. We intended to enrich the prior research, challenging the hypotheses and revisiting the literature, not trying to prove it right or wrong, but increasing this study reliability. The total sample encompasses 129 respondents, 50% men, 49% women, 1% non-binary. The average age of the participants is 25 years old, of which 62% are in the age group from 17 to 25 years old; 83% of the participants comprise students from public universities; 17% are students from private schools. All of them are business undergraduates. We used the *Google Forms App* to apply the questionnaire. The two scenarios of more and less authentic assessment were chosen randomically. Among the 129 observations, the N non-authentic = 64, and N authentic = 65. The results validated all the hypotheses of the pivotal study, meaning that the authentic assessment is positively related to student's satisfaction and promoting behavior. Student satisfaction mediated the relationship between authentic assessments and promoting behavior. The effects of authentic assessment are stronger among students with higher levels of career ambition than those who are less ambitious. This effect was not statistically significant with the moderation of competitiveness. Based on the findings, the author recommends more replication of works such as this one, with experiments that may collaborate for the reliability criteria in human sciences' research process, particularly in Marketing.

Keywords: Authentic assessment. Higher education. Promotion behavior. Satisfaction.

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<p style="text-align:center">**SUMMARY**</p>

1 INTRODUCTION

The methods by which higher education institutions qualify their students may be at odds with the expectations of future employers who increasingly value employees with greater professional practice or demonstrate a wide range of skills, not only a diploma degree. The study of authentic assessment on satisfaction and promotion behavior emerges from the difference between the workforce companies expectations and what universities really render as work experiences. McMurray *et al*. (2016) noted it is important for universities to understand the job market required skills so that students may meet or even be aware of those qualifications along their way through higher education.

Recently some research papers addressed this topic (see MCMURRAY *et al*., 2016; MATSOUKA; MIHAIL, 2016; FARASHAHI; TAJEDDIN, 2018; VILLARROEL *et al.*, 2020; AJJAWI, 2020). Their overall findings suggest that many undergraduates demonstrate a lack of the most required skills for their potential positions. They also remark that the employability of newly graduates and the reduction of the gap between their skills and the tangible needs of companies thus depend on effective cooperation between employers and universities. Furthermore, the analyses of teaching methods show that simulations are more effective in developing employability skills than established methods in business schools, like case studies and lectures.

James and Casidy (2018) addressed their study towards the two significant gaps found in the literature about authentic assessments. The authors identified the lack of empirical evidence that could support the relationship between students' satisfaction, promotion behavior, and authentic assessments. The second gap is that many researchers tested real-world evaluations in different areas of knowledge, Pedagogy (MASRAN; MASHITAL, 2017), Engineering and Mathematics (GUZZONI; MALE; MILLER, 2017; SANGLE; NANDURKAR; PAWAR, 2020; MERRETT, 2020), Biology (GHOSH, 2017), but very few times in business disciplines taking the students' perspective.

In this context, we have to point out the importance of replicating the research about newly undergraduates' skills to the labor market. Thus, to replicate a study in this field is a way to corroborate with initial work (work of reference) by giving more shreds of evidence to it,

consequently, rendering more credibility to it. It also allows other researchers to have a different perspective of a theory of interest (ROYNE, 2018). In Marketing literature, some authors are doing replications (IYER; GRIFFIN, 2020; HALLIKAINEN; LAUKKANEN, 2020; SANTOSO; NELLOH, 2017; HOOK; BAXTER; KULCZYNSKI, 2017); Even though it is essential for the reliability of experimental studies, many top journals in Marketing do not accept papers based on replications. They give preference to something novel, therefore unpublished (ROYNE, 2018).

Köhler and Cortina (2021), in a recent study about the importance of constructive replication in the organizational sciences, concluded that novelty is like a hot air balloon, and constructive replication is its ballast. Based on that, we affirm that replication is necessary to keep the stability of these balloons.

Thus the purpose of this study is twofold. We examine students' promoting behavior in higher education, using James and Casidy's (2018) research as a main reference. Aside from the call for its replication, their work is relevant particularly for marketing scholars, and education in general. According to Google Scholar metrics, this work had more than 76 citations in less than three years of its publishing, none of the most relevant works were a replication (MAXWELL-STUARTMaxwell-Stuart *et al.*, 2018; SOTIRIADOU *et al.*, 2020; GRIFFIOEN *et al.*, 2018; DERICKS *et al.*, 2019). For this thesis dissertation, we added to James and Casidy's (2018) work the moderator variable of competitiveness, thus extending their scope, testing its possible effects on the students' satisfaction. It is important to point out that   James and Casidy's (2018) study has given a great contribution to the field. However, the literature of reference (IYER; GRIFFIN, 2021; CORDES, 2020; FREESE; PETERSON, 2017) recommends the extension.

Therefore, our main goal is to replicate James and Casidy's (2018) experiment, not as a verification, but as an extension, running a different statistical analysis, with different data collection. By challenging the hypotheses, we are aiming to enrich the prior research, revisiting the literature, not trying to prove it right or wrong, but increasing the study reliability. As we know, human knowledge comes from what we learn from our problems and how much effort and talent we are able to put on to solve them, comprising the formulation of theories developed from a process involving conjectures and refutations, leading to the growth of scientific theory (POPPER, 2013).

Along the research, we compare the effect of satisfaction over a fictitious course's promotion behavior. The independent variable in this case is the degree of authenticity of the assessment, which varies for two distinct groups, who answered the questionnaire choosing between two scenarios with assessment more and less authentic. The participants are undergraduate students of business schools. The satisfaction is moderated by the students' career ambition and the psychological trait of competitiveness.

To debate these issues, this work is organized as follows. In the first chapter, we bring up the literature review, showing the possibilities of research in the field of business, previous studies on authentic assessments, co-creation of value, and employability of newly undergraduates. We also address the importance of replication for the development of marketing theory and science in general. Then, we introduce the methodology, the replication design, the development of the hypotheses, details of the sample and data collection, the measurements, manipulation checks, and hypotheses tests. In the third and fourth chapters, we discuss the results and limitations of this study. In the conclusion section, we finish this work with a summary of the ideas discussed.

2 REPLICATION STUDIES

Karl Popper's (2013) method basically consists of challenging a hypothesis repeatedly, as many times as possible. The goal is not to validate the hypothesis indistinctly but rather to increase its confidence degree, which is validation in practical terms when scientists collect and independently analyze data having the same findings.

Researchers such as Karl Popper practice replications for many years in different areas of knowledge. Then replication serves a useful purpose in magnifying our understanding of reality. It is a reanalysis of a study with new data but the same statistical analysis from the prior research (FIDLER; WILCOX, 2018; LAVRAKAS, 2008).

It is important to notice that dissimilarities between replication and verification reside in data collection. Verification means to repeat the study using the same data set. The replication occurs, as already explained, with new data collection and the same statistical manipulation (FIDLER; WILCOX, Fidler and Wilcox, 2018; LAVRAKASLavrakas, 2008). Sometimes in science, the term replication is used as a synonym of reproduction (MILKOWSKI, 2018). Having this in mind, Clemens (2017) advocates that a standard in the terminology of replication and robustness test is necessary. Social sciences need more replications than we produce now (PEELS, 2019). The increase in number would lead to a kind of standardization that would reduce the confusion and doubt about the meaning of past and future failures to replicate. Professional associations could act to set this standard. Clear terms could help decrease the discomfort among researchers who might perceive replication studies as a threat.

Schmidt (2009) points out that the replication main function is to verify a fact or piece of knowledge The author lists five other specific functions for replication in social sciences:

A. to control for sampling error (chance result);
B. to control for artifacts (lack of internal validity);
C. to control for fraud;
D. to generalize results to a larger or a different population; and
E. to verify the underlying hypothesis of the earlier experiment (2009, p. 93).

According to authors like Frost-Arnold (2020), Peels (2019), and Fidler and Wilcox (2018), replication is epistemically valuable, the practice of it may enhance our knowledge, understanding or beliefs about reality, and it is possible and desirable in humanities. They also state that consistent replication contributes with the results of the original study, so that running replication studies contributes to the core epistemic purposes of the academy.

Despite the apparent benefits of replication studies, and the necessity for more research on a great variety of fields, only few journals would publish replication papers, necessary for many studies that do not have clear verification. The journals have a preference for novel works (IYER; GRIFFIN, 2021).

However, there is a replication crisis as disappointing results emerged from large-scale reproducibility projects in various academic disciplines. Not only controversial research practices is the cause of it, but also the lack of space, financial incentive, mistrust of colleagues, among other reasons that may keep potential researchers away (FIDLER; WILCOX, 2018; CLEMENS, 2017; IYER; GRIFFIN, 2021; PEELS, 2019).

Peels (2019), for example, conducted a study that tried to answer the questioning if we should consider pursuing replication in the humanities. The author listed some of the reasons for the lack of replications and evidence to this method. According to Peels:

>   A. fraud, falsification, and plagiarism;
>   B. questionable research practices, partly due to unhealthy research systems with perverse publication incentives;
>   C. human error;
>   D. changes in conditions and circumstances;
>   E. lack of effective peer review;and
>   F. lack of rigor (Peels, 2019, p 1).

Peels (2019) also listed some factors regarding the importance of replicability and replication in academic research:

>   A. results that are consistently replicated are likely to be true, all else being equal, that is, controlling for such phenomena as publication bias and assuming that the other assumptions in the relevant theory or model are valid;
>   B. replicability prevents the waste of (financial, time, etc.) resources, since studies that cannot be consistently replicated are less likely to be true;

C. results that are not replicable are, if they are applied, more likely to cause harm to individuals, animals, and society (e.g., by leading to mistaken economic measures or medicine that is detrimental to people's health); and

D. if too many results turn out not to be replicable, upon attempting to replicate them, that will gradually erode public trust in science (p. 1).

Somehow, Peels (2019) has shown a peculiar paradox in science driven by the consistent avoidance of academic authorities that run the publishing events on   carrying out the more replication studies. Michael Clemens (2017) has pointed out that professional associations could set a standard of replication research and even create a journal with specific guidelines for standardization. His work proposes a standard for classifying one study as a replication of some other study. Fidler and Wilcox (2018) indicated that meta-science had painted a bleak picture of reproducibility in some fields, which gives fruitful avenues for future research attempting to solve this crisis of replication. Overall these studies present incentives for researchers, encouraging more and better replication tests.

3 AUTHENTIC ASSESSMENT IN HIGHER EDUCATION

Koh (2017) carried out an important review on "authentic assessments" in the context of education by giving the audience a definition, "authentic assessment is an effective measure of intellectual achievement or ability because it requires students to demonstrate their deep understanding, higher-order thinking, and complex problem solving through the performance of exemplary tasks" (2017, p. 1). The author highlights the importance of integrated learning and working practice, helping students to master needed skills for their future professional life, and the necessity of providing instructors with the capacity required to design this kind of evaluation and guidance.

According to Koh (2017), Grant Wiggin (2011) coined the term "authentic assessment" in his paper first published in 1989. In the context of learning and assessment, there is a consensus among a body of authors: such as Cumming and Maxwell (1999), Koh (2017), Walton (2020), Ghosh (2020), Villarroel *et al*. (2017), McDermott (2017), Ghalib (2018), e Onwuegbuzie (2000), who see Archbald and Newmann (1988) as the pioneers that introduced the adjective "authentic" in this circumstance. However, at first, the authors used the term "authentic performance" (VILLARROEL *et al*., 2017).

In this context, Wiggins (1990, 1991, 2011) observed that the traditional assessment relies on simplistic content tests that make instructors think they can make valid inferences about the student's performance at those valued assessments. In addition, the assessment is authentic when the instructors examine students' performance on worthy intellectual tasks (WIGGINS, 1990). Tasks that can enable institutions to watch a learner tackle slightly ambiguous problems, as it appears in the real world. Allowing to watch a student marshal evidence, arrange arguments, and take purposeful action to address the problems (WIGGINS, 2011).

Wiggins (1990) compares traditional standardized tests with authentic ones. This helps to clarify what "authenticity" means when considering assessment design and use. According to Wiggins:

> A. traditional tests reveal if the student can master what was learned but without contextualization;

B. authentic assessments give the students the opportunity to be challenged by activities that will lead them to develop relevant skills, as learning how to debate their ideas orally or co-working with colleagues. Traditional tests are more limited in material and content; and

C. with authentic assessments, it is possible to evaluate pupil's performance in creating responsive solutions. Traditional tests usually only give the chance to put the right answer, not mattering the reasons (1990, p. 1).

The literature is abundant in definitions of authentic assessment. The current understanding is quite similar to the first works we cited early on the topic. Somewhat most of them call for an alignment of current curriculum in schools, some kind of practice where the assigned activities would allow students to develop skills viewed as fundamental to real-life experiences (ELLIS *et al*., 2020; FARREL; SOTIRIADOU *et al*., 2020; JOHINKE, 2020; GHOSH *et al*., 2020). It is Koh (2017) who claims that some of the criteria for authentic assessment defined by the authors overlap so the comparison helps to reveal that different tests serve different purposes.

Wiggins (1990) sees the problem of traditional tests not in the content, but in the form it is applied. The more authentic the tasks are, the more improvement instructors and students make. The assessment results would be more meaningful for teachers, and students would have more clarity about their obligations. In this discussion about choosing between one or another, the author says that conventional testing is the call to control performance. If the goal is to improve their performance in more relevant aspects, then the tests must be designed having in mind worthy tasks, criteria, and standards.

In Higher Education, Ajjawi *et al*. (2019) investigated the relationship between students' placement experiences. They examined two groups with different activities, one tightly coupled with the curriculum and the other loosely coupled. The author found that there were more opportunities for performance evaluation for students in a tightly coupled traineeship, including feedback from their external supervisor. Students identified this form of assessment as highly authentic. In this study, the authors have defined tightly-coupled placements as mandatory in the program, regulated by external bodies, the industry sector, and loosely coupled placements, including elective units and non-accredited placements, as optional or just complementary.

Ajjawi *et al*. (2019) adoption of a qualitative research approach is interesting because it gives particular insights into the field. The incorporation of students' experiences may indicate a path for more cooperation among all the actors. Other findings include that the alignment required for the work-integrated learning is dynamic, multi-layer, complex, and is constructed by the students.

In the context of higher education, particularly in business schools, Sotiriadou *et al*. (2020) investigate oral exams as a tool of authentic assessment. Its authenticity addresses the need to promote skill development and employability and improve academic integrity, particularly in business disciplines. The authors had two research questions. The first one was to check if the authentic evaluations in the formal environment would preserve academic integrity and promote skill development and employability. The second question aimed at understanding how the faculty could design this kind of test so as to enhance these results (SOTIRIADOU *et al*., 2020).

Sotiriadou *et al*. (2020) suggest that students perceive that interactive oral exams are highly authentic and relevant to their employability, and can also promote academic integrity and the decrease of the level of academic dishonesty. It is also relevant to online courses where academic misconduct is harder to prevent. And towards the design of authentic assessments, they propose six key points for a successful plan:

A. scaffolding and support. Instructors must provide evaluations during the way until the final oral test, so students will get the scope of the assessment increasing their engagement during their study;
B. scenario-based. Giving students contextualisation enable them to see relevance in real world activities;
C. aligned to program;
D. learning outcomes. The assessment tasks should align to the program and learning program outcomes;
E. accessible and equitable. Ensuring the assessment is not in conflict with institution's policies or building disadvantages amid students; and
F. professionally focused. To design authentic assessments highly professionally focused, by offering tasks that go beyond the training area. (2020, p. 14).

Wiewiora and Kowalkiewicz (2018) examined the role of authentic assessment by equipping students with leadership knowledge, professional skills, and, more importantly, developing leadership features. They investigated how authentic assessment could develop students' intra-personal leadership competencies by applying an exciting method to solve real problems

through authentic activities, capturing their reflections. The authors coded and analyzed it, establishing a framework for future studies.

In the literature, we can find at least three key factors that boosted the authentic assessment in higher education. Wiewiora and Kowalkiewicz (2018) compiled the three factors, and here there is an extension of recent studies that addressed the topics:

A. dissatisfaction with multiple-choice questions (KANKAM *et al.*, 2014; QUANSAH, 2018; HARPER, 2021);

B. interest among educators in other forms of assessment (CUMMING *et al*., 2019; MCKNIGHT, 2020; MUSSELIN, 2018), and

C. the desire to equip students for real-life situations (WIEWIORA; KOWALKIEWICZ, 2018; SOTIRIADOU *et al*., 2020).

Many studies criticize business education, pointing out issues in the curriculum of management schools related to the lack of employability skills, that is, pupils are not learning relevant abilities required from the market (JOHINKE, 2020; TYMON, 2013; MCMURRAY, 2015; MATSOUKA; MIHAIL, 2016). Attempting to investigate this gap, Farashahi and Tajeddin (2018) presented the advantages and disadvantages of the methods most used in business education, such as simulations, case studies, and lectures.

Simulations are imitations of operations from a real-world process, focus on experiential learning, having the students as the leading active players in the learning process in an open learning environment. There are many kinds of case studies. In sum, they help students develop alternative solutions for business problems or to put in practice the use of a theory to solve problems. The most common method is teaching through lectures. It is very systematic, necessary to provide theories, concepts, frameworks, ideas. However, the students take a passive role, decreasing their chances to develop managerial skills. That is why Farashahi and Tajeddin (2018) indicated simulation as the most effective method in developing interpersonal skills.

In this context, the issue of employability may suggest different ideas because the term is multi-dimensional and hard to be defined. Tymon (2013) asserts that "employability requires the possession of skills, but also personal attributes, which are aligned to personality theory"

(2013, p. 843). In the same direction, we talked about skills and required abilities as synonyms. We are aware that there are many terms related to employability in the literature taken from different perspectives. Tymon (2013), for example, lists standard agreements from different frameworks, the most common cited items are: good written and verbal communication skills; to be able to work in teams; and interpersonal skills.

3.1 The five-dimensional framework for authentic assessment

Cumming and Maxwell (1999) developed a relevant study about the term 'authentic assessment' that gained widespread use in education during the 1990's. We have already introduced the different interpretations of authentic assessments and their original goals in education. Overall, according to these researchers, to put elements of reality in a traditional assessment does not necessarily transform it into an authentic assessment, it would be just camouflage. Another important work on this subject we have to take into consideration is Gulikers, Bastiaens, and Kirschner (2004, 2006). They defined the Five-Dimensional Framework for Authentic Assessment (5DF) so as to explain how the design of the assessments applied in this work has been developed.

Cumming and Maxwell (1999) advocated that it is necessary to take the forms of assessment and tailor it accordingly to the nature of learning. Authentic assessment is not possible to achieve without proper attention to authentic achievement. Otherwise, if the assessor detaches both the realization and the examination of the nature of learning, it can lead to empty rhetoric and facile assessment.

The phenomenon of camouflage that we must avoid in this experiment occurs in attempts to implement the authentic assessment. With different degrees of sophistication, it is common in mathematics. The potential effect is only to make tasks more contrived and artificial (CUMMING; MAXWELL, 1999). For these authors, when building assessments, two lessons should be clear, no matter how realistic it is, it will always remain a simulation; and traditional testing or performance-based assessment methods are not going to solve all the limitations in this context. That is why the choice of assessment methods should depend on the skills to be assessed and a compound of methods.

James and Casidy (2018) adopted the five-dimensions framework of authentic assessment (5DF) that has been developed and tested by Gulikers, Bastiaens, and Kirschner (2004). This model comprehends five aspects as dimensions that can vary in their degree of authenticity. These aspects are tasks, social context, physical context, assessment result or form, and criteria and standards. They reached these dimensions by reviewing the literature in order to find what authentic assessment really means. The authors have found categories that led them to the 5DF. They have found that an Assessment Result can be authentic when it falls into the categories summarized below: :

A. **Tasks**. Meaning to confront students with activities they would ind in their professional practice;

B. **Social context**. The background influences the authenticity of the tasks. Working together is practically a rule in our society, towards developing authentic assessment models it is imperative to consider the effect of the environment;

C. **Physical context**. The level of authenticity in this context depends on the union of a set of elements such as, fidelity, resources and time. Fidelity to details. Avoiding students from resources (eg, calculator, tables) and time, in professional projects due to their complexity have bigger deadlines;

D. **Assessment result or form**. Regardless of the content assessed, four elements characterize the results:
   1. the quality of the product or performance of the students;
   2. a demonstration of these products to make valid inferences about the core competencies;
   3. a set of data that could provide fair conclusions; and
   4. oral or written presentation to third parties.

E. **Criteria and Standards**. Criteria must be clear, transparent, and relevant for competencies' development.

Gulikers, Bastiaens, and Kirschner (2004) consider an authentic task when it matches criteria as the integration of knowledge, skills, and attitudes, its complexity, and its ownership; the user of the assessment task must recognize these characteristics as relevant. Giving the students ownership helps to engage them in the activity. Most authentic assessments are complex, but it is not a rule, like in real life, problems also can be simple and dismiss multidisciplinarity.

In real life, it is almost like an obligation to work together. One must put up and cope with a team. The dimension of the social context must be considered in authentic assessment. We should consider the social system we are included in. However, at this point, Gulikers, Bastiaens, and Kirschner (2004) think differently from the literature of authentic assessment, which defines collaboration as a characteristic of authenticity (HERRINGTON, J.; HERRINGTON, A., 2006; REEVES, 2000).

Gulikers, Bastiaens, and Kirschner (2004) consider that the assessment must be done in collaboration only if the task demands collaboration. If it does not demand collaboration, there should not be objections to doing it individually. The authors also add that the social context should stimulate competition between the learners if the assessment is individual.

The physical context dimension leads us to a question: to evaluate students in a spotless and safe environment can prepare them for real-life situations? In reality, it is crucial to verify if the resources available contain relevant information. It is part of a physical context authentic assessment. Authenticity levels in a specific context of the environment are defined by the similarity of these elements to the original problem (*Ibidem*, 2004).

The criteria are the characteristics of the result of the assessments, and the standardization is what we expect from the grades and ages of students. Students must know the Criteria beforehand. It must be explicit and clear. Criteria can also be shaped by the other four dimensions, i.e., limitations in the physical context, and criteria must adapt to limitations imposed by the environment dimension (*Ibidem*, 2004).

The five-dimensional framework for authentic assessment remains relevant nowadays. There were just a few critics over the years. Some authors found implications in applying it, not in the model itself (NEELY; TUCKER, 2012; CARE; KIM, 2017). Two years later, Gulikers, Bastiaens, and Kirschner (2006) also addressed some of the implications questioned by scholars. In spite of the critics to the 5DF, many recent studies still use this framework partially or integrally (RADOVIĆ *et al.*, 2020; FARREL, 2020; ELLIS, 2020; JAMES; CASIDY, 2018), which reinforce our choice for the model. Henceforth we address some of these works.

Thus, Gulikers, Bastiaens, and Kirschner (2006) suggest that the implications of the 5DF consist in saying that students build authenticity partially from the five elements proposed by the 5DF. Essentially, it corroborates the idea of the multidimensional aspect of authenticity. In this specific study, the authors put that students and teachers perceived the social context as a less important element of authenticity. However, the literature indicates the social context as a dimension of authenticity assessment, so the authors reinforce the need for more research to validate it.

More recently, Radović *et al.* (2020), partially using the 5DF for authenticity, examined to what extent an authentic learning environment supports master students in both processes of re- and (de)contextualization. Based on the literature and their own experiment, they found that designing the authentic learning task to facilitate experiential learning in (re-)contextualization and decontextualization can be successfully done following the eight principles of the mARC model (RADOVIĆ *et al.*, 2020, p.15):

1. develop tasks with a high interdependence between theoretical inquiry and concrete learning experiences (reflecting professional situations' complexity);
2. make opportunities for students to demonstrate skills and knowledge by creating a significant product and creating understanding;
3. provide a sustained period of time for finishing the task;
4. facilitate that students see the variability of experiential learning activities without the rigidness of the fixed learning patterns;
5. the task should elicit higher-order thinking and stimulate a wide range of cognitive strategies (including elaboration, analysis, organization, or deduction);
6. the task should include shared work and collaboration activities with peers and the community of practice to mimic the activities of experts and professionals;
7. theoretical knowledge should be used as a tool to understand a concrete learning experience (recontextualization); and
8. should engage students in generalization processes to associate meaning from experience with a broader context of knowledge (decontextualization).

Aiming to answer if marketing simulations provide an authentic assessment of learning, Farrell (2020) contributed with a study from students' perception about this topic, also having the 5DF as part of the construct. He found that the computer simulations provide

undergraduate business students with an authentic assessment, giving students opportunities for reflection and developing an understanding of the real world of international marketing.

Foro almost two decades, authors from different fields apply the five dimensions framework (VILLARROEL *et al*., 2017; RADOVIĆ *et al*., 2020; FARREL, 2020), searching for better designing of authentic assessments. The next sections of this thesis dissertation will go deeper into this framework so as to understand James and Cassidy (2018) work itself and the applicability of this model in business education.

4 VALUE CO-CREATION

This master's dissertation is based on a systematic literature review, so as to scrutinize a given topic as a source of data. This type of study provides a summary of the evidence related to a specific intervention strategy, through the application of explicit and systematic methods of searching, critical appraisal, and synthesis of the selected information. Systematic reviews are particularly useful for integrating information from a set of studies carried out separately on a particular theory or topic, which may present conflicting or coincident results, as well as identifying topics that need evidence, helping to indicate themes for future research (SNYDER, 2019).

This section aims at providing a general panorama of value co-creation delivered from Service-Dominant Logic (SDL) Theory, and particularly value co-creation role in higher education.

The emergence of the S-D logic narrative occurred in the middle of the 1990 decade. At that time, Vargo and Lusch (2017) could foresee what would happen to their ground theory. They were still developing it, but now, almost three decades later, they suggest a partial research agenda, a possible path to comprehend and use this theory as a key research tool. It took them this time to realize that the core of the marketing process is more about a service-for-service exchange than an exchange in terms of goods-for-goods. In other words, while the value of an asset is co-created, it is important to consider that value is not created by one actor and delivered afterwards. Notice that this Theory is not "new", though other theories anchor its concepts (VARGO; LUSCH, 2017).

Few contemporary themes in marketing had such immediate popularity and critique as Vargo and Lusch's Service-Dominant Logic (HIETANEN; ANDÉHN; BRADSHAW, 2017). The SDL actually emerged in 2004 as a potential framework and a paradigmatic set of lenses for rethinking the role of service in exchange and value creation.

Thus value is co-created by multiple actors, always including the beneficiary in the context. The SDL brings another structure for the exchanges, and not only that it also changes the goals along the process. While in Goods-Dominant Logic the purpose of the exchange is the

profit for the firm, SDL demonstrates a design for the value co-creation (WILDEN *et al*., 2017; VARGO; KOSKELA-HUOTARI; VINK, 2020).

When the SDL is used to discuss value, it is not directed to profit or payment for services only. Instead, the value in SDL influences positively or negatively the results of a particular system or agent. Observe these two premises: a) actors cannot deliver value but they can participate in the creation and offering of value propositions; and b) a service-centered view is inherently beneficiary oriented and relational, therefore central in value co-creation discussion in SDL. Having this in mind, value co-creation occurs when there is an integration of the beneficiary or participant's resources with those applied by the service provider and others. In short, value emerges from resource integration, which is always co-created by multiple actors as Vargo, Koskela-Huotari and Vink (2020) pointed out.

In SDL, all the actors provide service, i.e., all actors can apply any kind of resources for others' benefit in the process of co-creating value. Hence all the agents / actors are both providers and beneficiaries of services. According to Vargo, Koskela-Huotari and Vink (2020), all the economic actors are part of the creation process. This situation shows that there is no dichotomy between producers on one side and consumers on the other side. They both are part of the same group on creating value.

In this context, actor-generated institutions and institutional arrangements coordinate value co-creation (VARGO; KOSKELA-HUOTARI; VINK, 2020). This special feature highlights the importance of institutions. Their role is crucial in value co-creation since they are responsible to empower actors so they would be able to increase the level of collaboration under time and cognitive limitations. Consequently, the value in SDL can be generated by institutions through their guidelines, making the integration of processes rise up to reality. The institutions arrange the activities to make the integration of resources possible. It regards coordination and giving criteria for value determination (WILDEN *et al*., 2017; BRODIE; LÖBLER; FEHRER, 2019; VARGO; KOSKELA-HUOTARI; VINK, 2020).

According to Vargo and Lusch (2017), ecosystems and institutional theory are tools that might be used to understand value co-created through the ongoing process of zooming out. This exercise of zooming in and out is advantageous to navigate through both levels, bringing more articulation to the Theory itself (VARGO; LUSCH, 2016, 2017). The ecosystem service

aims to consider all the networks instead of the dyadic interactions and discrete transactions. Otherwise, institutional arrangements would guarantee integration among all the actors. The institutions set the rules of the game up. These concepts help SDL to support its narrative of value co-creation through resource integration and service exchange.

It seems that SDL is capable to motivate the study of concepts of a higher order in business and management sciences, leading to academic research and practical knowledge that leads to the understanding and management of environments with complex dynamics in the real world. Therefore, the methods presented in some of our references seem to illuminate a new way to evaluate the research trajectories of paradigms in Marketing and be used by other social sciences. The understanding of the higher-order themes that inform SDL can enhance the understanding of the nature of the exchange and, mainly, of the creation of value based on a co-creation, which is an essential theme for the SDL (POHLMANN; KAARTEMO, 2017; VURAL, 2017; WILDEN *et al.*, 2017).

Hence the concept of value is an integral aspect of SDL that emphasizes value in use (contextual) opposing the understanding of the value in exchange for Goods-Dominant Logic (transactional). The origins of this perspective points to a change of traditional vision of goods production, centered on the company, for an interest in studying co-creation from customer experiences. In SDL theory, value is not only exchanged with other actors but is co-created in the same context. The actors are connected to other actors at different levels of the ecosystem of services, from the small world to the broader world. Experts suggest that there is still uncertainty about the main definitions of value co-creation and co-created value as a process, then the necessity for further research (POHLMANN; KAARTEMO, 2017; VURAL, 2017; VARGO; LUSCH, 2017).

Vargo, Koskela-Huotari, and Vink (2020) provide a broad range of research streams and disciplines that are using SDL. They highlighted the application of this Theory in some areas such as service research where there is some kind of changing of focus from goods to service, Marketing, which relies on SDL guidelines for the development of a general theory of the market, and many other fields: engineering, information systems, management, health, art philosophy and creative industries, design, ecosystem services, education, among many others evolving towards a general theory of value co-creation as the purpose of society.

Despite its wide applications in such a wide array of fields of knowledge, there is an obvious limitation of the SDL axioms related to the presence of articulation mechanisms for the coordination and cooperation necessary for the co-creation of value in the markets and in society. This was observed by Buhalis, Andreu, and Gnoth (2020) who undertook an effort in this direction, by making a thorough review in the literature, a netnography and a case study, to discuss the co-creation and co-destruction of value externalized by the interested parties in the accommodation sharing platforms so called *Airbnb*.

By incorporating the co-creation of value in social relations, regulations, and institutions, the concept of service ecosystem lightens the collaborative economy. In this case of shared accommodation, Buhalis *et al*. (2020) identified five domains in which resources are affected: economy, technology, ecology, society, and local institutions. It is a complex operation. The benefits are perceived in two ways, sometimes by belonging to a compassionate community, sometimes related to the reciprocal and balanced character of the transactions. The concept of co-creation is not generalizable. Specific contexts and cases can be appreciated and studied thoroughly.

The generalization of value co-creation in the shared accommodation scenario comes into suspicion due to issues identifying parties involved, showing how impacted they are, who, or what is affected. Failures in these models can lead to co-destruction. Events such as the loss of the platform's operating license or the destruction of the sense of community of residents are examples of the negative aspects that follow this kind of enterprise (BUHALIS *et al*., 2020).

All in all, the *Airbnb* study addresses the need to find a balance that promotes the co-creation of value for all parties interested in sharing economy relationships against value co-destruction. To this purpose, a big responsibility lies on local authorities, who must mediate with appropriate legislation, security forces, and partnerships, ensuring this balance.

Yen *et al*. (2020) took on a different direction to demonstrate co-creation mechanisms among institutional actors. They conducted a study so as to take in the food industry in certain aspect. The results indicated that customer engagement can be a key checkpoint to detect how innovation influences value co-creation behaviors for beneficiaries.

4.1 Value co-creation in higher education

Systematic reviews, such as Voorberg *et al*. (2015), also guide possible paths while presenting the context in which co-creation is a common practice and the sectors of society that this practice should be encouraged and enhanced. Ratten (2020) studied how the world pandemic of the vírus known as Covid-19 increased levels of co-creation of value by creating innovative benefits in society, however, we know that society will never be the same as before. This means that policy makers need to be innovative towards incorporating social value co-creation initiatives during the pandemic, maintaining existing policies at the same time.

Ranjan and Read (2016) carried out a conceptual validation work for value co-creation. They realized that several studies from the analyzed data set include elements of co-production and value-in-use attempting to conceptualize co-creation, therefore, offer objective evidence that the co-creation of value is inherent to co-production, as well as the specificity of the value-in-use. These perceptions about such mechanisms of co-creation of value offer several conceptual advances and possibilities for future research.

Donovan *et al*. (2017) implemented an experiential learning project that allowed them to observe the co-creation of value in the classroom within the participation and the development of students' practical skills. The researchers found that even with learning projects designed for the co-creation of value,students will not be active in the process if there is absence of motivation.

The authors offered the social media monitoring project to graduates of marketing courses at a large public university in the United States Midwest. Given the growing importance of social media in the business environment, the researchers put on a project using co-creation of value to teach how to monitor, analyze, and report social media activities - due to a university partnership with a media intelligence company that provides software for such activities. This was a great step for the use of new technologies on experiences of co-creation of value in higher education (DONOVAN *et al*., 2017).

In short, the researchers developed an opportunity to co-create value for students within an experiential learning project, confirming their original hypothesis that predicted that motivations and the interest in the project would moderate the positive benefits of value

co-creation in an experiential learning project. It is important to note that student engagement was a key factor for the success of the project. However, in the end, not all of them achieved worthwhile results. The significant contribution of the research was to identify the need to increase students' motivation to seek co-creation of value at the higher education level - i.e., the experience itself (DONOVAN *et al*., 2017).

Dollinger, Lodge, and Coates (2018) also introduced a research about co-creation in higher education. According to the authors, students are assuming the role of more participation with the professors. They classified this behavior as a form of value co-creation. It occurs when students assume a proactive attitude towards giving their opinion, or feedback, in participating in the institutions' decisions and exploring its resources. This work presented the first conceptual model of value co-creation in higher education using a lens of co-creation cultivated through business and marketing literature, anchored on Service-Dominant Logic. Their findings suggest "the model details specifically how value co-creation can supplement value to higher education, both within the institutions themselves and for the students on whom the institution relies" (p. 226), a strong argument for this application.

5 METHODOLOGY

A question that took our attention since we started going through the literature is: how this project could contribute to the Marketing literature? Creswell and Creswell (2018) had already proposed this same question and have suggested two distinct paths. The first one, by picking a new topic not yet examined;or the second, by replicating a study under unique circumstances, such as new participants, place, and time.. We chose to pursue the latter for the possibilities this approach seemed to open at the time.

The quantitative approach also seems to be the right one that could render a reliable description of the trends of a 'population' of undergraduate business students, which helped us understand a bit further the relationships between the study variables.

This chapter describes the replication design we used as a model for this research, its importance, the conceptual framework, the variables and hypotheses origins, the characteristics of the sample, the data collection instrumentalization, the measures, the manipulation check, the hypothesis testing, the results, and, finally, the discussion granted by all of these.

5.1 The replication design

By definition, "replication is a reanalysis of a study, building on a new data set that was constructed and statistically analyzed in the same way as the original work" (LAVRAKAS, 2008, p. 719). This master's dissertation is not a simple verification of previously collected data. It is a replication but it presents new data and has run an extension of the previous statistical analysis. Anyways, replications should be a challenging task even for the original researchers. We tried to conduct this research using the same instrumentalization. We were aware that usually in social sciences studies cannot be entirely replicated because the population analyzed is in constant change, hence they may not behave or do things the same way (LAVRAKAS, 2008; THALER, 2021).

Once we have decided what and how to do the replication, we started to ground our experience based on Clemens (2017) set replications. According to the author, a replication test can take two forms:

A. a verification test, which means using the same data set and statistical analysis from the original study; and

B. a reproduction test, resampling the same population, and using the same statistical methods.

Clemens (2017) puts that a robustness test can also take two forms:

A. a reanalysis test, consisting of using or not the same data for a different computer code; and

B. an extension test, a new data from a different population, using or not the same statistical analysis.

Under these settings, we can say that our work is exclusively an extension test, because the new data will undergo the same basic statistical instrumentalization. In addition to that, we have introduced a new potential moderator - the psychological trait of competitiveness. The basic idea was to make our enterprise insightful and meaningful. Even Clemens (2017) remarks that social sciences need more replications, and it is crucial to standardize the forthcoming replications (CLEMENS, 2017).

5.2 Variables and hypotheses

As said here, this research replicated and extended James and Casidy (2018) study, which evaluated the effect of the authenticity of assessments on promotion behavior towards a course by undergraduates in a business school. It is assumed that this effect is mediated by student satisfaction and that the relationship between authenticity and satisfaction is moderated by career ambition (FIGURE 1). Thus, we added a second moderator variable (competitiveness) to the original plan. Its theoretical diagram is reproduced by Figure 2, an adaptation from model 9 proposed by Hayes (2018).

Figure 1 - Conceptual framework replicated
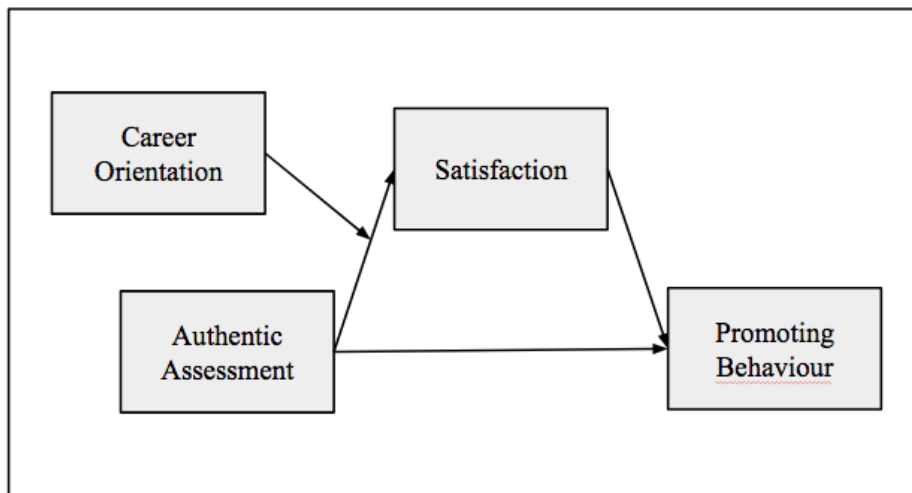
Source: James and Casidy (2018, p. 403).

Figure 2 - Conceptual framework
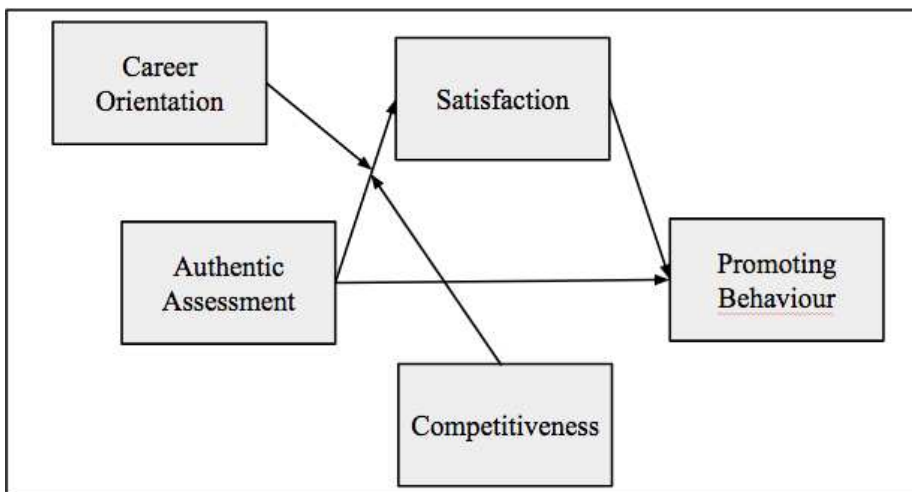
Source: adapted from Hayes (2018, p. 589), model 9.

Notice that the original study presented the hypotheses due to what they have found in the literature review about the study variables. James and Casidy (2018) were not setting the assumptions by chance, i.e., without a method. Hence, we have decided to summarize the main ideas found on the literature review that preceded each deduction from the replicated work so as to reproduce the same hypotheses. We also updated the topics based on recent research works (DAHL; PELTIER; SCHIBROWSKY, 2018). By doing that, we confirmed the primary content and asserted the reliability of the prior research that served as reference to this one.

Back in the middle of the 1990's, Scouller and Prosser (1994) asserted that assessments that encourage transformational learning could improve students' satisfaction with their university. Almost 25 years later, Dahl, Peltier, and Schibrowsky (2018) recognized that the case teaching method is well spread in marketing. However, they are not as empirically adequate as the real-world activities that improve the students' critical thinking.

In general, students care about employability. They believe it to be essential to develop abilities in order to engage in real situations on a day by day basis. Dahl, Peltier, and Schibrowsky (2018) pointed out that activities

Holmes and Weaver (2020) point out some of the consequences of the good and bad choices regarding the kinds of assessments we have to deal with in our school trajectory. Professors must reflect on the perspectives about student evaluation and students, on their side, check what is valued with direct and indirect signs. Silva and Brambilla (2020) identified that professors usually have great expectations that students act as proactive agents in constructing knowledge. They also observed that students characterize the professors as someone to enable some kind of support for their development, but not as the only source of knowledge. So, there is value co-creation in the students' knowledge construction.

We must have in mind that this framework does not depend on the moderator variable to fix its direct effect. Using this model, we see the results are unaffected by setting the direct effect despite the career orientation variable (HAYES, 2018).

List of hypotheses (H)

Hypothesis 1: Authentic assessment is positively related to student satisfaction

James and Casidy (2018) concluded that an essential aspect of supportive student behavior is recommending the university to others. Thus, the universities must find this support amid their students and alumni to remain competitive. Notice that this research focused on students' promoting behavior within the scope of a fictitious course. Based on their literature research, the authors reported that word-of-mouth recommendations from students are an important source of information for choosing a university.

According to Chen (2016, p. 31), university students' brand image, satisfaction, and loyalty will influence the sharing of satisfying experiences and making recommendations to others. Other authors also put satisfaction as a critical factor for promoting behavior, a high level of satisfaction contributes directly to building a good reputation of the institutions (HANAYSHA *et al.*, 2011; SADEH; GARKAZ, 2015; MEŠTROVIĆ, 2017; MUNAPA; YAHAYAB, 2019).

Hypothesis 2: Authentic assessment is positively related to promoting behavior

The conceptual framework indicates that authentic assessments have indirect effects on promoting behavior through satisfaction as the mediating variable (JAMES; CASIDY, 2018) (see FIGURE 1).

The aim of mediation analysis is to authenticate the extension in which a variable "X" affects some outcome, "Y", through one or more mediator variables (HAYES, 2018). We can also set this mediation "M" as a mechanism through which X influences Y, being an emotional, cognitive, biologic, or any other phenomenon (PRADO; KORELO; DA SILVA, 2014). Based on this model, we analyze whether the interaction between Authentic Assessment and Promoting Behavior is mediated by Career Ambition.

These authors predicted that students who are satisfied with authentic assessments would in turn spread positive messages about the unit to other students when they have an opportunity to do it. What is confirmed by the original study and up-to-date literature review is that satisfied customers (an analogy to the students in focus) tend to talk about their positive experiences (JAMES; CASSIDY, 2018; BARARI, ROSS; SURACHARTKUMTONKUN, 2020; RYU; PARK, 2020; SANTINI *et al.*, 2020). We also point out that the customers also tend to share their negative experiences when they attribute service failure to the company (BARARI; ROSS; SURACHARTKUMTONKUN, 2020).

Hypothesis 3: Student satisfaction mediates the relationship between authentic assessments with promoting behavior

There are many key factors in student motivation even more relevant than the content being taught. It goes from the importance of the instructors knowing the students' names to the chosen teaching method, and beyond the motivation factor. In this context, some authors also

investigated factors of dissatisfaction, since students can be demotivated about grading and assignments or with self-centered professors (COOPER *et al.*, 2017; DÖRNYEI; USHIODA, 2011).

Career orientation can have significant effects on student's attitude towards authentic assessments, and this aspect is the focus of the research we have replicated. The authors observed that the impact of authentic assessment on satisfaction is more substantial among highly career-oriented students (JAMES; CASIDY, 2018).

Hypothesis 4: The positive effect of authentic assessments on student satisfaction will be moderated by students' career orientation level, with the positive effect being stronger for highly career-oriented students than it is for less career-oriented students.

In addition to James and Casidy's (2018) remarkable study, we suggested another moderation of the effect of authentic assessment on student satisfaction. This new moderation is represented in the form of a conceptual framework as seen in Figure 2. This diagram illustrates a process in which the effect of the variable of interest "X" (Authentic Assessment) on "Y" (Promotion Behavior) is influenced by or dependent on "W" (Career Ambition), and "Z" (Competitiveness).

Grudistova *et al.* (2019) found a high level of motivation in using personal creative potential in solving specific practical problems that are becoming the most critical factors in the competitiveness of graduates in the labor market. From our perspective, this idea endorses how important it is to analyze the combined effects of these moderators variables, Career Ambition and Competitiveness.

Posselt (2021) conducted a study that clarified how organizational and individual factors in graduate students' mental health may be intertwined through competitive, discriminatory or supportive interactions with peers, faculty, family, and friends, students that face racial discrimination, financial issues, or is an LGBTQ student. This group tends to face more anxiety and depression when they perceive competitiveness.

Hypothesis 5: The positive effect of authentic assessments on student satisfaction will be moderated by students' career ambition and competitiveness levels. The positive effect is stronger for highly career-oriented and highly competitive students than it is for less career-oriented and less competitive students

5.3 Sample and data collection

The total sample, presented in Table 1, had 129 respondents; 50% men; 49% women; and 1% non-binary. The average age of the participants is 25 years old, of which 62% are in the age group from 17 to 25 years old. From this group, 83% of the population comprises students from public universities, 17% are students from private schools. After we had made the invitation to the selected group, it took us a week to collect the data. Universities' coordinators distributed the questionnaire among the management undergraduates, who responded to it voluntarily. As a token of our appreciation to the event, we donated R\$ 2.00 (Brazilian currency - *reais*) to the non-governmental organization "SOS Pantanal" for each of the valid replies provided by the students..

We used the *Google Forms App* to apply the questionnaire to the participants. The choice between the two scenarios of more and less authentic assessment was done at random; for the translations from English to Portuguese see Appendix A and B. Based on the random responses of the participants, they chose an option among four keywords, thus were directed to one of the scenarios. Among the 129 observations the $N_{non-authentic} = 64$ and $N_{authentic} = 65$. The scenarios were adapted from James and Casidy (2018). Their description and the resulting data from them are described below.

Scenario A: low authenticity

You are enrolled in a business subject, and this is a brief description of your major assignment that is worth 50% in the unit. The assignment asks you to observe a case study based on a fictional problem or scenario that may occur within a specific industry sector.

You are NOT allowed to make any contact with relevant companies or its representatives. You are then asked to present a report to the assessor, addressing various issues or questions based on the fictional scenario contained within the case study presented.

Scenario B: high authenticity

You are enrolled in a business subject, and this is a brief description of your major assignment

that is worth 50% in the unit. The assignment asks you to observe a case study based on an actual problem experienced by a company.

You are then provided with an internship opportunity within the company to interact with company representatives in a workplace setting. You are then asked to present a report to both the assessor and company representatives proposing strategic solutions to the company in order to address their problems.

Table 1 - Demographic profile of the sample

Variable	Categories	Frequency (Valid%)
Gender	Male	50
	Female	49
	Non-binary	1
Age	17-25 years	63
	26-35 years	33
	36-50 years	4
Universities	Public	83
	Private	17

Source: the author.

5.4 Measures

After reading the randomly assigned scenario, respondents evaluated items with a *7-point Likert-type scale*. We obtained the factors of authenticity, career orientation, satisfaction, and promotion behavior from James and Casidy (2018). To measure competitiveness, we used a scale empirically validated from prior research. Mowen (2000) conducted a pilot study to develop *The Need to Compete Scale*. After many tests, adding and removing items, he found a four-item scale in which the coefficient Alpha was 0,92. Many researchers are still using this same scale, integrally as we did here or adapting it (see BLUT; WANG, 2020; CHEN, 2019; ISLAM; RAHMAN; HOLLEBEEK, 2017; TAY, 2018; GUPTA; GENTRY, 2016).

After that we ran out reliability and validity tests of the scales of authenticity, satisfaction, promotion behavior, and competitiveness. Initially, for verifying the assumed dimensionality of these scales, we have performed an exploratory factor analysis (EFA) as shown on Table 2. In the four cases, the first extracted factor presented more than 50% of the common variance. Therefore, we can interpret the four scales as one-dimensional scale. We calculated

the reliability of the scales via *Cronbach's Alpha*, with respective results of 0.87, 0.91, 0.97, and 0.74 that indicate internal consistency, evidence of reliability.

The convergent validity was estimated by the average variance extracted (AVE) for the scales of authenticity, satisfaction, promotion behavior and competitiveness which presented values as $AVE_{AUT} = 0.79$, $AVE_{SAT} = 0.85$, $AVE_{PRO} = 0.94$ and $AVE_{COM} = 0.57$ (see TABLE 2). AVE values above 0.5 indicate convergent validity.

Table 2 - Validity and psychometric properties

Variable	Code	SFL*	α**
Authenticity	**AUT**	**.790**	**.87**
This assessment is clearly oriented to professional requirements.	AUT1	.742	
This assessment would prepare me for my future profession.	AUT2	.780	
This assessment is oriented to my future profession.	AUT3	.848	
Satisfaction	**SAT**	**.853**	**.91**
I would think I had done the right thing if I decided to enroll in this unit.	SAT1	.772	
I would be satisfied with the education I received in this unit.	SAT2	.898	
I would be satisfied with my experience in this unit.	SAT3	.891	
Promoting Behavior	**PRO**	**.937**	**.97**
In social situations, I would speak favorably about the unit.	PRO1	.911	
I would 'talk-up' this unit to people I know.	PRO2	.944	
I would bring up the unit in a positive way in conversations I have with friends, classmates, and acquaintances.	PRO3	.956	
Career Ambition	**CA**	**-**	**-**
I want to be in a position to do mostly work which I really like.	-	-	-
Competitiveness	**COM**	**.570**	**.74**
I enjoy competition more than others.	COM1	.643	
I feel that it is important to outperform others.	COM2	.690	
I enjoy testing my abilities against others.	COM3	.398	
I feel that winning is extremely important.	COM4	.549	

Source: the author.
* Cronbach's Alpha
** Standardized factor loadings

Two criteria verified the discriminant validation of the constructs (categories) of authenticity, satisfaction, promotion behavior, career ambition, and competitiveness. The simplest one was based on the bivariate correlation analysis between the variables that represent these constructs. These variables were defined by averaging its items, e.g., AUT was obtained by averaging the scores of the three items from the authenticity's construct AUT1, AUT2, and AUT3.

The use of variables to represent the constructs is justified by the consistency of the scales and the need to test the hypothesis of effect, mediation, and moderation, using regression analysis and a macro process created by Andrew Hayes (2018). All the correlations were positive (see TABLE 3), ranging from .05 to .81. Another adopted criterion was the comparison of the correlations with the AVE square root of the constructs. When the square root of the AVE is bigger than the module of the correlation of the construct compared with the other items, there is an indication of discriminant validity. E.g., $\text{AVE}_{\text{AUT}} \sqrt{.790} \simeq 0.89$ is greater than the correlations of AUT with SAT, PRO, COM, and CA, respectively .76, .72, .12, and .25. When comparing SAT, PRO, and COM AVE roots, we obtain similar results as presented on Table 3. Thus we have other evidence of discriminating validity between the constructs.

Table 3 - Correlation matrix

	Mean	SD	AUT	SAT	PRO	COM	CA
Construct							
AUT	5.06	1.49	**.89**				
SAT	4.70	1.63	.76	**.92**			
PRO	4.68	1.86	.72	.81	**.97**		
COM	4.54	1.39	.12	.05	.08	**.75**	
CA	6.34	1.01	.25	.24	.22	.09	**N/A**

Source: the author.

5.5 Manipulation check

In experiments with two groups, the ideal solution is to arrange the participants so as to set up groups of the same size. Unfortunately, it was not possible for this case, and the groups were set up with slightly different sizes (see TABLE 4). To verify the success of the randomization, the averages of the AUT measures obtained were compared. The 64 participants of group 1 ($\overline{X}$ = 13,56, σ = 4,36) compared to the 65 in group 2 ($\overline{X}$ = 16,55, σ = 4,04) assessed the scenario as less authentic as expected, $t(127) = -4.31$, $p < 0.01$.

Table 4. Independent Sample t-Test

	Mean	Levene's test for equality of variances		t-test for Equality of Means		
		F	Sig.	t	DF*	Sig. (2-tailed)
AUT	Equal variances assumed	2,380	.125	-4,310	127	.000

Source: the author.

*Degrees of freedom
5.6 Hypothesis testing (H)

To test hypotheses H1, H2, H3, and H4, we used model 7 of the Process macro and model 9 to test hypothesis H5. Following Hayes and Matthes (2009) recommendation, we ran an analysis with five thousand bootstrap samples. To avoid bias, we have tested the statistical significance of the indirect effect using an interval of confidence of 95% (PREACHER; HAYES, 2008). Overall, it resulted that authentic assessment (AUT) and career ambition (CA) indicate a great portion of the total variance of satisfaction (SAT) ($F_{(3, 125)} \simeq 64.39$, $p < 0.001$; $R^2 \simeq 0.60$). In parallel to these results, authentic assessment (AUT) and satisfaction (SAT) also indicate a great portion of the total variation of promotion behavior (PRO) ($F_{(2, 126)} \simeq 137.56$, $p < 0.001$; $R^2 \simeq 0.68$).

H1: Authentic assessment is positively related to student satisfaction.

H1 was confirmed by the test. That is: more authentic assessment leads to higher levels of satisfaction within the course ($\beta = 0.83$, $\sigma x = 0.06$, $t = 13.03$, $p < 0.001$). In other words, this result indicates that students are more satisfied in conditions of more authentic assessments.

H2: Authentic assessment is positively related to promoting behavior.

H2 was also confirmed ($\beta = 0.31$, $\sigma x = 0.10$, $t = 3.22$, $p < 0.001$). It previously pointed to a direct and positive effect of the assessments' authenticity on the promotion behavior . Thus, the more authentic the assessment, the more students will recommend the course (or the program, school, and anything related to it).

H3: Student satisfaction mediates the relationship between authentic assessments with promoting behavior.

H3 pointed to an indirect effect, with satisfaction mediating the relation between authentic assessment and promotion behavior. If the direct effect of authentic assessment on satisfaction is moderate, the indirect effect will also affect students' career ambition. In sum, although satisfaction can emerge as a significant mediator amid authentic assessment and the promotion behavior, this indirect effect will depend on the students' career ambition. It is a conditional process analysis (PRADO; KORELO; DA SILVA, 2014). H3 was endorsed, the

bootstrapped confidence interval has excluded zero. In Table 5, there is an indirect effect of AUT over PRO, via SAT for the varying CA levels, values of the moderator at the various percentiles 16th, 50th, and the 84th (HAYES, 2018).

Table 5. - Indirect effect AUT → SAT → PRO

CA	Effect	Boot SE	Boot Lower Level CI	Boot Upper Level CI
-1.3411	.4130	.0872	.2803	.6242
.6589	.6727	.1070	.4681	.8903
.6589	.6727	.1070	.4681	.8903

Source: the author.

H4: The positive effect of authentic assessments on student satisfaction will be moderated by students' career orientation level, with the positive effect being stronger for highly career-oriented students than it is for less career-oriented students.

We confirm the moderate mediation effect pointed in H4. The confidence interval of the index of moderated mediation, calculated by the bootstrap samples, does not include zero: $Index_{CA}$ = .13, $Boot_{\sigma x}$ = 0.05, $Boot_{LLCI}$ = .0157, $Boot_{ULCI}$ = 0.2092. To put it another way, this result indicates that students with greater Career Ambition had a stronger correlation in the interaction between Authentic assessment and Satisfaction. For the interaction between CA and AUT, see Table 6.

Table 6 - Bootstrap results for regression model parameters

	Coeff	Boot Mean	Boot SE	Boot LLCI	Boot ULCI
Constant	4.6269	4,6323	.0987	4.4425	4.8283
AUT	.8261	.8330	.0632	.7112	.9633
CA	.0988	.0822	.0939	-.1219	.2544
Int_1	**.1827**	**.1697**	**.0649**	**.0225**	**.2777**

Source: the author.

Notice that Figure 3 indicates the effect of authenticity (AUT) over satisfaction (SAT), moderated by career ambition (CA), also in support of H4. This means that in the interaction of authentic assessment on satisfaction the effect is stronger among students with highly career ambition (β = .9464, σx = .0777, t = 12.1785, p < .001) than it is with those students with less career ambition (β = .5810, σx = .1022, t = 5.6852, p < .001).

Figure 3 - the effect of authenticity (AUT) over satisfaction (SAT), moderated by career ambition (CA)
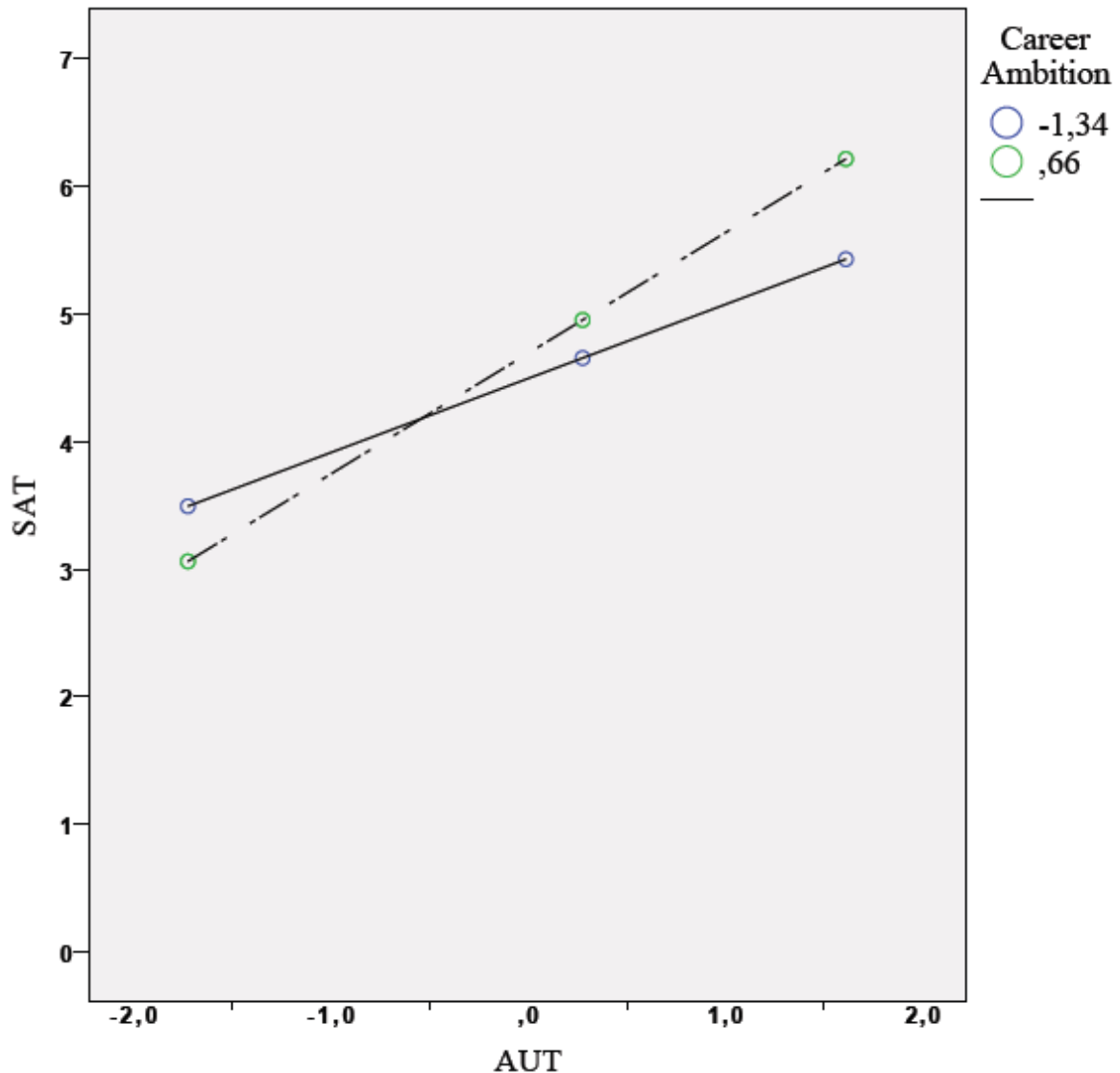
Source: *SPSS* output.

H5: The positive effect of authentic assessments on student satisfaction will be moderated by students' career ambition and competitiveness levels. The positive effect is stronger for highly career-oriented and highly competitive students than it is for less career-oriented and less competitive students.

We performed a moderation analysis to investigate the extent to which levels of career ambition (CA) and competitiveness (COM) moderated the relationship between Authenticity (AUT) and Satisfaction (SAT). Table 7 presents that the interaction between CA and COM did not have a statistically significant effect.

Table 7. Moderation Effects

	Coeff	SE	t	p
Constant	4.6268	.0950	48,71	.0000
AUT	.8305	.0644	12,90	.0000
CA	.1025	.0943	1.09	.2794
X*W[1]	.1793	.0642	2.79	**.0061**
COM	-,0404	.0670	-.60	.5470
X*Z[2]	.0056	.0413	.14	**.8918**

1 - Interaction between AUT and CA
2 - Interaction between AUT and COM
Source: the author.

Figure 4 shows the effect of authenticity (AUT) over satisfaction (SAT), moderated by competitiveness (COM) and career ambition (CA). Note that the effect of authenticity (AUT) on satisfaction (SAT) is slightly more significant for competitiveness (COM) within intermediate and low levels. H5 is not supported in this case.

Figure 4 - effect of authenticity (AUT) over satisfaction (SAT), moderated by competitiveness (COM) and career ambition (CA)
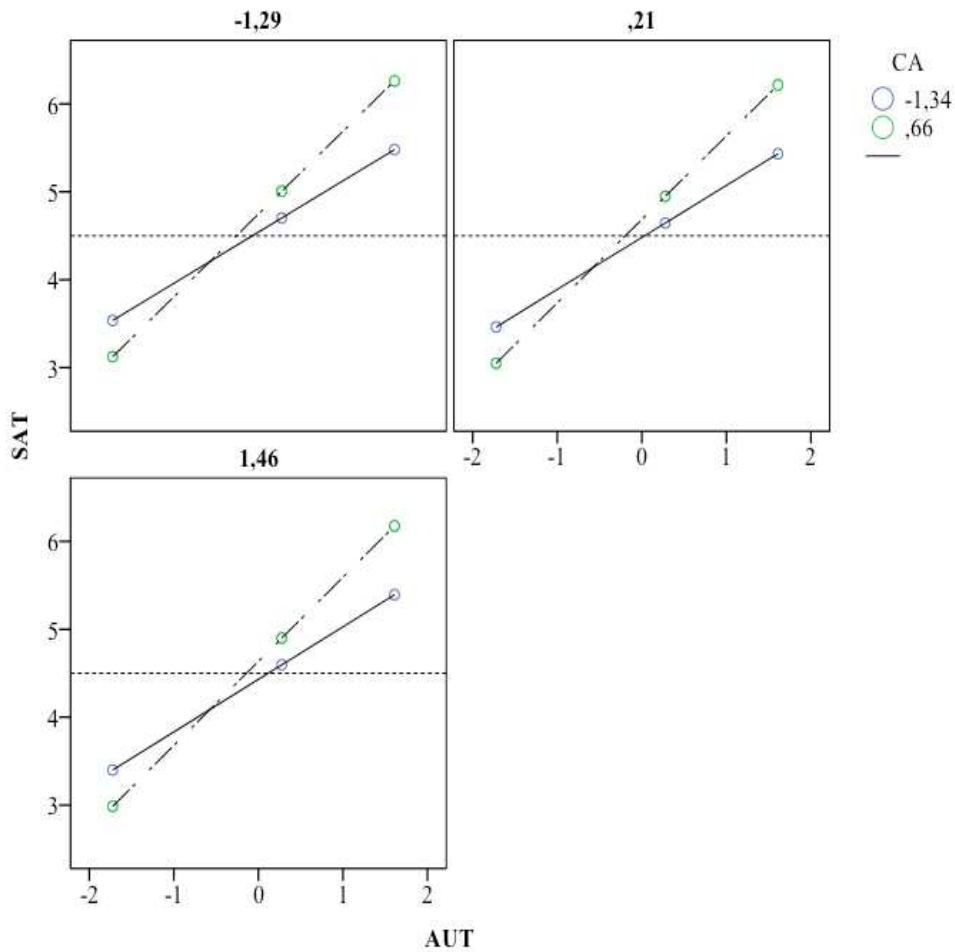
Source: *SPSS* output.

Model 7 (HAYES, 2018) analysis was also performed, replacing career ambition with competitiveness. In this case, there was also no moderation. Check table 8 and Figure 5 for detailed information.

Table 8 - Bootstrap results for regression model parameters

	Coeff	Boot Mean	Boot SE	Boot LLCI**	Boot ULCI***
Constant*	4.6892	4.6861	.0937	4.5009	4.8718
AUT*	.8398	.8438	.0642	.7227	.9727
COM	-.0471	-.0465	.0726	-.1947	.0944
Int 1	**.0250**	**.0266**	**.0468**	**.0636**	**.1234**

*Observe that there's a small difference between the values for these variables and the same ones in table 6, it happens because each time PROCESS is run as a result of the random sampling process confidence intervals and standard errors will differ slightly.
** Lower Level Confidence Interval
*** Upper Level Confidence Interval
Source: the author.

Figure 5 - The effect of authenticity (AUT) over satisfaction (SAT), moderated by competitiveness (COM)
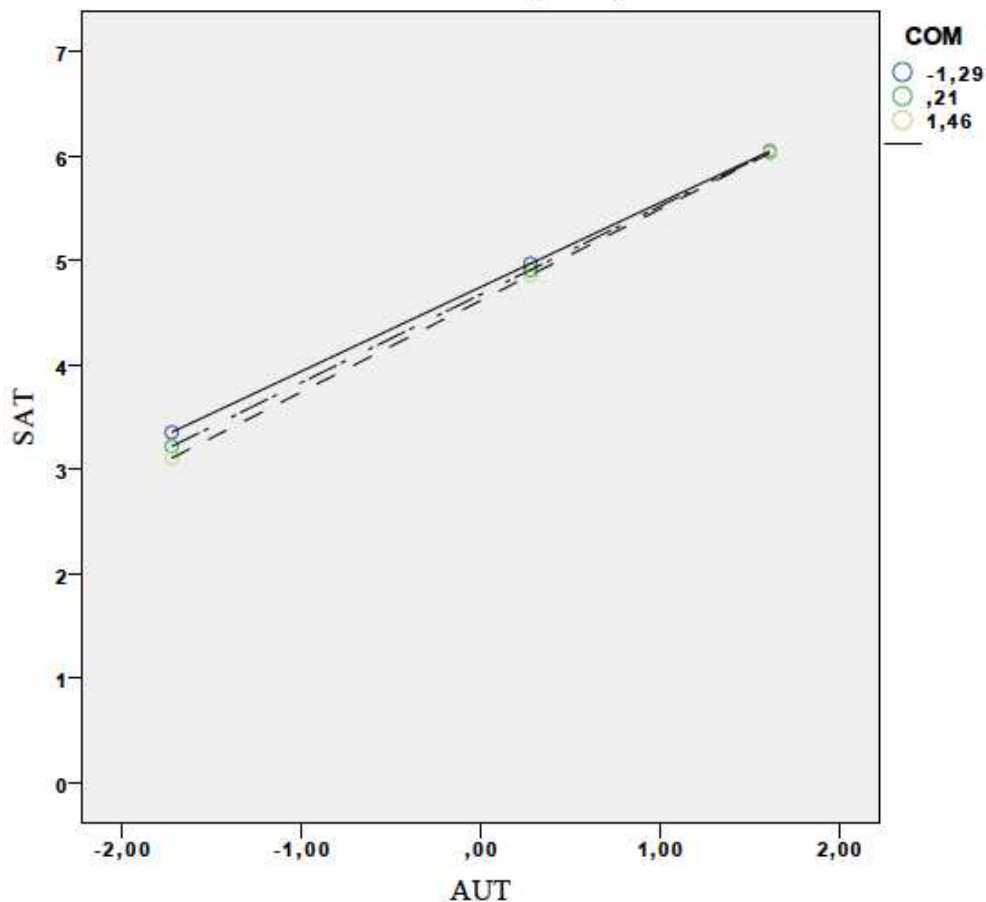
Source: *SPSS* output.

6 DISCUSSION AND RESULTS

Results validated all the hypotheses of the pivotal study. Table 9 summarizes the results of the hypotheses testing.

The authentic assessment is positively related to student satisfaction and promoting behavior, confirming hypotheses H1 and H2. The more authentic the assessment, the greater the students' satisfaction and the promoting attitude.

We used a mediation analysis as a statistical method to answer how the independent variable "authentic assessment" affects the dependent variable "promoting behavior". Mediation, "satisfaction", was the mechanism by which AUT influences PRO. Student satisfaction mediated the relationship between authentic assessments and promoting behavior.

The effects of authentic assessment are stronger among students with higher levels of career ambition than those who are less ambitious, but the effects are not statistically significant when we add the variable competitiveness. For all the levels of competitiveness, low, medium and high, the levels of satisfaction remained almost the same, see figure 4.

Table 9. Hypotheses testing results

Hypotheses	β	t-values	Tests results
H1: AUT is positively related to SAT	.83	13.03	Supported
H2: AUT is positively related to PRO	.31	3.22	Supported
H3: SAT mediates between AUT and PRO	.71	8.13	Supported
H4: AUT on SAT moderated by CA	.95	12.18	Supported
H5: AUT and SAT moderated by CA and COM	*	*	Not supported

*did not have a statistically significant effect.
Source: the author.s

7 LIMITATIONS

We are aware that this thesis dissertation could contribute to some fields related to higher education, particularly for the studies of business also that it has some limitations. We tried to conduct this research using the same instrumentalization of another study, aware of the limitations of this kind of replication in social sciences, since the population analyzed is in constant change. Therefore, the sample we worked with is totally different in time and space relations with cultures, social background, education methods, universities, and so forth.

The second limitation can also be a suggestion for future studies. Our main goal was to replicate the experiment presented by James and Cassidy (2018) but as a field investigation. We would compare the level of satisfaction (DV) and the intention to recommend a workshop on sustainability (DV), in which the degree of authenticity of the learning assessment (IV) would vary for two classes, and the content taught would be the same for both of them. The workshop would be offered for undergraduate students in a business school.

We could not follow with the experiment we designed at first due to the COVID-19 pandemic. It would not be possible to have the experiment in the traditional format, presenting lectures in person at the university, and we also understood that if we had implemented it in the online format, it could have created a bias - all the groups would have possibly understood both activities as more authentic.

We believe that it would be interesting to test more scales and apply different assessments in order to compare more results. In this case, the limitation would be the lack of a bigger sample and the financial funds to carry on the experiment.

We also regret that we did not have the opportunity to exchange information with the authors of the pivotal study, Professors Lincoln T. James and Riza Casidy, from the Department of Marketing, at Deakin University, Geelong, Australia. We believe it would enrich our work greatly.

CONCLUSION

We hope all the hypotheses tested here will be repeated as many times as possible in many other research pieces. This certainly would increase the confidence level we aim for. Hence, other researchers may run more analyses comparing the results, providing broad assessments of variables that co-occur with the ones we presented here, permitting analyses delineating the specificity of the replications we aim for as well.

In a way, we cannot call this a conclusion, once it is only a result ready to be challenged or verified and enlarged with useful data. The output of the conditional analyses we have run on *SPSS* software is available in Appendix C, D, and E. They are presented in the output format of this software. We hope it may help future studies.

Overall the literature we have used as theoretical background revealed a gap between what employers expect from new graduates and what educational institutions give in terms of employability skills. This gap indicates that companies (just one part of the market) expect more than a diploma from their employees. Besides the academic expertise, they actually require professionals equipped with and ready to perform communication and social abilities.

Remarkably, the results of our search validated all the hypotheses of the pivotal study (JAMES; CASIDY, 2018). It indicates that the authentic assessment is positively related to student satisfaction and promoting behavior. Student satisfaction mediated the relationship between authentic assessments and promoting behavior. The effect of authentic assessment is stronger among students with higher levels of career ambition than it is for those students who are less career oriented. The same effect was not statistically significant with the moderation of competitiveness, i.e., there was no moderation.

We also investigated some critical elements at the core of authentic assessment. Based on our analyses and the findings of the literature, we come to the conclusion that higher education institutions should consider designing authentic evaluations in regard to form and content. At this point, we can assure that there is evidence that this practice would greatly impact on students' performances and understanding concerning their development of professional skills, satisfaction, and consequent attitude to promote their schools.

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Appendix A – Low authenticity

It is extracted from James and Cassidy (2018), translated to Portuguese by the author.

Original text:

You are enrolled in a business subject, and this is a brief description of your major assignment that is worth 50% in the unit.

The assignment asks you to observe a case study based on a fictional problem or scenario that may occur within a specific industry sector.

You are NOT allowed to make any contact with relevant companies or their representatives.

You are then asked to present a report to the assessor addressing various issues or questions based on the fictional scenario contained within the case study presented.

The translation:

Você está matriculado em uma disciplina de administração e esta é uma breve descrição de sua principal atribuição. Isso vale 50% da sua nota final.

A tarefa pede que você observe um estudo de caso baseado em um problema ou cenário fictício que pode ocorrer em um setor específico da indústria.

Você NÃO tem permissão para fazer qualquer contato com as empresas participantes, nem com os empregados dela.

Em seguida, você é solicitado a apresentar um relatório ao avaliador, abordando vários problemas ou questões, com base no cenário fictício contido no estudo de caso apresentado.

Appendix B – High authenticity

It is extracted from James and Cassidy (2018), translated to Portuguese by the author.

Original text:

You are enrolled in a business subject and this is a brief description of your major assignment that is worth 50% in the unit.

The assignment asks you to observe a case study based on an actual problem experienced by a company.

You are then provided with an internship opportunity within the company to interact with company representatives in a workplace setting.

You are then asked to present a report to both the assessor and company representatives proposing strategic solutions to the company in order to address their problems.

The Translation:

Você está matriculado em uma disciplina de administração e esta é uma breve descrição de sua principal atribuição. Isso vale 50% da sua nota final.

A tarefa demanda que você observe um estudo de caso baseado em um problema real de uma empresa.

Em seguida, você tem uma oportunidade de estágio na empresa para interagir com os seus empregados em um ambiente de trabalho.

Em seguida, é solicitado que você apresente um relatório ao avaliador e aos empregados da empresa, propondo soluções estratégicas para a empresa a fim de resolver seus problemas.

Appendix C – Replication output from SPSS, Model 7

This appendix is presented in the output format of the *SPSS* software.

Run MATRIX procedure:

**************** PROCESS Procedure for SPSS Version 3.5 ****************

    Written by Andrew F. Hayes, Ph.D.   www.afhayes.com

  Documentation available in Hayes (2018). www.guilford.com/p/hayes3

****

Model : 7

  Y : PRO

  X : AUT

  M : SAT

  W : CA

Sample Size: 129

****

OUTCOME VARIABLE: SAT

Model Summary

R	R-sq	MSE	F	df1	df2	p
,7792	,6071	1,0742	64,3882	3,0000	125,0000	,0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	4,6269	,0942	49,1129	,0000	4,4404	4,8133
AUT	,8261	,0634	13,0316	,0000	,7006	,9515
CA	,0988	,0935	1,0560	,2930	-,0863	,2838
Int_1	,1827	,0627	2,9144	,0042	,0586	,3068

Product terms key:

 Int_1 :   AUT   x   CA

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	,0267	8,4938	1,0000	125,0000	,0042

  Focal predict: AUT   (X)

    Mod var: CA   (W)

Conditional effects of the focal predictor at values of the moderator(s):

CA	Effect	se	t	p	LLCI	ULCI
-1,3411	,5810	,1022	5,6852	,0000	,3788	,7833
,6589	,9464	,0777	12,1785	,0000	,7926	1,1003
,6589	,9464	,0777	12,1785	,0000	,7926	1,1003

Moderator value(s) defining Johnson-Neyman significance region(s):

Value	% below	% above
-2,6403	,7752	99,2248

Conditional effect of focal predictor at values of the moderator:

CA	Effect	se	t	p	LLCI	ULCI
-5,3411	-,1498	,3370	-,4445	,6575	-,8168	,5172
-5,0411	-,0950	,3186	-,2981	,7661	-,7254	,5355
-4,7411	-,0402	,3002	-,1338	,8938	-,6342	,5539
-4,4411	,0146	,2818	,0520	,9586	-,5431	,5724
-4,1411	,0695	,2635	,2636	,7925	-,4520	,5910
-3,8411	,1243	,2453	,5066	,6133	-,3612	,6097
-3,5411	,1791	,2272	,7883	,4320	-,2705	,6287
-3,2411	,2339	,2092	1,1182	,2656	-,1801	,6479
-2,9411	,2887	,1913	1,5090	,1338	-,0900	,6674
-2,6411	,3435	,1737	1,9778	,0502	-,0002	,6873
-2,6403	,3437	,1736	1,9791	,0500	,0000	,6873
-2,3411	,3983	,1563	2,5481	,0120	,0889	,7077
-2,0411	,4531	,1393	3,2521	,0015	,1774	,7289
-1,7411	,5080	,1229	4,1338	,0001	,2648	,7511
-1,4411	,5628	,1072	5,2499	,0000	,3506	,7749
-1,1411	,6176	,0927	6,6635	,0000	,4342	,8010
-,8411	,6724	,0800	8,4074	,0000	,5141	,8307
-,5411	,7272	,0701	10,3780	,0000	,5885	,8659
-,2411	,7820	,0643	12,1666	,0000	,6548	,9092
,0589	,8368	,0637	13,1333	,0000	,7107	,9629
,3589	,8916	,0685	13,0113	,0000	,7560	1,0273
,6589	,9464	,0777	12,1785	,0000	,7926	1,1003

Data for visualizing the conditional effect of the focal predictor:

Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/

  AUT   CA   SAT   .

BEGIN DATA.

-1,7235	-1,3411	3,4930
,2765	-1,3411	4,6551
1,6098	-1,3411	5,4298
-1,7235	,6589	3,0607
,2765	,6589	4,9536
1,6098	,6589	6,2156
-1,7235	,6589	3,0607
,2765	,6589	4,9536
1,6098	,6589	6,2156

END DATA.

GRAPH/SCATTERPLOT=

 AUT   WITH   SAT   BY   CA   .

****

OUTCOME VARIABLE:

 PRO

Model Summary

R	R-sq	MSE	F	df1	df2	p
,8282	,6859	1,1041	137,5597	2,0000	126,0000	,0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1,3400	,4208	3,1848	,0018	,5073	2,1727
AUT	,3079	,0956	3,2221	,0016	,1188	,4970
SAT	,7107	,0874	8,1300	,0000	,5377	,8837

***************** DIRECT AND INDIRECT EFFECTS OF X ON Y **********

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
,3079	,0956	3,2221	,0016	,1188	,4970

Conditional indirect effects of X on Y:

INDIRECT EFFECT:

 AUT   -> SAT   -> PRO

CA	Effect	BootSE	BootLLCI	BootULCI

-1,3411	,4130	,0872	,2803	,6242
,6589	,6727	,1070	,4681	,8903
,6589	,6727	,1070	,4681	,8903

Index of moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
CA	,1299	,0489	,0157	,2092

*********** BOOTSTRAP RESULTS FOR REGRESSION MODEL PARAMETERS

OUTCOME VARIABLE:

 SAT

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	4,6269	4,6323	,0987	4,4425	4,8283
AUT	,8261	,8330	,0632	,7112	,9633
CA	,0988	,0822	,0939	-,1219	,2544
Int_1	,1827	,1697	,0649	,0225	,2777

OUTCOME VARIABLE:

 PRO

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	1,3400	1,3517	,4498	,5032	2,2563
AUT	,3079	,3087	,1001	,1183	,5037
SAT	,7107	,7082	,0893	,5274	,8745

********************* ANALYSIS NOTES AND ERRORS *****************

Level of confidence for all confidence intervals in output:

 95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

 5000

W values in conditional tables are the 16th, 50th, and 84th percentiles.

NOTE: The following variables were mean centered prior to analysis:

     CA   AUT

NOTE: Standardized coefficients not available for models with moderators.

------ END MATRIX -----

DATA LIST FREE/

  AUT   CA   SAT   .

BEGIN DATA.

  -1,7235   -1,3411   3,4930

   ,2765   -1,3411   4,6551

  1,6098   -1,3411   5,4298

  -1,7235   ,6589   3,0607

   ,2765   ,6589   4,9536

  1,6098   ,6589   6,2156

  -1,7235   ,6589   3,0607

   ,2765   ,6589   4,9536

  1,6098   ,6589   6,2156

END DATA.

GRAPH/SCATTERPLOT=

 AUT   WITH   SAT   BY   CA   .

Appendix D – Output from SPSS, Model 7, with competitiveness

This appendix is presented in the output format of the *SPSS* software.

Run MATRIX procedure:

**************** PROCESS Procedure for SPSS Version 3.5 ****************

     Written by Andrew F. Hayes, Ph.D.   www.afhayes.com

    Documentation available in Hayes (2018). www.guilford.com/p/hayes3

****

Model : 7

  Y : PRO

  X : AUT

  M : SAT

  W : COM

Sample Size: 129

****

OUTCOME VARIABLE: SAT

Model Summary

R	R-sq	MSE	F	df1	df2	p
,7616	,5800	1,1484	57,5375	3,0000	125,0000	,0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	4,6892	,0949	49,4264	,0000	4,5014	4,8769
AUT	,8398	,0642	13,0805	,0000	,7127	,9668
COM	-,0471	,0685	-,6872	,4932	-,1827	,0885
Int_1	,0250	,0418	,5978	,5510	-,0577	,1076

Product terms key:

 Int_1 :   AUT   x   COM

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	,0012	,3574	1,0000	125,0000	,5510

  Focal predict: AUT   (X)

    Mod var: COM   (W)

Data for visualizing the conditional effect of the focal predictor:

Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/

   AUT   COM   SAT   .

BEGIN DATA.

   -1,7235   -1,2926   3,3583

    ,2765   -1,2926   4,9733

   1,6098   -1,2926   6,0500

   -1,7235   ,2074   3,2231

    ,2765   ,2074   4,9130

   1,6098   ,2074   6,0396

   -1,7235   1,4574   3,1105

    ,2765   1,4574   4,8628

   1,6098   1,4574   6,0310

END DATA.

GRAPH/SCATTERPLOT=

  AUT   WITH   SAT   BY   COM   .

****

OUTCOME VARIABLE:

 PRO

Model Summary

      R   R-sq   MSE   F   df1   df2   p

   ,8282   ,6859   1,1041   137,5597   2,0000   126,0000   ,0000

Model

         coeff   se   t   p   LLCI   ULCI

constant   1,3400   ,4208   3,1848   ,0018   ,5073   2,1727

AUT   ,3079   ,0956   3,2221   ,0016   ,1188   ,4970

SAT   ,7107   ,0874   8,1300   ,0000   ,5377   ,8837

***************** DIRECT AND INDIRECT EFFECTS OF X ON Y *************

Direct effect of X on Y

   Effect   se   t   p   LLCI   ULCI

    ,3079   ,0956   3,2221   ,0016   ,1188   ,4970

Conditional indirect effects of X on Y:

INDIRECT EFFECT:

AUT   -> SAT   -> PRO

COM	Effect	BootSE	BootLLCI	BootULCI
-1,2926	,5739	,0914	,3997	,7539
,2074	,6005	,1016	,4136	,8090
1,4574	,6227	,1264	,3977	,8892

Index of moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
COM	,0177	,0342	-,0403	,0954

*********** BOOTSTRAP RESULTS FOR REGRESSION MODEL PARAMETERS

OUTCOME VARIABLE: SAT

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	4,6892	4,6861	,0937	4,5009	4,8718
AUT	,8398	,8438	,0642	,7227	,9727
COM	-,0471	-,0465	,0726	-,1947	,0944
Int_1	,0250	,0266	,0468	-,0636	,1234

OUTCOME VARIABLE: PRO

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	1,3400	1,3656	,4695	,4776	2,3232
AUT	,3079	,3109	,1033	,1073	,5149
SAT	,7107	,7056	,0933	,5154	,8787

********************* ANALYSIS NOTES AND ERRORS ******************

Level of confidence for all confidence intervals in output:

 95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

 5000

W values in conditional tables are the 16th, 50th, and 84th percentiles.

NOTE: The following variables were mean centered prior to analysis:

    COM   AUT

NOTE: Standardized coefficients not available for models with moderators.

------ END MATRIX -----

DATA LIST FREE/

  AUT   COM   SAT   .

BEGIN DATA.

-1,7235	-1,2926	3,3583
,2765	-1,2926	4,9733
1,6098	-1,2926	6,0500
-1,7235	,2074	3,2231
,2765	,2074	4,9130
1,6098	,2074	6,0396
-1,7235	1,4574	3,1105
,2765	1,4574	4,8628
1,6098	1,4574	6,0310

END DATA.

GRAPH/SCATTERPLOT=

 AUT   WITH   SAT   BY   COM   .

Appendix E – Output from SPSS, Model 9

This appendix is presented in the output format of the *SPSS* software.

Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5 *****************

    Written by Andrew F. Hayes, Ph.D.   www.afhayes.com

  Documentation available in Hayes (2018). www.guilford.com/p/hayes3

****

Model : 9

  Y : PRO

  X : AUT

  M : SAT

  W : CA

  Z : COM

Sample Size: 129

****

OUTCOME VARIABLE: SAT

Model Summary

R	R-sq	MSE	F	df1	df2	p
,7799	,6083	1,0884	38,2057	5,0000	123,0000	,0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	4,6268	,0950	48,7053	,0000	4,4388	4,8149
AUT	,8305	,0644	12,9003	,0000	,7030	,9579
CA	,1025	,0943	1,0865	,2794	-,0842	,2892
Int_1	,1793	,0642	2,7921	,0061	,0522	,3064
COM	-,0404	,0670	-,6039	,5470	-,1730	,0921
Int_2	,0056	,0413	,1363	,8918	-,0762	,0875

Product terms key:

 Int_1 :   AUT   x   CA

 Int_2 :   AUT   x   COM

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p

X*W   ,0248   7,7956   1,0000   123,0000   ,0061

X*Z   ,0001   ,0186   1,0000   123,0000   ,8918

BOTH(X)   ,0261   4,1050   2,0000   123,0000   ,0188

   Focal predict: AUT   (X)

     Mod var: CA   (W)

     Mod var: COM   (Z)

Conditional effects of the focal predictor at values of the moderator(s):

CA	COM	Effect	se	t	p	LLCI	ULCI
-1,3411	-1,2926	,5828	,1082	5,3854	,0000	,3686	,7970
-1,3411	,2074	,5912	,1076	5,4923	,0000	,3781	,8043
-1,3411	1,4574	,5983	,1318	4,5409	,0000	,3375	,8591
,6589	-1,2926	,9413	,0956	9,8446	,0000	,7520	1,1306
,6589	,2074	,9498	,0786	12,0760	,0000	,7941	1,1054
,6589	1,4574	,9568	,0979	9,7682	,0000	,7629	1,1507
,6589	-1,2926	,9413	,0956	9,8446	,0000	,7520	1,1306
,6589	,2074	,9498	,0786	12,0760	,0000	,7941	1,1054
,6589	1,4574	,9568	,0979	9,7682	,0000	,7629	1,1507

Data for visualizing the conditional effect of the focal predictor:

Paste text below into a SPSS syntax window and execute to produce plot.

DATA LIST FREE/

   AUT   CA   COM   SAT   .

BEGIN DATA.

   -1,7235   -1,3411   -1,2926   3,5372

    ,2765   -1,3411   -1,2926   4,7028

   1,6098   -1,3411   -1,2926   5,4798

   -1,7235   -1,3411   ,2074   3,4620

    ,2765   -1,3411   ,2074   4,6444

   1,6098   -1,3411   ,2074   5,4327

   -1,7235   -1,3411   1,4574   3,3993

    ,2765   -1,3411   1,4574   4,5958

   1,6098   -1,3411   1,4574   5,3935

   -1,7235   ,6589   -1,2926   3,1243

    ,2765   ,6589   -1,2926   5,0069

```
1,6098    ,6589   -1,2926   6,2620
-1,7235   ,6589    ,2074    3,0491
 ,2765    ,6589    ,2074    4,9486
1,6098    ,6589    ,2074    6,2149
-1,7235   ,6589   1,4574    2,9864
 ,2765    ,6589   1,4574    4,9000
1,6098    ,6589   1,4574    6,1757
-1,7235   ,6589   -1,2926   3,1243
 ,2765    ,6589   -1,2926   5,0069
1,6098    ,6589   -1,2926   6,2620
-1,7235   ,6589    ,2074    3,0491
 ,2765    ,6589    ,2074    4,9486
1,6098    ,6589    ,2074    6,2149
-1,7235   ,6589   1,4574    2,9864
 ,2765    ,6589   1,4574    4,9000
1,6098    ,6589   1,4574    6,1757
```

END DATA.

GRAPH/SCATTERPLOT=

 AUT   WITH   SAT   BY   CA   /PANEL   ROWVAR= COM   .

****

OUTCOME VARIABLE: PRO

Model Summary

R	R-sq	MSE	F	df1	df2	p
,8282	,6859	1,1041	137,5597	2,0000	126,0000	,0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1,3400	,4208	3,1848	,0018	,5073	2,1727
AUT	,3079	,0956	3,2221	,0016	,1188	,4970
SAT	,7107	,0874	8,1300	,0000	,5377	,8837

***************** DIRECT AND INDIRECT EFFECTS OF X ON Y ***********

Direct effect of X on Y

Effect	se	t	p	LLCI	ULCI
,3079	,0956	3,2221	,0016	,1188	,4970

Conditional indirect effects of X on Y:

INDIRECT EFFECT:

AUT -> SAT -> PRO

CA	COM	Effect	BootSE	BootLLCI	BootULCI
-1,3411	-1,2926	,4142	,0947	,2720	,6510
-1,3411	,2074	,4202	,1086	,2705	,7028
-1,3411	1,4574	,4252	,1352	,2398	,7777
,6589	-1,2926	,6690	,1118	,4469	,8889
,6589	,2074	,6750	,1107	,4640	,8946
,6589	1,4574	,6800	,1273	,4488	,9399
,6589	-1,2926	,6690	,1118	,4469	,8889
,6589	,2074	,6750	,1107	,4640	,8946
,6589	1,4574	,6800	,1273	,4488	,9399

Indices of partial moderated mediation:

	Index	BootSE	BootLLCI	BootULCI
CA	,1274	,0554	-,0066	,2130
COM	,0040	,0347	-,0496	,0871

*********** BOOTSTRAP RESULTS FOR REGRESSION MODEL PARAMETERS

OUTCOME VARIABLE: SAT

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	4,6268	4,6330	,0980	4,4403	4,8328
AUT	,8305	,8404	,0643	,7153	,9699
CA	,1025	,0841	,1004	-,1299	,2699
Int_1	,1793	,1638	,0749	-,0098	,2855
COM	-,0404	-,0466	,0751	-,2050	,0936
Int_2	,0056	,0108	,0479	-,0768	,1152

OUTCOME VARIABLE: PRO

	Coeff	BootMean	BootSE	BootLLCI	BootULCI
constant	1,3400	1,3541	,4570	,4959	2,2799
AUT	,3079	,3068	,1002	,1104	,5012
SAT	,7107	,7083	,0897	,5263	,8756

********************** ANALYSIS NOTES AND ERRORS ****************

Level of confidence for all confidence intervals in output:

95,0000

Number of bootstrap samples for percentile bootstrap confidence intervals:

5000

W values in conditional tables are the 16th, 50th, and 84th percentiles.

Z values in conditional tables are the 16th, 50th, and 84th percentiles.

NOTE: The following variables were mean centered prior to analysis:

      CA   COM   AUT

NOTE: Standardized coefficients not available for models with moderators.

------ END MATRIX -----

DATA LIST FREE/

  AUT   CA   COM   SAT   .

BEGIN DATA.

AUT	CA	COM	SAT
-1,7235	-1,3411	-1,2926	3,5372
,2765	-1,3411	-1,2926	4,7028
1,6098	-1,3411	-1,2926	5,4798
-1,7235	-1,3411	,2074	3,4620
,2765	-1,3411	,2074	4,6444
1,6098	-1,3411	,2074	5,4327
-1,7235	-1,3411	1,4574	3,3993
,2765	-1,3411	1,4574	4,5958
1,6098	-1,3411	1,4574	5,3935
-1,7235	,6589	-1,2926	3,1243
,2765	,6589	-1,2926	5,0069
1,6098	,6589	-1,2926	6,2620
-1,7235	,6589	,2074	3,0491
,2765	,6589	,2074	4,9486
1,6098	,6589	,2074	6,2149
-1,7235	,6589	1,4574	2,9864
,2765	,6589	1,4574	4,9000
1,6098	,6589	1,4574	6,1757
-1,7235	,6589	-1,2926	3,1243
,2765	,6589	-1,2926	5,0069
1,6098	,6589	-1,2926	6,2620
-1,7235	,6589	,2074	3,0491

```
        ,2765     ,6589     ,2074    4,9486
       1,6098     ,6589     ,2074    6,2149
      -1,7235     ,6589    1,4574    2,9864
        ,2765     ,6589    1,4574    4,9000
       1,6098     ,6589    1,4574    6,1757
END DATA.
GRAPH/SCATTERPLOT=
 AUT    WITH   SAT    BY    CA    /PANEL   ROWVAR= COM   .
```