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Abstract

The present study experimentally investigated how perceptions of educational inequality impact students' aspirations and the moderating role of locus of control in the relationship between the two. Drawing on prior research, we hypothesised that educational aspirations would be negatively affected by educational inequality of both outcomes and opportunities, whereas it would be positively influenced by internal locus of control. Moreover, we expected locus of control to play a moderating role in the relationship between perceived inequality and aspirations, mitigating the adverse impact of inequality on the latter. Finally, based on previous findings, we expected the impact of perceived inequality of opportunities on aspirations to be comparatively weaker for students with internal academic locus of control when contrasted with perceived inequality of outcomes. A sample of 190 U.S. college students were randomly assigned to watch one of three educational inequality manipulation videos (i.e. opportunities, outcomes, and control). They were then given a questionnaire which assessed their perceptions of inequality, their academic locus of control and their educational aspirations. Only one of our hypotheses was supported by our results. While our findings align with existing evidence that internal locus of control positively affects educational aspirations, there was no main effect of perceived inequality on students' goals. Notably, our study suggests that higher perceptions of inequality may have motivating effects, which, however, appear exclusive to students with an external locus of control. Given these unexpected findings, further research is warranted for a deeper understanding of the psychological dynamics behind students' goal-setting processes.

Keywords: education, inequality, locus of control, aspirations, opportunities

Layman's Abstract

In our study, we looked into how college students' views about equality in education, considering both opportunities and outcomes, might affect their goals. We also explored how the belief in whether one's achievements are caused by internal (e.g. effort, ability) or

external (e.g. luck) factors, also known as locus of control, could influence this relationship. We thought that if students felt education was unfair, it might harm their aspirations, but having a strong belief in internal control might counteract this. We tested this with 190 U.S. college students who watched different videos about educational inequality. Surprisingly, we found that while believing in internal control positively influenced students' dreams, the inequality videos did not directly impact them. Strangely, it seems that seeing more educational inequality might motivate students, but only if they think their achievements are caused by external factors such as luck. These unexpected results show there is more to explore in how students perceive and react to educational inequalities.

Keywords: education, inequality, locus of control, aspirations, opportunities

Introduction

Education is often hailed as “the great equalizer”, a transformative force that has the potential to level the playing field and bridge socioeconomic gaps (Holmes & Zajacova, 2014; Mann, 1997). However, while education holds the promise of overcoming societal inequalities it also introduces a paradox. On one hand, disadvantaged adolescents are encouraged to maximise their educational opportunities and achievements to enhance their future prospects (Khattab, 2015). On the other hand, ironically, the persistence of inequality within the educational system itself may be detrimental to students' success and aspirations, by putting some students at a disadvantage and negatively impacting their self-esteem and overall well-being (Allen & Chakraborty, 2018; OECD, 2011). This paradox raises important questions: is inequality in educational settings an obstacle to students’ academic aspirations? And which psychological mechanisms could lead inequality to become an asset?

Importantly, inequality tends to only exert its detrimental effects when it is perceived as unfair by the individual (Uğur, 2021). Consequently, people's responses to inequality can vary based on their interpretation of its origin, as individuals who are inclined to perceive the source of disparities as a fair distribution based on merit may experience limited negative consequences. The development of fairness-related beliefs is a nuanced process influenced by the intricate interplay of cultural and individual attributions, which encompass how individuals interpret and explain a given situation, drawing upon culturally-determined beliefs and individual traits (Almås et al., 2010; Trump, 2020).

Specifically, our focus on students from the United States (U.S.) allows us to delve into their unique cultural perspective on inequality and effort, rooted in the enduring concept of the "American Dream", which posits that success is attainable for all those who prove deserving through dedicated effort and hard work (Adams, 1931). Despite facing substantial income inequality (Alston, 2018) and limited intergenerational mobility (Causa & Johansson, 2010; Corak, 2006), the belief in success driven by individual effort persists among U.S.

citizens (Alesina et al., 2018; Newman, 2022). In a domain with limited research, our objective is to contribute insights into educational aspirations within this demographic.

Regarding individual attributions we focus on locus of control, a trait introduced by Rotter (1966), referring to an individual's belief in whether life's outcomes are attributed to internal factors or external factors beyond their influence. For instance, those with internal locus of control are more inclined to believe achievements to be a product of personal factors, such as effort or ability, while those with external locus of control may believe achievements to be a product of luck or other factors outside of their control. Importantly, inequalities resulting from personal effort and merit are often viewed as fairer than those attributed to luck (Almås et al., 2020; Sachweh & Sthamer, 2019), which goes hand in hand with the finding that individuals with internal locus of control are more inclined to be accepting of disparities compared with those with external locus of control (Aguiar et al., 2021). Based on these previous findings, we have good reason to believe that locus of control may have a crucial role in shaping the effects of perceptions of inequality on students' aspirations.

Moreover, disparities in educational settings manifest in diverse forms, which may each exert distinct influences on students' aspirations. As Martorano and Nübold (2023) identified diverse patterns in the impact of different types of economic inequality on educational aspirations, a similar exploration may reveal insights into the multifaceted nature of inequality within educational domains. Existing literature commonly categorises educational disparities into two main types (Buis, 2010): the first involves discrepancies in access to educational resources (i.e. inequality of educational opportunities), while the second pertains to variations in actual educational achievements (i.e. inequality of educational outcomes). By employing manipulation of these two different aspects of educational inequality, we aim to gain a better understanding of how disparities can impact students' aspirations and how locus of control may potentially moderate their effects. This line of inquiry is not only highly pertinent to real-life scenarios, as students' aspirations and the

psychological processes shaping them bear tangible consequences in students' lives, but also remarkably underexplored in existing literature.

Finally, as mentioned above, previous research has mainly addressed inequality from an economic standpoint when investigating its impact on individuals' aspirations (Martorano & Nübold, 2023). Therefore we decided to further investigate this relationship by focusing on perceived inequality in educational settings, as its repercussions on educational aspirations have yet to be addressed in psychological research, and we contend that information pertaining specifically to educational disparities holds unique relevance in shaping students' educational aspirations.

Theoretical Background

Educational aspirations

Educational aspirations are defined as the extent to which individuals plan to pursue formal education and the importance they place on its value (Campbell, 1983; Cobb, 1989). Differently from general educational orientations, aspirations express a concrete motivation to follow a certain path, which subsequently guides one's actions in educational settings (Mickelson, 1990). Holding high academic aspirations and actively working towards them has been proven to positively affect academic achievement (Guo et al., 2015; Guyon & Huillery, 2020), which in turn contributes to determining an individual's cultural capital, as well as their future wages and life standard (Khattab, 2015; Morin et al., 2014). According to the Rational Choice Theory's (Breen and Goldthorpe, 1997; Erikson & Jonsson, 1996) perspective on educational aspirations, students make educational choices based on a rational assessment of costs, benefits, and the probability of success associated with different degrees. In simpler words, they weigh factors like the expenses involved, the potential subjective and objective advantages, and their personal prospects for success, to form the highest educational aspirations that are reasonably within their reach.

Nevertheless, students' educational aspirations do not exist in a vacuum and are

subject to social biases, influenced not solely by rational preferences, but also by psychological factors that align with societal stereotypes (Guyon & Huillery, 2020; Zimmermann, 2019). For instance, individuals from less privileged backgrounds tend to set less ambitious educational goals for themselves (Stocké et al., 2011), which makes inequalities based on social class a cause of concern in the formation of educational aspirations. This trend can be attributed to their more pessimistic assessment of the possibilities for social mobility, which, in turn, appears to be grounded in a more realistic understanding of the opportunities and constraints associated with their social class (Hyman, 1966; Zimmermann, 2019). Nonetheless, it's important to recognize that the consequences of educational inequality extend beyond social class alone. They have a broad impact, intersecting with various factors such as race, gender, disability, and other characteristics that individuals have no control over (Fabes et al., 2014; Marini & Greenberger, 1978; Qian & Blair, 1999; Rojewski, 1999).

While it is evident that disparities in educational goals arise, in part, as a result of unequal conditions among various social categories, the influence of students' perceptions of educational inequality itself on the development of their educational aspirations remains uncertain. For these reasons, we will dive deeper into how educational opportunities and outcomes differ among social categories and how educational disparities seem to affect students' aspirations based on previous findings.

Inequality of educational outcomes and opportunities

Educational outcomes are defined as different educational achievements, attainment levels, and overall results among individuals or groups (Musso et al., 2020). Aspiring for equality in educational outcomes does not advocate for identical results for all students. Instead, it emphasises the importance of ensuring that every student, irrespective of their background or initial circumstances, attains similar or comparable educational results when expending similar amounts of effort (OECD, 2011). Evidence of inequality in such outcomes

has been found several times in the past, especially when socio-economic backgrounds are taken into account: according to findings by Bailey and Dynarksi (2011), more than two-thirds of college students from high-income backgrounds manage to continue their college education and graduate, whereas less than one-third of students from the lowest-income bracket achieve the same outcome. Moreover, low-income students were found to be less likely to graduate in time, to prefer shorter college programs (Papay, 2015), and to be half as likely to have a GPA over 4.0, while being almost nine times as likely to have a GPA below a 2.5 compared to their high-income counterparts (Patch, 2020). Importantly, these attainment gaps are not necessarily indicative of a lack of effort from low-income students. Instead, they stem from complex socio-economic factors, including disparities in early childhood educational investments, teachers' biased perception of students from low-income backgrounds, and the quality of education in schools with a high concentration of low-income children (Papay, 2015). Disparities in educational achievement extend past socio-economic factors, as they also apply to students from different racial and ethnic backgrounds (Reardon & Robinson, 2015).

Educational opportunities, on the other hand, refer to the chances, experiences, and resources available to individuals that facilitate their learning, development, and academic success (Coleman, 1968). Inequality of educational opportunities includes disparities in access to quality schools, advanced coursework, extracurricular activities, educational resources and support services. The presence of this type of inequality among students belonging to various social backgrounds in the U.S. has also been widely documented (Morgan et al., 2013; Erikson, 2020).

Inequality of educational outcomes and inequality of educational opportunities are intricately linked, creating a cyclical and often self-perpetuating dynamic within the education system. For instance, limited access to quality learning opportunities often results in poor educational achievements, creating a cycle of disadvantage where inadequate

outcomes limit future educational opportunities (Jackson, 2013). Students with lower academic achievements may face challenges in accessing higher education because of strict admission requirements, which further perpetuates the cycle of disadvantage, creating a systemic barrier that hinders social mobility and reinforces disparities (Reardon, 2011). This cycle can have intergenerational effects: children from families with limited educational opportunities are more likely to face similar challenges in their own educational journeys (Pfeffer, 2008).

Nonetheless, making a distinction between the two allows for a more nuanced understanding of the psychological workings that lead to the formation of educational aspirations as influenced by perceptions of inequality. Our differentiation between educational opportunities and outcomes is also informed by prior research by Martorano and Nübold (2023) revealing that inequality of outcomes and inequality of opportunities exerted different impacts on aspirations. Specifically, information on inequality of economic outcomes showed an overall negative effect on students' educational goals, while information on inequality of economic opportunities only exerted a negative effect on the aspirations of students from states with higher racial inequality. In view of the closer conceptual link between educational inequality and educational aspirations, we speculate that both types of inequality will generally adversely impact aspirations. However, there's a likelihood that inequality of outcomes may wield a stronger negative impact in certain contexts, based on existing evidence and patterns observed in previous research. Given these insights, we argue that discerning between the effects of these two forms of inequality will offer a more comprehensive understanding of how inequality influences students' aspirations.

Academic Locus of Control

It is important to note that perceptions of educational inequality may not have a uniform impact on every student. Recent findings indicate that the detrimental effects of inequality are significantly mitigated when individuals perceive inequality as fair (Uğur,

2021). Take, for instance, a class of students exposed to educational inequality due to their differing socio-economic backgrounds. If all students, while perceiving inequality, interpret it as justified, attributing it to individual effort, ability, or personal choices, the adverse impact on their educational aspirations will likely be diminished. Interestingly, individuals with an internal locus of control, perceiving greater agency over their outcomes, are significantly more likely to find inequality acceptable compared to those with an external locus of control, who believe that life's outcomes result from external factors (Aguiar et al., 2021). Taken together, these findings suggest that locus of control may play a pivotal role in influencing whether individuals experience the detrimental consequences associated with inequality.

Specifically, we decided to focus on academic locus of control as a moderator of the relationship between perceptions of educational inequality and educational aspirations. This decision was influenced by two primary factors. Firstly, academic locus of control is defined as a causal dimension that characterises an individual's belief in whether academic achievements are caused by internal or external factors (Trice, 1985). We believe that examining academic locus of control, rather than general locus of control, is particularly pertinent when exploring the dynamics of inequality and aspirations within educational settings. Secondly, its relationship with academic behaviour is well-documented in psychological literature.

For instance, internal academic locus of control is linked with higher academic achievements compared to external academic locus of control (Findley and Cooper, 1983; Kalechstein and Nowicki, 1997). Students with internal academic locus of control are also more inclined to have higher academic aspirations (Agasisti & Maragkou, 2022; Brown et al., 2017; Landrum, 2010) and to be less prone to early college drop-out (Ogden & Trice, 1986). Individuals who possess internal locus of control invest more effort compared with those with external locus of control because they believe in their ability to influence the outcomes of both their own actions and the actions of others (Aguiar et al., 2021; Arslan &

Akin, 2014). Therefore, a more internal academic locus of control might partially protect students from the negative effects that perceived academic inequality may have on educational aspirations, as their academic opportunities and outcomes may be perceived as something that is within their control and that can be influenced through effort.

Moreover, students' responses to disparities in opportunities versus outcomes may vary based on their locus of control. The existence of unequal access to quality schools, resources, and support services can contribute to a heightened sense of competition. Specifically, students with an internal academic locus of control, those who feel in command of their outcomes, may react to this competitive environment by actively pursuing greater achievements and fostering elevated educational aspirations (Sommet et al., 2021). Consequently, considering earlier research indicating a more pronounced impact of inequality of outcomes on aspirations compared to inequality of opportunities (Martorano & Nübold, 2023), we anticipate observing this difference when accounting for students' academic locus of control.

Hypotheses

Based on the extensive theoretical background provided, we formulated several hypotheses to guide the investigation into the complex interplay between educational inequality, locus of control, and students' educational aspirations. First, we expect both types of perceived educational inequality (i.e. opportunities and outcomes) to significantly negatively impact educational aspirations, based on prior research by Martorano and Nübold (2023).

Secondly, we anticipate that academic locus of control will significantly predict educational aspirations. Consistent with previous findings (Brown et al., 2016; Flowers et al., 2003), students with a more internal academic locus of control are expected to exhibit higher educational aspirations compared to those with a more external academic locus of control.

Thirdly, we hypothesise a moderating role of locus of control in the relationship

between perceptions of inequality and educational aspirations. Specifically, we anticipate that students with a more internal academic locus of control may be more resilient to the negative effects of perceived inequality, as they may view academic opportunities and outcomes as controllable and influenceable through their own effort.

Finally, it is possible that disparities in accessing quality schools, resources, and support services could foster a more competitive environment, and that students with an internal academic locus of control who perceive inequality of educational opportunities may respond by striving for greater achievements and developing higher educational aspirations (Sommet et al., 2021). Therefore, building on previous findings by Martorano and Nübold (2023), we expect that while the effect of perceived inequality on educational aspirations may be negative overall, the impact of perceived inequality of opportunities on aspirations will be comparatively weaker for students with internal academic locus of control when contrasted with perceived inequality of outcomes.

Methods

Participants and Design

Design. We addressed the previously mentioned research question through a 1 (continuous measure of academic locus of control) x 3 (inequality: control vs. inequality of outcomes vs. inequality of opportunities) experimental design. Our dependent variable, educational aspirations, was assessed through a continuous measure.

Participants. The participants for this study ($N = 190$) are college students of different gender identities from various universities in the United States of America. The age of the participants ranged from 18 to 59 ($M = 27.47$, $SD = 8.72$). The sample included 81 male participants, 98 female participants, and 11 individuals who identified as non-binary or a third gender. The selection procedure was conducted through the Prolific platform, therefore all participants were required to be at least 18 years old. We conducted a power analysis using G*Power (Faul et al., 2007; Faul et al., 2009) to determine the minimum

sample size required for our study. The analysis selected is linear multiple regression (fixed model, R^2 increase), the significance level was set at $\alpha = .05$ and the desired power ($1 - \beta$) was set at .8. The minimum sample size necessary to find a medium effect size in our analysis would be $N = 158$. To be eligible for participation, individuals had to be currently enrolled as undergraduate students at a recognised university in the United States and to be willing to provide informed consent and participate voluntarily in the study.

Measures

Inducing perceptions of inequality

Perceptions of educational inequality were manipulated by showing all students different animated videos based on the condition they had been assigned to. Participants in the two inequality conditions were shown an informational video depicting a situation of either inequality of educational outcomes or inequality of educational opportunities in the U.S., whereas participants in the control condition were shown a video providing information on the structure of the academic year in the United States.

Perceptions of inequality

Perceptions of inequality in educational outcomes and opportunities were assessed as a manipulation check through two 5-item scales. Each scale was designed to gauge the level of inequality perceived by participants in educational settings, with responses recorded on a 7-point Likert scale. Participants were asked to rate their level of agreement with each item on a scale from 0 (*strongly disagree*) to 6 (*strongly agree*). Each scale consisted of items like 'Educational outcomes are mostly fair within the American educational system.' and 'Some students get unequal educational opportunities compared to their peers, regardless of their efforts, knowledge, and skills.' After data collection, the Cronbach's alpha for both scales was assessed. The Cronbach's alpha for the Educational Outcomes Inequality scale was 0.82, while the Educational Opportunities Inequality scale had a Cronbach's alpha of 0.84, indicating good internal consistency for both scales. The mean sample score for the

Educational Outcomes Inequality scale was 4.38 (*SD* = 1.12), and for the Educational Opportunities Inequality scale, the mean sample score was 4.49 (*SD* = 1.16).

Academic locus of control

Academic locus of control was assessed using a version of the Academic Locus of Control Scale developed by Trice (1985) which was modified to specifically include items addressing locus of control over educational outcomes and opportunities. This scale comprised 15 true-or-false items, allowing participants to indicate their agreement or disagreement with each statement. The scale's total score ranged from 0 to 15, with a higher score suggesting a more internal locus of control. Example items from the scale included statements such as 'There are some subjects in which I could never do well, despite my efforts.' and 'I think that access to quality education relies mostly on external circumstances and luck.' Following data collection, the reliability of the Academic Locus of Control Scale was assessed using Cronbach's alpha, yielding a value of 0.61. This value indicates acceptable internal consistency, although lower than the original scale by Trice (1985, α = .81). An attempt was made to enhance the reliability of the scale by conducting a factor analysis to identify and eliminate items with lower component loadings. However, the results did not reveal any discernible patterns among the items. On average, participants in our sample had a mean score of 7.79 (*SD* = 2.48) on this scale.

Educational aspirations

The participants were asked to share their educational and professional aspirations in terms of their desired and expected future level of education (i.e. Bachelor's Degree, Master's Degree, PhD…) and career. They also filled in an 11-item questionnaire meant to measure the extent of their educational goals and the importance they placed upon them. Responses were recorded on a 6-point Likert scale, with 0 indicating minimal importance or aspiration, and 5 reflecting substantial importance or aspiration.

Example items included inquiries such as 'How important is achieving good grades

to you?' and 'How determined are you to pursue further education after completing your current degree?'. The questionnaire exhibited good internal consistency, with a Cronbach's alpha coefficient of 0.87, signifying that the items consistently measured participants' educational aspirations. On average, participants in our sample had a mean score of 3.60 (*SD* = .63) on this scale.

Procedure

Participants were requested to provide their informed consent prior to the start of the questionnaire and to check if their audio was working properly. They were then randomly assigned to one of three conditions and shown a different animated video based on their designated condition. After having been shown the stimulus material, the participants were asked to fill out three attention-check questions related to content from the video they had just watched. The questionnaire then included items measuring educational aspirations, to ensure the shortest time gap possible between manipulation and measurement of the dependent variable. The participants were then asked to answer questions about their perceptions of inequality of educational outcomes, followed by inequality of educational opportunities. The intentional sequencing aimed to reduce the possibility of participants' views on inequality of opportunities affecting their judgments on inequality of outcomes. The rationale behind this order is rooted in the recognition that while opportunities and outcomes share a cyclical relationship, the influence of opportunities on outcomes might be more perceptibly apparent than the reverse. The students' academic locus of control was then assessed, once again to reduce the possible influence of participants' locus of control responses on perceptions of inequality. Questions on the participants' socio-economic background were addressed at the end of the questionnaire in order to avoid possible priming effects of socio-economic background on the students' answers. Upon completing the questionnaire, the students were provided with a debriefing statement that explained the purpose of the study and its significance. They were given the opportunity to ask questions or

provide additional comments. Participants were compensated for their time through Prolific's participant retribution system.

Statistical Analyses

The dataset underwent a rigorous screening process to identify and address missing values, outliers, and logical inconsistencies. Following this, a randomization check ensured comparability across demographic characteristics in the three experimental conditions. A reliability analysis was then conducted on all scales used to ensure the robustness of the measurements. A manipulation check was executed using a one-way ANOVA to assess the effectiveness of the perceived educational inequality manipulation.

To investigate our research question, a moderation analysis was conducted using Process Macro Model 1 (Hayes, 2013). Educational aspirations served as the dependent variable, with inequality condition as the independent variable and locus of control as the moderator. Subsequently, a simple slope analysis was performed to delve into the direction and intensity of the moderation effect.

The assumptions of multiple regression analysis, including linearity, normality of residuals, homoscedasticity, and independence of residuals, were examined and addressed as needed. Effect size measures, such as R-squared or partial R-squared, were computed to gauge the proportion of variance in educational aspirations explained by the predictors and interaction terms. The significance level (alpha) was set at 0.05 to determine statistical significance. The statistical analysis was performed using SPSS.

Ethics

Ethical approval was obtained for the present study.

Results

Data Preparation

The following section will address all steps taken during data analysis to investigate the relationship between perceived educational inequality, locus of control and educational

aspirations. The dataset underwent a comprehensive screening process to ensure that participants who either had not completed the survey ($N = 4$) or did not meet the inclusion criteria ($N = 12$) were not included in the analyses. Following this screening, the original sample of 206 participants was refined to a final sample of 190 participants. No outlying cases were excluded, as they had all achieved sufficient scores on the attention check items.

Manipulation and Randomization Checks

A randomization check was conducted to ensure that participants in the three conditions were comparable in terms of all demographic characteristics included in the survey. The analysis indicated that all three groups demonstrated comparability across the full range of demographic variables investigated.

Additionally, a manipulation check was carried out to assess the success of the perceived educational inequality manipulation. The results revealed that the manipulation was only partially successful. The results of a one-way ANOVA indicated the presence of at least one significant difference among the three groups in mean levels of perceived inequality of opportunities ($F(2,187) = 7.786$, $p < .001$). Post-hoc tests indicated that both the opportunities group (*Mean Difference* = .5356, $p = .023$) and the outcome group (*Mean Difference* = .7822, $p < .001$) differed significantly from the control group. However, no significant difference in perceived inequality of opportunities (*Mean Difference* = .2466, $p = .432$) was found between the two experimental groups.

Likewise, both the outcomes (*Mean Difference* = .6699, $p = .002$) and the opportunities groups (*Mean Difference* =.7472, $p < .001$) differed significantly from the control group in terms of perceived inequality of educational outcomes ($F(2,187) = 8.916$, $p < .001$). However, no significant difference in perceived inequality of outcomes (*Mean Difference* = .0773, $p = .914$) was found between the two experimental groups. In other words, the groups exposed to the educational opportunities and outcomes manipulations did not significantly differ from each other in how they perceived these two types of inequality.

It is also important to note that our manipulation check scores for perceived inequality of educational outcomes and opportunities exhibited a strong positive correlation ($r = 0.87$, $p < .001$). This suggests that participants who perceived greater inequality in one dimension were likely to report similar perceptions in the other. Moreover, a reliability analysis combining both inequality scales yielded an impressive Cronbach's alpha value of .92, indicating robust internal consistency. These findings imply that, at least within the context of our study, perceived inequality in educational outcomes and opportunities might be intricately connected, reflecting a broader construct of perceived educational inequality. Further research is warranted to investigate the nuanced interplay between these dimensions.

Statistical analyses were adapted in response to these findings. Since our analyses were initially predicated on the expectation of higher levels of perceived inequality of opportunities in the opportunities group and higher levels of perceived inequality of outcomes in the outcomes group, and those differences were not observed, we implemented contrast coding to compare participants in the two experimental groups with those in the control group. Furthermore, our fourth hypothesis, which suggested a difference between the two experimental conditions in the moderation effect, could not be properly tested, due to our manipulation failing to effectively distinguish between the two inequality groups.

Descriptive statistics

Table 1 shows relevant descriptive statistics for educational aspirations and locus of control in the two groups employed in the analyses: the inequality group, which includes both the outcome and opportunities conditions, and the control group.

Table 1

Descriptives for educational aspirations and locus of control scores by group.

		N	Min	Max	Mean	SD
Control	Aspirations	61	1,93	4,67	3,52	,64
	LOC	61	1,00	13,07	8,18	2,45
Inequality	Aspirations	129	1,73	4,60	3,58	,62
	LOC	129	2,00	13,07	7,50	2,50

In contrast to our initial expectations, we observed that the mean score for educational aspirations is slightly higher in the inequality group when compared to the control group. Additionally, we noted that locus of control tends to be more internally oriented in the control group, which coincides with lower scores in educational aspirations. These counterintuitive results will be further analysed and discussed in the following sections.

Test statistics

To address our research question regarding the influence of locus of control on the relationship between perceived educational inequality and educational aspirations, we conducted a moderation analysis using Process Macro Model 1 (Hayes, 2013). The analysis aimed to determine whether locus of control moderates the effect of perceived educational inequality on educational aspirations. The overall model was statistically significant, explaining a significant proportion of the variance in educational aspirations ($R^2 = .10$, $F(3, 186) = 7.169$, $p < .001$). Our analysis met the assumptions of independence of errors, linearity, homoscedasticity, and normality of residuals (see Appendix A).

Perceived inequality did not have a significant main effect on educational aspirations ($\beta = .986$, $SE = .707$, $t = 1{,}394$, $p = .165$), meaning that those in the inequality group did not have significantly different educational aspirations compared to participants in the control group. Therefore, our first hypothesis that perceived educational inequality would negatively impact educational aspirations was not supported.

On the other hand, our second hypothesis was supported. Academic locus of control demonstrated a significant positive main effect on educational aspirations ($\beta = 1.25$, $SE = .273$, $t = 4.59$, $p < .001$), meaning a more internal locus of control predicted higher educational aspirations.

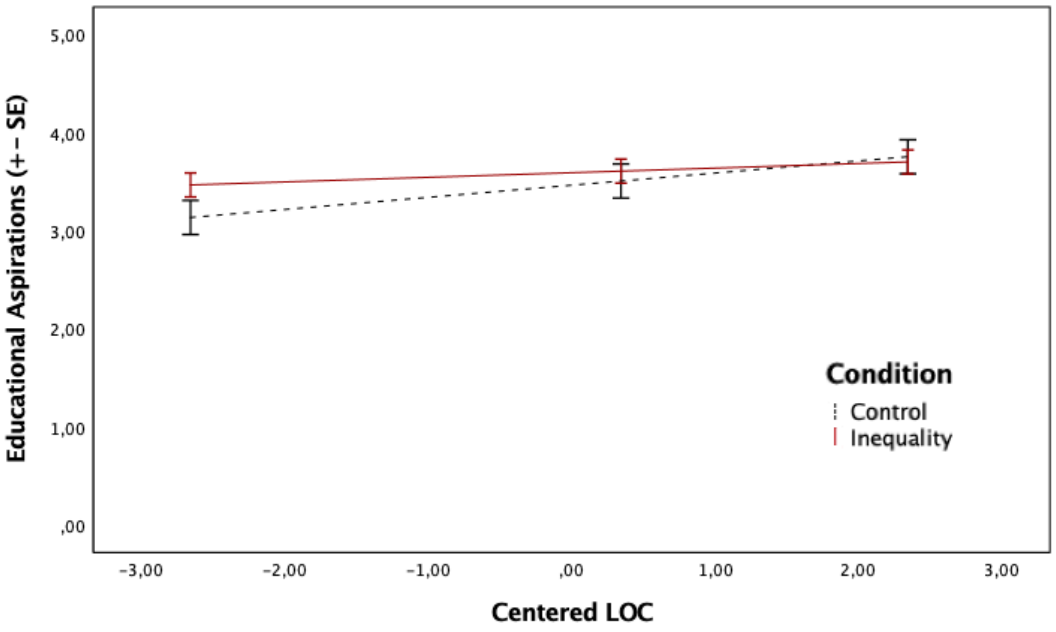
Finally, our third hypothesis was not supported. The interaction effect between perceived inequality and academic locus of control was found to be statistically significant ($\beta = -.550$, $SE = .273$, $t = -2.01$, $p = .045$), indicating that locus of control does indeed moderate

the relationship between perceived inequality and educational outcomes. However, the relationship between the three variables appears to be quite different from the one we hypothesised.

To understand the nature of the interaction, we conducted a simple slopes analysis (see Figure 1) by examining the relationship between perceived inequality and educational aspirations separately for students with internal and external locus of control.

Figure 1

*Line graph for the inequality*centered locus of control interaction effect on educational aspirations.*



We found a significant effect of perceived inequality for those with a more external locus of control (F (1,186) = 4.837, p = .029), as those in the inequality condition had significantly higher mean educational aspirations (M = 3.46; SD = .65) compared to the control group (M = 3.16; SD = .58). In contrast, for those with a more internal locus of control, the relationship between inequality and aspirations was not significant (F (1,186) = .628, p = .429)).

Additionally, we found locus of control to have a significant effect on educational aspirations both within the control group (F (12,48) = 3.351, p = .001), and within the inequality groups combined (F (12,116) = 2.000, p = .030). Although higher mean levels of educational aspirations were significantly associated with more internal locus of control in both conditions, this effect was stronger within the control group (η^2 = .456) compared to the inequality groups (η^2 = .171).

The lack of support for the majority of our hypotheses in the present findings raises important questions and prompts a closer examination of the factors at play. In the following section, we will explore and discuss potential explanations for these unexpected results. This exploration will allow us to gain a deeper understanding of the complex relationship between perceived educational inequality, locus of control, and educational aspirations.

Discussion

The aim of the present study was to investigate the impact of locus of control on the relationship between perceived educational inequality and educational aspirations. In contrast to Martorano and Nübold's (2023) earlier research, our study revealed that perceived inequality did not exert a significant direct influence on educational aspirations. This finding suggests that, in the context of our study, individuals in the inequality group did not exhibit markedly distinct educational aspirations when compared to those in the control group. Our study diverged from Martorano and Nübold's work in two notable ways.

First, while their focus was on the impact of perceived economic inequality on educational aspirations, we directed our attention to perceived educational inequality, reasoning that a construct closely aligned with educational aspirations would yield a more direct relationship. The subtle distinctions between perceived educational inequality and perceived economic inequality may give rise to different impacts on educational aspirations. Perceptions of economic inequality might have a stronger effect on educational aspirations due to the pervasive impact of economic disparities on various life domains. For

example, the ability to afford rent in a high-cost student city, the necessity of taking on student loans, and the requirement to work alongside studies are tangible manifestations of the pervasive effects of economic inequality within education. These financial challenges extend beyond academic boundaries, shaping perceptions of educational and professional possibilities. In contrast, perceived educational inequality may focus more narrowly on disparities within the educational system itself (e.g. students from less affluent areas only having access to outdated educational resources or encountering biased treatment and lower expectations from educators). Although still influential, these perceptions might not carry the same weight as economic inequality, which casts a broader shadow over an individual's entire life course.

Secondly, Martorano and Nübold's (2023) research also indicated that distinct types of inequality (i.e. opportunities versus outcome) affected aspirations differently, an aspect we were unable to explore due to our manipulation's inability to differentiate between these two dimensions. According to their findings, inequality of outcomes had a significant negative effect on aspirations overall, whereas inequality of opportunities only negatively affected students living in states with higher racial inequality. In our study, the absence of significant findings regarding the influence of inequality on aspirations aligns more closely with Martorano and Nübold's observations related to inequality of economic opportunities. Nevertheless, the limitation of lacking information about the states of origin of our participants prevents us from unequivocally confirming this alignment. It may remain plausible that students perceived educational outcomes as an inherent consequence of their educational opportunities, potentially attributing both constructs with the significance they would assign to inequality of educational opportunities alone. Should this notion hold true, our study would confirm that perceived educational inequality may not universally impact students' aspirations. This perspective implies that individuals might not consistently distinguish between opportunities and outcomes in educational settings,

viewing both as instances of unequal educational opportunities that may not significantly influence students unless they come from specific backgrounds. This nuanced interplay underscores the complex nature of how perceptions and contextual factors interact in shaping aspirations, providing valuable insights for future research.

Furthermore, academic locus of control did show a significant main effect on educational aspirations, indicating that a more internal academic locus of control predicted higher educational aspirations. This finding aligns with prior research, bolstering the body of evidence supporting the notion that an individual's belief in the influence of internal factors on academic achievement directly relates to their inclination to set more ambitious educational goals (Agasisti & Maragkou, 2022; Aslan & Akin, 2014; Brown et al., 2017; Landrum, 2010).

Finally, the interaction effect between perceived inequality and academic locus of control was found to be statistically significant, indicating that locus of control moderates the relationship between perceived inequality and educational outcomes. Most interestingly, we found that in students with a more external academic locus of control, there is a significant negative effect of perceived inequality on educational aspirations, meaning that those in the control group had significantly lower aspirations compared to those in the inequality group. On the other hand, there was no difference in aspirations between inequality groups for students with a more internal locus of control. Additionally, we found a significant positive effect of locus of control within both inequality groups, meaning that having an internal locus of control positively impacted educational aspirations regardless of perceived inequality.

The implications of these findings invite further investigation. Notably, higher perceived educational inequality appeared to have a positive, rather than negative, influence on students' educational aspirations. However, this effect was only significant for individuals with an external academic locus of control. These findings suggest that

inequality might have a meaningful motivational impact on students who tend to attribute academic achievements to external factors. Prior research on the role of inequality as a source of academic motivation has offered mixed insights. Some studies have suggested that inequality can enhance competitiveness (Sommet et al., 2022). However, other previous research has indicated that heightened competitiveness may not effectively motivate students with an external locus of control (Anderson et al., 2005; Nowicki, 1982). This observation aligns with the core concept of external locus of control, as defined by Rotter (1966): individuals who view their educational achievements as being determined by external factors are less likely to be motivated by competitive scenarios that assume a greater degree of personal control.

It is nonetheless important to note that our sample only included undergraduate students, all of whom were already committed to pursuing higher education. Consequently, their academic aspirations were already naturally tilted towards the higher end of the scale. For those students with an external academic locus of control who were informed about educational inequality, this information may have acted as a motivational factor. The heightened perception of inequality, which underscored their advantage in academic settings, might have motivated them to leverage this advantage further, considering they were already committed to their educational path. However, a comparison between perceived advantage scores in students with external and internal locus of control revealed that the former held significantly higher perceptions of disadvantage, which would directly contradict this hypothesis.

In conclusion, the limited body of previous research in this area presents a puzzling and contradictory landscape compared to our findings. Despite these challenges, our results remain intriguing and warrant further investigation. The subsequent sections will delineate specific directions for further investigation, aiming to untangle the complexities surrounding the relationship between perceived inequality, locus of control, and

educational aspirations.

Strengths and Limitations

There are several potential strengths and limitations worth mentioning concerning the results of this study. First of all, the manipulation of participants' perceptions of educational inequality through the use of animated videos allows for precise control and standardisation in inducing specific perceptions, enhancing the study's internal validity. However, our manipulation of perceived educational inequality was only partially successful, as it failed to distinguish between inequality of opportunities and inequality of outcomes. While these two concepts may be easily distinguishable in economic contexts, the educational setting may prove more intricate, blurring the lines between them and challenging their meaningful separation. Educational inequality of outcomes and opportunities may simply be perceived as two faces of the same coin, making up the broader concept of educational inequality. After all, these two constructs go hand in hand, often creating a cyclical pattern in the educational system: limited access to quality learning experiences and resources (i.e. educational inequality of opportunities) can lead to lower academic achievements, subsequently impacting access to higher education (i.e. educational inequality of outcomes).

This notion is further supported by the scores of the two inequality scales being highly positively correlated with one another and having excellent reliability when combined. Therefore, despite introducing a highly reliable measure of perceived educational inequality to the literature, some of our original hypotheses could not be tested due to the challenge of differentiating between perceived inequality of educational opportunities and outcomes. In future research, it might be useful to supplement quantitative data with qualitative methods, such as interviews or focus groups, to gather nuanced insights into participants’ understanding of educational opportunities and outcomes. While this approach demands a greater investment of time and effort, it holds

the potential to clarify whether individuals truly maintain a distinct conceptualization of the two aspects, obscured by the limitations of our manipulation, or if, instead, they inherently perceive them as integral components of a broader construct.

Secondly, including only college students in our research may have introduced a potential bias in the sample, as these individuals had already committed to pursuing a higher education degree. Incorporating high school students in the study could have strengthened its robustness and enhanced its generalizability by capturing a broader spectrum of aspirations, while providing valuable insights into the early stages of educational decision-making.

Furthermore, while we utilised a scale for academic locus of control that had been previously validated in the literature, it's important to note that our measure demonstrated only acceptable reliability. This means that the consistency of the responses to the items in our scale was moderate. When interpreting our results, it's crucial to consider this limitation, as it may affect the precision and robustness of the conclusions drawn from the data. Future research could explore and adopt alternative or refined measures of academic locus of control to enhance the reliability of this critical variable in understanding its role in the context of educational aspirations and perceived inequality.

Nonetheless, the measures for perceived educational inequality and educational aspirations demonstrated strong internal consistency. This indicates that the questions within each scale consistently measured the same aspects they were intended to, reducing the chances of measurement errors. Moreover, the reliability of these measures makes them suitable for use in future studies, providing confidence to researchers who wish to employ or adapt them for their investigations.

Finally, the inclusion of 190 participants in the study exceeded the initially calculated minimum size ($N = 158$) established according to G*Power (Faul et al., 2007; Faul et al., 2009). This larger sample size significantly enhances the study's statistical

power, making it more likely to detect true effects. It also increases the generalizability of the results to the broader population and provides more accurate estimates of population parameters.

Implications

Despite the limitations mentioned above, our results suggest several theoretical and practical implications. First of all, the study's results indicate that individuals may not substantially differentiate between perceptions of inequality related to educational outcomes and educational opportunities. This finding challenges the conventional distinction between these two constructs in the realm of social psychology, as it implies that people might perceive educational inequality as a broader concept encompassing both outcomes and opportunities. As our study represents the first investigation into how perceptions of educational inequality affect students and their aspirations, there are currently no established models or theories that distinguish between these two facets and their psychological implications within educational contexts. Nevertheless, it is valuable to recognize how this distinction might not be relevant in people's perceptions, even within a population of students for whom education is a highly salient and relevant domain.

Additionally, higher perceptions of inequality were found to have a positive impact on the aspirations of students with external locus of control. This unexpected result challenges some of the existing theoretical frameworks in the field, which typically associate inequality with negative outcomes (Gugushvili et al., 2020; Martorano & Nübold, 2023; Pi‐Sunyer et al., 2022), especially for individuals who by definition are not motivated by competitive environments. Although the precise mechanisms driving this motivational effect remain puzzling based on our findings, this result underscores the need for theoretical refinement. It raises questions about whether inequality might trigger motivational effects beyond simply making competitiveness more salient. And if this is not the case, why would a competitive environment motivate students with external locus of

control? These intriguing aspects warrant further in-depth exploration of the matter.

The methodological implications of the present study mainly concern the Academic Locus of Control Scale (Trice, 1985) we employed as the base for our measure of locus of control that only had marginal reliability. This scale originally utilised a true or false response format, which we also adopted. However, it may be worth considering the adoption of a Likert scale in future studies, as this could potentially enhance the reliability of the locus of control measurement by allowing for more nuanced responses and potentially capturing the concept of locus of control more accurately (Donner & Eliasziw, 1994). Additionally, a factor analysis was conducted on the scale, in an attempt to improve its reliability by removing items with lower component loadings. The results of the analysis did not point towards any distinct pattern within the items, signalling a possible structural issue with the scale. This, in turn, poses a challenge to the overall reliability of the measurement of locus of control in our study. These methodological considerations highlight the importance of refining the measurement tools for academic locus of control in future research to ensure more robust and accurate assessments.

Given that the Academic Locus of Control scale was developed almost 40 years ago, a thorough review and update of its items are warranted to ensure their continued relevance to the academic experiences of modern students, which may differ from the perspectives of students in 1985. For instance, recent transformations in education such as the widespread adoption of hybrid teaching models (Ulla & Perales, 2022) and a growing emphasis on student-centred learning (Trinidad, 2019), may render items such as "For some courses, it is not important to go to class" and "What I learn is more determined by college and course requirements than by what I want to learn", somewhat outdated. Furthermore, the emergence of the internet has introduced a variety of factors that could be pertinent to incorporate into the scale (Apuke & Iyendo, 2018), as they may exert both positive (e.g., the opportunities to independently acquire knowledge and skills) and

negative (e.g., increased susceptibility to digital distractions while studying) influences on students' locus of control. A comprehensive review of the scale's items may bring it into closer alignment with the contemporary understanding of academic locus of control, potentially enhancing its internal consistency.

Regardless of these methodological limitations, our results contribute to the existing body of literature stating that students with an internal academic locus of control tend to have higher educational aspirations (Agasisti & Maragkou, 2022; Aslan & Akin, 2014; Brown et al., 2016; Landrum, 2010). These results hold significant practical relevance, emphasising the need to cultivate and nurture a sense of internal control among students. Doing so can serve as a powerful motivational tool to encourage students to aim for higher educational goals and aspirations. Educators, counsellors, and policymakers can consider targeting interventions and programs to help students develop a stronger sense of internal control over their academic success. These interventions could include educational and motivational programs designed to enhance students' belief in their ability to influence their academic outcomes (Nallapothula et al., 2020; Zappala-Piemme et al., 2023). By fostering a sense of internal control, students may be more motivated to pursue higher educational goals and strive for academic success.

Future Directions

While the present results may not lead to a fully satisfying answer to our investigation of the relationship between perceived inequality, locus of control and educational aspirations, they raise a variety of intriguing questions for future study.

Our findings indicate that students with external locus of control might somehow be motivated by information on educational inequality to raise their educational aspirations. As mentioned above, this result could not be explained through increased competitiveness or perceived advantage. However, as our research did not include thorough measurements of either of these constructs, it is not yet possible to completely rule out these explanations

based on our findings. For instance, future researchers might want to consider including measures of perceived and personal competitiveness as possible moderators of the relationship between perceived inequality, locus of control and educational aspirations.

Perceived competitiveness refers to an individual's perception of the level of competition in a given situation or context, whereas personal competitiveness relates to an individual's inherent disposition or inclination to engage in competitive activities (Sommet & Elliot, 2023). Both observational and experimental studies have indicated that the motivational impact of inequality may be amplified by the perception that those around us are oriented toward competitiveness. The ethos of competitiveness instigated by inequality predicts behaviours focused on status, with individuals striving to either move closer to or avoid moving further away from higher-status counterparts. Our findings suggest that students with an external locus of control were, in some way, motivated by inequality, although the exact reasons remain unclear. Despite evidence suggesting that students with an external locus of control often struggle in highly competitive environments, there is no definitive proof indicating that competitiveness arising from inequality produces the same detrimental effects. In a typical high-pressure competitive setting, where personal effort and skills are paramount, external attributions may lead students to believe that success is largely beyond their control, thereby dampening their motivation to compete. Conversely, heightened perceived competitiveness fostered by inequality might serve as a motivator for individuals to strive to change their position regardless of attributions, either by moving closer to or avoiding moving further away from those in higher-status positions.

On the other hand, personal competitiveness may play a more stable role in influencing individual reactions to inequality. Individuals with a higher degree of personal competitiveness may be more sensitive to information that underscores prevailing disparities, given their inherent inclination to respond more intensely to competitive situations. For a more comprehensive understanding, researchers might consider evaluating

competitiveness after exposing participants to manipulation of inequality, employing a control group for comparison. This approach enables the examination of any observed changes in competitiveness that may be directly attributed to the exposure to perceived inequality. The control group, functioning as a baseline, would serve as a crucial reference point, enhancing the internal validity of the study by controlling for individual differences and external factors. Furthermore, such exploration may provide insights into why students with an internal locus of control appear to be unaffected by perceived inequality, as to date, no studies have thoroughly explored the relationship between locus of control and competitiveness.

Secondly, in future studies, it would be valuable to incorporate a more comprehensive measure of perceived advantage, for instance by employing items that reflect various aspects of privilege, access, and opportunities within societal and educational structures and assessing perceptions of advantages related to race, gender, socioeconomic status, and other relevant factors. This approach would serve multiple purposes: not only would it offer a deeper understanding of how perceived advantage influences the intricate relationship between perceived inequality, locus of control, and educational aspirations, but it would also enable exploration into the underlying reasons why students with a more external locus of control might perceive themselves as less advantaged in comparison to their peers. This avenue has yet to be explored in the literature, but it might offer useful insights into why students with different locus of control would react differently to perceived educational inequality.

Finally, it may be worth exploring different measures of perceived educational inequality that have the potential to better differentiate inequality of educational opportunities from inequality of educational outcomes. As highlighted earlier, Martorano & Nübold (2023) identified a significant effect of perceived inequality of outcomes on aspirations, whereas inequality of opportunities only yielded significant effects for students

living in states with high racial inequality. In future studies, by systematically disentangling these two constructs, researchers may explore whether inequality of educational outcomes alone indeed has significant effects on aspirations or, as our study suggests, whether there is in fact no significant main effect of perceived educational inequality on aspirations.

As previously mentioned, using qualitative methods may help acquire a more nuanced insight into how students perceive different kinds of disparities in educational settings. The absence of a clear differentiation between these two concepts could be attributed to a potential lack of familiarity with the theoretical distinctions between educational opportunities and outcomes. Therefore, including clear definitions of the two concepts in the questionnaire instructions might improve the likelihood of measuring perceived educational inequality more effectively in future studies. Additionally, conducting a factor analysis on a refined version of the educational inequality scale, including clearer definitions and explanations, may shed light on previously unexplored dimensions within perceptions of inequality, such as examining whether individuals perceive specific bias within educational institutions, contributing valuable insights to the psychological literature.

Incorporating these recommendations into future research holds the promise of shedding light on the complex interplay between perceived inequality, locus of control, and educational aspirations, ultimately contributing to a deeper understanding of the motivational factors that influence students' educational journeys.

Conclusion

In conclusion, while the present study yielded some unexpected findings regarding the impact of perceived educational inequality and locus of control on students' aspirations, it highlights the complexity of this relationship and identifies promising avenues for future research to provide further insights. Our research aligns with the established body of evidence indicating that an internal locus of control positively affects students' educational

aspirations. Most notably, we provide support for the notion that higher perceptions of educational inequality may have motivating effects on students who feel like their academic outcomes depend on external factors. The enhancement of measurement approaches and the exploration of previously unexamined influences, such as perceived competitiveness and advantage, hold the potential to deepen our understanding of how inequality and locus of control mould students' aspirations. This study not only enriches the evolving knowledge on the relevant topic of how students' educational aspirations are formed, but also sparks a call for continued exploration into the nuanced realms of perceived inequality and locus of control.

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Appendix A

Linearity

The assumption of linearity was checked through scatterplots (see Figure 1.A and Figure 2.A). There appears to be a positive linear relationship between locus of control and educational aspirations. Educational aspirations scores appear to be spread evenly across the two perceived inequality groups, and as there are no signs of non-linearity, we can conclude that the linearity assumption is met.

Figure 1.A

Scatterplot of educational aspirations by locus of control scores.

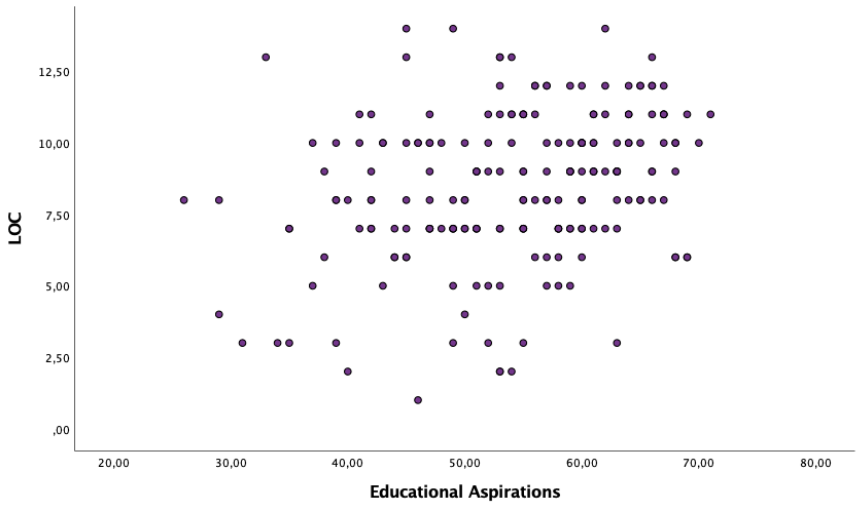
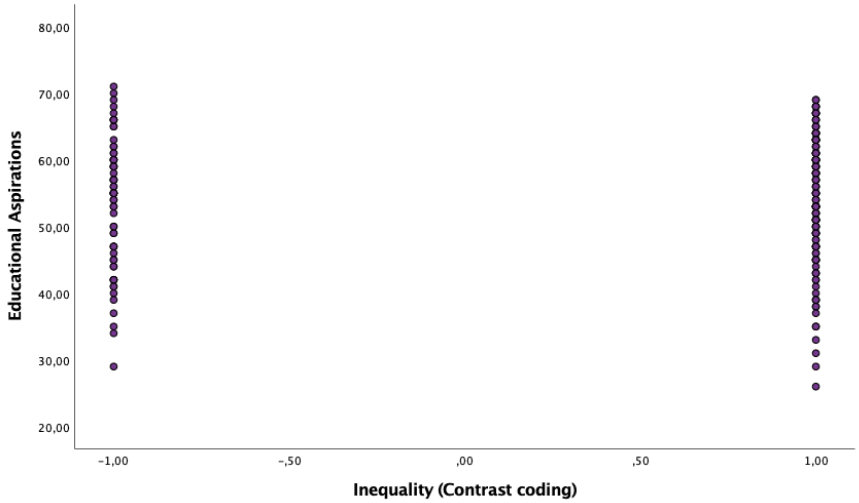


Figure 2.A

Scatterplot of contrast coding of inequality groups by educational aspirations scores.

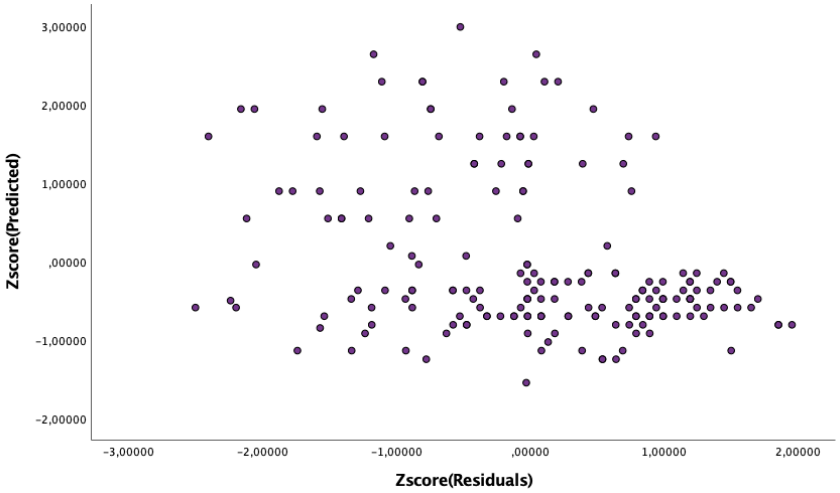


Homoscedasticity

The assumption of homoscedasticity was checked through a plot of standardised residuals against standardised predicted values (see Figure 3.A). The plot shows similar dispersion of scores around the mean indicating homoscedasticity, therefore we can conclude that this assumption was met.

Figure 3.A

Scatterplot of standardised residuals against standardised predicted values.



Normality of residuals

The assumption of normally distributed residuals was checked through a histogram (see Figure 4.A) of the standardised residuals. Distribution appears to be relatively normal, therefore we can conclude that the normality assumption has not been violated.

Figure 4.A

Histogram of standardised residuals for educational aspirations.