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Controlling Your Destiny in a World Filled with Inequality:

The Effects of Perceptions of Inequality and Locus of Control on Educational Aspirations

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Abstract

Previous research has argued the importance of education for future gains (Palomino et al., 2019) and how inequality can negatively affect educational aspirations (Jia et al., 2021). Therefore, this study aimed to further demonstrate whether differences in perceptions of inequality of opportunity and outcome negatively affects students' educational aspirations. Further, based on previous research demonstrating positive main effect of internal locus of control (Sagone & Caroli, 2014) and a moderating effect of internal locus of control (Jia et al., 2021) on educational outcomes, locus of control was added as a moderator to see if an internal locus of control offsets negative effects of inequality on educational aspirations. Our manipulation, videos explaining inequality of opportunity and outcome, failed to tease apart perceptions of inequality of opportunity and outcome and were consequently combined into one factor, inequality. We found no significant main effect of perception of inequality, but a significant positive main effect of locus of control on educational aspirations. An interaction effect between perceptions of inequality and locus of control on educational aspirations was found. However, unexpectedly, students perceiving inequality within the external locus of control group scored highest on educational aspirations. Implications, limitations, and avenues for further research are discussed.

Layman's Abstract

Some students feel like they are being unfairly treated because of, for example, family background (inequality of opportunity). Others sometimes feel unfairly treated when they work at least as hard on projects and produce equally or better resulting work but are given worse grades than others (inequality of outcome). We wanted to see how the difference in these perceptions lead to less desire to set and achieve higher educational goals. To manipulate the difference in perceptions of unfair treatment, participants in our study were

put in different groups. In one group they saw a video explaining the negative effects of inequality of opportunity. In the other, they saw a video explaining the negative effects of inequality of outcome. Also, we checked whether believing you have personal control over outcomes depending on your own efforts would reverse the expected effects previously mentioned. However, we were unable to create a difference in perceptions of inequality of opportunity and outcome. Therefore, we combined the two inequalities and treated them as one overall perception of inequality. Perception of inequality did not affect students' desires for higher educational achievements. Belief in personal control over outcomes based on effort, on the other hand, did have a positive effect. Surprisingly, those who perceived inequality and had little belief in control over outcomes based on effort had the highest desires for educational achievements. Possible explanations, weak points of our study, and implications of our results are discussed.

Controlling Your Destiny in a World Filled with Inequality

“We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.” (Jefferson, 1997).

As can be seen here, the ‘Declaration of Independence’ holds equality in creation and equality of opportunity to be “self-evident.” The question is whether this does hold true. One important aspect in securing future gains is education (Palomino et al., 2019). Currently in the U.S., representation at colleges of children from wealthier families is disproportionate to the representation of children from lower wealth families. Overrepresentation of students from wealthier families is especially present in Ivy-League colleges. In these schools, children from the wealthiest 1% households are 77 times more likely to be accepted than children from bottom income households (Chetty et al., 2020). Such inequality in college admittance opportunities can potentially negatively affect students’ educational aspirations (Jia et. al, 2021). Furthermore, inequality can negatively affect students’ outcomes not only before college admission, but during and after college as well (Chetty et al., 2014). Our goal is therefore to study the difference in the effect of perceived inequality of opportunity and outcome on educational aspirations in people currently enrolled in college programmes. Inequality of opportunity can be defined as the difference in distribution of opportunities offered based on family wealth and education (Corak, 2013). Inequality of outcome, on the other hand, can be defined as putting in equal efforts and having equal access to resources, such as education and wealth, yet obtaining different outcomes (Phillips, 2004; Kanbur, 2018).

Inequality can negatively affect educational aspirations by limiting a person’s belief in their potential for development towards improving their abilities and talents (Jia et al., 2021).

Further, Jia and colleagues (2021), demonstrated that the effect of inequality on educational aspirations is moderated by obstacles outside a person's control, such as family level of education, income, and occupation, also known as socio-economic status (SES; Duncan & Magnuson, 2012). Moreover, inequality of opportunity can have a negative effect on educational and occupation outcomes (Marrero & Rodríguez, 2013; Johnson & Reynolds, 2013). However, providing good educational opportunities in itself can lower these negative effects significantly (Palomino et al., 2019). It is therefore easy to see that inequality can have a negatively spiralled effect on educational aspirations. In other words, inequality of opportunity can negatively affect students' educational aspirations, which further down the line can lead to inequality of educational outcomes. These inequality of educational outcomes can lead to further inequality of educational opportunities down the generational lines (Reardon, 2011).

Most of previous studies have focused on inequality of opportunity by, for example, by selecting nation- or state-wide samples and statistically analysing outcomes in areas such as education and occupation (Chetty et al., 2020, Chetty et al., 2014, & Carnevale, 2004). Previous studies have therefore contributed to the literature by demonstrating the correlations between inequality of opportunity and outcome on educational outcomes on a more macro level. Further, the number of studies focusing on inequality of outcome has been very limited. We could find only one study that studied the difference in effect of inequality of outcome and opportunity on educational success (Gromada et al., 2021). However, our study will focus on the effects of perceived inequality of opportunity and outcome on educational aspirations by attempting to manipulate the two inequalities separately. Therefore, our study will contribute towards a better understanding of the internal psychological perceived inequalities and their effects on educational aspirations on a more micro level.

Theoretical Background

As stated earlier, education is one important aspect in securing future gains (Palomino et al., 2019). However, there are many life conditions which can influence and alter a person's ability to stay on their educational track. Some are outside a person's control, such as race, gender, sexual orientation, and family social-economic status whereas others are conditions that a person can control such as attitude, (personal) values, and behaviour (Schunk & DiBenedetto, 2020). Schunk and DiBenedetto (2020) demonstrated how behaviour is necessary in the form of putting in hard work and effort to reach academic goals. However, to initiate and maintain such a necessary level of work and effort, you need to have the proper motivation. Moreover, motivation can be influenced by conditions outside your control to a certain degree. Perception of inequality of outcome is an example of a condition that is outside of your control (Schunk & DiBenedetto, 2020). If you put in high levels of effort in performing goal-directed tasks, but your work and effort is not receiving the same recognition as others' same level of work and effort put into the same task, your motivation can be lowered (Bandura, 1997). In turn, motivation can lead to diminished effort and work in future (educational) goal-directed tasks (Schunk & DiBenedetto, 2020). We therefore arrive at the following hypothesis:

- H1a: Perception of inequality of outcome will lead to lower educational aspirations.

Related to inequality of outcome, evidence shows the negative impact of inequality of opportunity on aspects such as, for example, educational achievements and aspirations (Marrero & Rodríguez, 2013; Johnson & Reynolds, 2013). In other words, not having the same access to resources, such as education, based on, for example family wealth, can lead to a hampering of future growth for next-in-line familial generations through further limited access to education (Marrero & Rodríguez, 2013). Further, inequality of opportunity negatively affects young people's expectation to be able to stay in school and to achieve a

higher education degree (Johnson & Reynolds, 2013). Thus, we arrive at the following hypothesis:

- H1b: Perception of inequality of opportunity will lead to lower educational aspirations, replicating the results of Johnson and Reynolds (2013).

However, we found another important aspect in relation to educational aspirations, namely internal locus of control (Jia et al., 2021). Internal locus of control is the belief one has personal control, through personal effort, over task outcomes (Graham, 2020). There is a concern about children being unable to move upwards in societal standings based on lack of access to higher education. This (non-)restricted access to higher education based on family SES is known as educational mobility, which is closely related to (in)equality of opportunity through a shared focus on access to resources based on a family's socio-economic status (Jia et al., 2021). However, Jia and colleagues (2021) found an indirect effect of educational mobility on educational aspirations. They looked at the effect of whether students' belief that abilities can be improved through effort, also known as growth mindset, has a positive impact on educational aspirations. However, this effect was moderated by educational mobility such that low educational mobility reduced the effect of growth mindset on subsequent educational performance (Jia et al., 2021). Another trait, closely related to growth mindset, is internal locus of control. These constructs are similar insofar as they both focus on a person's belief in achieving goals through effort (Burnette et al., 2013; Yeager & Dweck, 2012). Internal locus of control has been found to have a direct positive effect on educational aspirations (Jia et al., 2021). It has been linked with a better self-concept, self-image, and an increased ability to tackle not only academic work but also everyday circumstances next to studies (Sagone & Caroli, 2014). Thus, our second hypothesis is as follows:

- H2: Those with a higher score on locus of control, indicating a more internal locus of control, will have higher educational aspirations than those who score low on locus of control.

As mentioned before, inequality of opportunity can moderate the relationship between locus of control and educational aspirations (Jia et al., 2021). However, there is some evidence that it could be the other way around; that locus of control moderates the relationship between inequality of opportunity and educational aspirations. One study, using a sample of only African American men and women found that locus of control positively moderated the negative effect of internalized racial oppression on educational valuation, but only for the males in their study (Brown et al., 2017). Another study looked at students who differ from ‘traditional’ students by, for example, being single parents, being financially independent, or being full-time employed. The study demonstrated how internal locus of control positively contributes towards a more realistic view of demand for effort to gain positive educational outcomes (Crone & Babb, 2023). An internal locus of control has even been found to offset the negative effects of posttraumatic stress on educational achievements (Boyraz et al., 2019). Lastly, one study found that despite family background, an internal locus of control positively affects high-school graduation, college aspirations, and school attendance (Szabó-Morvai & Kiss, 2023). We therefore come to our 3rd and last hypothesis:

- H3: Higher internal locus of control will reverse the negative effect of perceived inequality of opportunity and perceived inequality of outcome on educational aspirations.

Methods

Design and Participants

Design

We used a 1 (Locus of Control) x 3 (Inequality: Control, Opportunity, Outcome) between-subjects design with Locus of Control and Inequality being independent variables measured on continuous scales. Educational Aspirations, our dependent measure, was measured on a continuous scale.

Participants

Our criteria for taking part in our study was a minimum age of 18 and being in college, working towards an associate or bachelor's degree. Participants were recruited using Prolific (www.prolific.co). Also, a power analysis was conducted using G*Power (Faul, 2007) to determine our minimum number of participants needed for our study. For the power analysis, we set the parameters to 'linear multiple regression (fixed model, R² increase, the significance level at $\alpha = .05$, and desired power ($1 - \beta$) to .80. The results of our power analysis suggested a minimum of 158 participants to find a medium effect size. We chose a medium effect size based on time and budget size considerations (Kraemer & Thiemann, 1987). As Kraemer and Thiemann (1987) argue, aiming for large size poses a risk towards a between-subjects study being underpowered, whereas, more importantly, aiming for a small effect size demands an enormous sample size to detect true power. Further, we could not find much in terms of effect sizes reported in previously related studies. Therefore, we also chose medium effect size based on Maxwell and Delaney's (2004) argument that medium effect size offers a reasonable balance in reducing the chance for Type II error without requiring an enormous sample size.

Due to being done with their bachelor's degree and working on a master or higher degree, 12 participants were excluded from statistical analysis. This left us with 190 valid participants with ages ranging from 18-59 ($M = 27.47$, $SD = 8.72$), of which 51.6% were

female, 42.6% male, and 5.8% identified as 'Non-binary/Third gender'. The ethnicity of our population was 53.2% 'White or Caucasian', 16.8% 'Asian', 16.2% 'Black or African American', 12.1% 'Hispanic or Latino'.

Measures

Perception of Inequalities

To manipulate our participants in the three different inequality groups (control, opportunity, outcome) we created three different videos for the corresponding groups. Those in the perception of inequality of opportunity and outcome groups saw a corresponding video about inequality of opportunity or outcome in educational settings. The video about inequality of opportunity contained slides explaining how some students are not offered similar educational opportunities based on aspects outside their control. For example, it explains how students may not always have the same access to resources, such as books and technology, because of lower family income. The video about inequality of outcome, on the other hand, explains how students' work and effort are not always recognized equally by tutors and professors. For example, it shows how biases towards extraversion vs. introversion in tutors, generally speaking, can lead to unfair assessments even when extraverted and introverted students put in the same effort and quality into their work. The video further explains how this inequality of outcome can negatively affect students' educational achievements. The video further explains how this can affect students' educational achievements. Lastly, the participants in the control group saw an informative video about the general yearly structure of colleges in the United States.

Attention-Check

To check if participants paid attention while watching their corresponding video, we posed three questions in each condition. Examples of questions for control, opportunity, and

outcome conditions were ‘When is spring break usually, according to the video?’, ‘Who does the quote about education mentioned in the video belong to?’, and ‘Which factor influencing educational opportunities was NOT mentioned in the video?’, respectively. There were four answer possibilities for each question, with only one answer being correct per question. For control condition, 52 (85.2%) participants answered two or more questions correctly; for opportunity 58 (89.2%) participants answered two or more questions correctly; for outcome 63 (98.4%) participants answered two or more questions correctly.

Measuring Perception of Inequalities

To see if our manipulations worked, we employed a manipulation check using two 5-item scales. The two scales were designed to assess participants’ level of perceived inequality of opportunity and outcome. Assessing perceived inequality of opportunity included statements such as ‘Educational opportunities are mostly fair within the American educational system.’ Inequality of outcome included statements such as ‘Some students encounter unique challenges that create unfair educational inequality in outcomes.’ These statements were rated on a 7-point Likert scale ranging from 0 (*strongly disagree*) to 6 (*strongly agree*). Cronbach’s alpha indicated good internal consistency for both scales, with $\alpha = .84$ and $\alpha = .82$ for perceived inequality of opportunity and perceived inequality of outcome, respectively. For perceived inequality of opportunity and perception of inequality of outcome, mean sample scores were 4.49 ($SD = 1.17$) and 4.39 ($SD = 1.13$), respectively.

Locus of Control

Locus of control was measured using a modified version of the Academic Locus of Control Scale (Trice, 1985) which scores high on internal consistency $\alpha = .81$. We modified the scale by selecting the items that we thought would best represent locus of control questions regarding effort towards education. For example, we kept statements such as

‘College grades most often reflect the effort you put into classes’ and ‘Some students, such as student leaders and athletes, get free rides in college’ and excluding statements such as ‘I came to college because it was expected of me’ and ‘I have largely determined my own career goals’. Also, we made and added statements probing locus of control regarding control over educational opportunities and outcomes such as ‘I think that access to quality education relies solely on external circumstances and luck’ and ‘Having a positive outlook enables one to overcome educational challenges, despite the circumstances’. Our modified version of the scale contained 15 true or false statements. The codings were 0 (*false*) and 1 (*true*). Higher scores on this scale indicated a more internal locus of control. Our modified scale had a lower but acceptable internal consistency score of $\alpha = .61$. To see if we could increase this internal consistency, we conducted a reliability analysis to check if items could be removed based on ‘Cronbach’s alpha if item deleted’. The reliability analysis did not reveal any items to be removed to increase reliability. Our participants had a mean score of .56 ($SD = .18$).

Educational Aspirations

Based on Survey Inequality-Educational Outcomes (n.d.) educational aspirations were assessed by asking participants what degree of education and level of career they desired to achieve, but also what degree of education and level of career they expected to achieve in the future. Answers on these questions ranged from 0 (*I am not interested in getting a degree, I am considering dropping out.*) to 5 (*Ph. D. Degree; See Appendix for further information*). Further, they were asked 11 questions about their educational goals and how much importance they put on those goals, such as ‘How confident are you in your academic performance?’ and ‘How important is your education for the job that you pursue?’. These 11 questions were answered on a 6-point Likert scale ranging from 0 (*not at all important*) to 5 (*very important*). Thus, high scores on desires and expectations to achieve future goals, and high scores on the 11 further questions would indicate a high educational aspiration score.

Cronbach's alpha ($\alpha = .87$) indicated good internal consistency and participants had a mean score of 3.56 ($SD = .63$).

Procedure

Participants were first asked to give their informed consent. Then, they had to test whether audio was working properly. If participants gave consent and indicated their audio was working, they moved on to the main part of the study.

Participants were randomly put in one of the three inequality conditions (control, opportunity, or outcome) and were shown the corresponding inequality condition video. Our distribution for each condition was as follows: 61 participants in the control condition, 65 participants in the opportunity condition, and 64 participants in the outcome condition.

Then, they were asked three attention-check questions that corresponded to their inequality condition video. After, they were asked to fill out the questionnaires mentioned earlier in the following order: educational aspirations, perceptions of inequality of outcomes, perceptions of inequality of opportunity, and finally locus of control. Because we wanted the manipulation videos to be fresh in our participants' minds, we assessed the dependent variable, their educational aspirations, first. For the perception of inequalities, we chose to assess outcome before opportunity. The idea behind this is that both inequality of opportunity and outcome share a "symbiotic relationship". I.e., in most cases, if not all, one of the two inequalities do not exist without the other. However, our thinking was that perception of inequality of opportunity will be more obvious as an antecedent to perception of inequality of outcome than vice versa. In other words, we thought assessing inequality of opportunity first would influence answers on the assessment of inequality of outcome measurement, whereas assessing inequality of outcome first would have less or no effect on participants' answers on inequality of opportunity measurement. Finally, we decided to assess locus of control last to

make sure ideas about locus of control would not influence participants' ideas about both inequality of opportunity and outcome.

After the main questionnaires, participants were asked to answer demographic optional questions, such as age, gender, and ethnicity. Finally, they were debriefed about the purpose of our study and were prompted to ask questions or leave comments for us. Prolific (www.prolific.co) automatically compensated participants based on a pre-calculated average time to participate in the study.

Ethics

Our study gained ethics approval by the Psychology Research Ethics Committee.

Results

Data Screening and Preparation

As our study was meant for bachelor students, 12 participants were excluded because they indicated studying at a master level or higher. This left us with 190 participants. We found no missing data for our 190 remaining participants in the data for the main measurements. For the questions assessing demography, there was some missing information due to these questions being optional. As the demographic questions were optional, we did not exclude any of the participants who decided to not give an answer. Further, we tested for outliers on age but found no significant outliers above the age of 18. We checked for assumptions of linearity, normality of residuals, homoscedasticity, and independence of residuals and handled these accordingly. Next, we performed a randomization check to see if participants were truly randomly distributed among the three conditions and found no issues. All scales were tested for reliability.

For our main analysis, moderation analysis was performed using Process Macro Model 1 (Hayes, 2018). Our independent variables used were the perception of inequality of opportunity, perception of inequality of outcome, and locus of control measurements. The dependent variable was the educational aspirations measurement. We also tested for locus of control as our hypothesized moderator of the effect of inequality conditions on educational aspirations. Moderation analysis was performed using a simple slope analysis. All our statistical analyses were performed using SPSS version 29.0.

Manipulation Check

For the perception of inequality of opportunity, a one-way ANOVA showed a significant difference between the inequality of opportunity condition ($M = 22.91, SD = 6.28$) and the control condition ($M = 20.23, SD = 5.60, M_{diff} = 2.68, p = .023$) and a significant difference between the outcome condition ($M = 24.14, SD = 4.99$) and the control condition ($M = 20.23, SD = 5.60, M_{diff} = 3.91, p < .001$). However, no significant difference was found between the inequality of opportunity condition ($M = 22.91, SD = 6.28$) and the inequality of outcome condition ($M = 24.14, SD = 4.99, M_{diff} = -1.23, p = .432$).

For the perception of inequality of outcome, a one-way ANOVA showed a significant difference between the inequality of opportunity condition ($M = 23.28, SD = 5.30$) and the control condition ($M = 19.54, SD = 5.51, M_{diff} = 3.74, p < .001$) and a significant difference between the outcome condition ($M = 22.89, SD = 5.48$) and the control condition ($M = 19.54, SD = 5.51, M_{diff} = 3.35, p = .002$). However, no significant difference was found between the inequality of opportunity condition ($M = 23.28, SD = 5.30$) and the inequality of outcome condition ($M = 22.89, SD = 5.48, M_{diff} = .39, p = .914$).

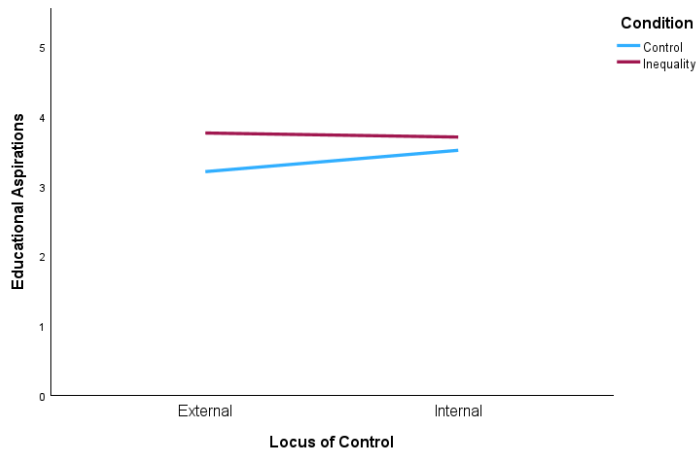
Thus, we found the inequality conditions to significantly differ from control conditions on both perception of inequality of opportunity and outcome. However, because

the manipulation check detected no significant difference between inequality of opportunity and outcome, we decided to check how much the two perceived inequalities correlated with each other. The perception of inequality of opportunity and perception of inequality of outcome manipulations were highly correlated (Cronbach's $\alpha = .91$). Based on the results of our manipulation check, we decided to treat perception of inequality of opportunity and perception of inequality of outcome conditions as one, called 'perception of inequality condition' versus control condition in further analyses.

Main Analysis

Using PROCESS Macro Model I by Hayes (2018) in order to test our hypotheses, we found that manipulation of inequality has no significant main effect on educational aspirations ($t = 1.39, p = .165, d = .01$). Thus, we found no support for hypothesis 1. Supporting hypothesis 2, however, locus of control does have a significant positive main effect on educational aspirations ($t = 4.237, p < .001, d = .05$). Further, there was a significant interaction effect of inequality and locus of control on educational aspirations ($t = -2.02, p = .045, d = .06$). The coefficients of inequality and locus of control were positive (.99 and 1.06, respectively) but the interaction effect showed a negative coefficient (-.55). Therefore, our results suggest that inequality and locus of control individually positively affects educational aspirations. However, when treating locus of control as a moderator, the effect of inequality on educational aspirations is weakened.

Figure 1. Graph showing the interaction effect of LOC by Inequality on Educational Aspiration.



Further simple effects analyses demonstrated our third hypothesis was not supported. The difference between low and high inequality on educational aspiration within the internal locus of control group is not significant ($F[1, 92] = .45, p = .506, \eta^2 > 0.01$) with mean scores for the inequality group at 3.79 ($SD = .53$) and 3.71 ($SD = .57$) for the control group. However, the difference between low and high inequality on educational aspiration within the external locus of control group is significant ($F[1, 92] = 4.50, p = .037, \eta^2 = 0.05$), with mean scores for the inequality group at 3.16 ($SD = .58$) and 3.46 ($SD = .65$) for the control group. Within the control condition locus of control has a significant effect on educational aspiration ($F[12, 48] = 3.35, p = .001, \eta^2 = 0.32$). Locus of control also has a significant effect on educational aspirations within the inequality condition ($F[12, 116] = 2.00, p = .030, \eta^2 = 0.09$).

Discussion

We aimed to study the difference in effect of perceived inequality of opportunity compared with perceived inequality of outcome on students' educational aspirations with locus of control as a moderator. However, we were not able to successfully tease apart a difference in perceived inequality of opportunity and perceived inequality of outcome. As

perceived inequality of opportunity and outcome were found to be similar in construct, we combined them into one overall construct, inequality. Using the new construct, inequality, to be compared with the control group for their effect on educational aspirations, we did not find support for our hypothesis that higher perception of inequality will lower educational aspirations. However, our results showed that locus of control had a significant main effect on educational aspirations, supporting our second hypothesis. Further, we found a significant interaction effect of inequality and locus of control on educational aspirations. However, this interaction effect did not support our hypothesis that those with a high perceived inequality would benefit from an internal locus of control for their educational aspirations. Surprisingly, the results suggest otherwise.

Further, within the internal locus of control group, there was no significant difference between control and perceived inequality conditions on educational aspirations. Apparently, for people who believe they have a personal effect on outcomes depending on their own efforts, their level of perception of inequality matters little for their educational aspirations. Thus, internal locus of control can control for other factors, such as perceived inequality, on the effect on educational aspirations. These results are in line with previous research that argue the importance of having an internal locus of control (Sagone & Caroli, 2014). Sagone and Caroli (2014) found locus of control to strongly and independently affect educational outcomes in students. Level of perceived inequality, on the other hand, does not necessarily control for locus of control on the effect of educational aspirations as we will discuss further.

For participants in the external locus of control group, on the other hand, our results show that there is a significant difference between the control and perceived inequality groups on educational aspirations. Surprisingly, though, educational aspirations are highest in the perceived inequality group within external locus of control. These surprising results might be to some degree explained by what is known as 'learned optimism' (Seligman, 1991).

Learned optimism is a way of challenging negative thoughts about oneself. In our case, participants could perhaps be in a state of mind, reflecting complete lack of control over their situation due to their external locus of control and high perceived inequality. With so little control, one can cope by putting a positive spin on the situation (Seligman, 1991). Perhaps the participants with an external locus of control in the inequality group thought things could not get worse, but only better if they decide to rely on their own effort and input. Such thoughts could then lead to results more similar with the results showing the positive influence of an internal locus of control, as we will discuss later. However, since we did not assess factors such as optimism, it is difficult to know whether our reasoning holds true. Therefore, it would be advisable to include such measures in future similar studies.

Further, our results showed a significant interaction effect. First, our results show that within control and inequality groups separately, locus of control has a significant effect on educational aspirations. Therefore, reflecting the significant main effect of locus of control, it matters little whether students perceive low or high inequality for their educational aspirations. If they have an internal locus of control, their educational aspirations will generally be higher. Similar results have been found in earlier research. Szabó-Morvai and Kiss (2023) found that having an internal locus control positively affects educational outcomes. Further, Brown and colleagues (2017) looked at the effects of internalized racial oppression with locus of control as a moderator on educational valuation in a sample of African American young adults. They did find locus of control to positively moderate the negative effects of internalized oppression on educational valuation. However, their results were only found for the men in their study.

Lastly, as hypothesized, locus of control showed a positive significant main effect on educational aspirations. Our results demonstrate that students with a more internal locus of control tend to have higher educational aspirations. In other words, students who believe they

are personally in control of possible outcomes depending on their own efforts generally tend to have higher educational aspirations. These results are in line with previous research that have demonstrated similar patterns of a positive main effect of locus of control on educational outcomes (Jia et al., 2021; Sagone & Caroli, 2014). As Sagone and Caroli (2014) further demonstrate in their study, an internal locus of control is linked with higher self-appraisal and a belief in being able to tackle problems, such as educational ones, more efficiently in relation to educational outcomes. Thus, it is not just the belief that putting in effort itself results in higher educational aspirations, but also the belief one can efficiently overcome all or most obstacles towards higher educational achievements.

Strengths and Limitations

Most of past research has had a greater focus on methods, such as selecting nation- and state-wide samples on, for example, SES and statistically linked these samples with (in)equality in education and occupation (Chetty et al., 2020, Chetty et al., 2014, & Carnevale, 2004). Therefore, previous studies have linked inequality with educational outcomes on a more macro level. The strength of our study, on the other hand, lies in its greater focus on the micro level by manipulating our participants on an individual level for perceived inequalities. Research in this area is still in its infancy and needs a better understanding of the inner workings of perceptions of inequality of opportunity and outcome. Further evidence for the need for more understanding of the inner workings of perceptions of inequality of opportunity and outcome comes from an unpublished study (Martorano et al., 2023). As with our study, Martorano and colleagues (2023) were unsuccessful in manipulating and creating clearly interpretable differences in effect between inequality of opportunity and inequality of outcome on an individual level. Thus, more research is necessary to understand the effect of perception of inequality on educational outcomes on a more micro level.

Also, we used the Academic Locus of Control scale which has a high reliability of $\alpha = .81$ (Trice, 1985). However, in our sample we obtained a reliability of 0.61. This reliability is quite low, despite being acceptable. Some research suggests that using dichotomous scales can negatively affect reliability and therefore advice caution in using dichotomous scales (Donner & Eliasziw, 1994; Stöber et al., 2002). Further, as mentioned in the methods section, factor analysis did not reveal any items for removal to significantly improve the reliability. We are therefore inclined towards following earlier mentioned caution in using dichotomous scales. Perhaps it would be best to develop a continuous locus of control scale for the future to capture more nuance.

Another limitation was the fact that we used students of age 18 and up and who are already enrolled in college. If (perception) of inequality of opportunity and outcome, together or separately, does have an impact on young peoples' educational aspirations, perhaps (perception) of inequalities pose a problem at a much younger age. In other words, those who have already been eliminated in the track of attaining higher education due to lowered educational aspirations through (perception) of inequality, were not present in our studies. This limitation might therefore also to some degree explain why we did not find a significant main effect on the relationship between inequality and educational aspirations. Therefore, it would be a good idea for future research to look at the effect of perception of inequality of opportunity and outcome, together and separately, in younger school-age children. Designing studies in this manner for different school-aged children would yield a better picture of how (perception) of inequality affects educational aspirations over time before college. For example, as Steele (1997) argues, stereotype threat, the fear of a person conforming to other peoples' stereotypes of them, can lead to lowered academic achievements in African American children. These lowered academic achievements can lead to lowered educational aspirations through lowered motivation (Bandura, 1997; Schunk & DiBenedetto, 2020).

Therefore, it is important to investigate the effects of perceptions of inequality at a very young age as well to get a better understanding of factors that can possibly hinder young children's desire for college later in life.

Another limitation was our unsuccessful attempt to tease apart the perception of inequality of opportunity and the perception of inequality of outcome in our respondents. A pessimistic view would be to conclude that perhaps inequality of opportunity and outcome are only theoretically, or even only philosophically, distinct constructs. In other words, it is possible that the two inequalities share too many cognitive and emotional similarities as previous research seems to suggest (Martorano et al., 2023). As mentioned earlier, inequality of outcome is defined by expending same effort and input into goal-directed tasks, but obtaining different results (Phillips, 2004; Kanbur, 2018), whereas inequality of opportunity is defined by the difference in opportunities offered based on family wealth and education (Corak, 2013). Further, inequality of opportunity has been demonstrated to negatively influence outcomes (Marrero & Rodríguez, 2013; Johnson & Reynolds, 2013). As we can see, the starting point of both inequalities are different, but the end results seem to be similar, namely unfair outcomes for the victim of inequality. Therefore, it would perhaps be better to first tease apart the two inequalities by first obtaining a better and more exact understanding of the different emotions and cognitions that underlie the starting point of both constructs. Then, future studies can take a more indirect route towards researching the emotions and cognitions underlying the perceptions of the two inequalities, opportunity, and outcome, before moving on towards more direct approaches, such as our study.

Implications

This study offers some contribution to the study of the relationship between perception of inequalities, locus of control, and educational outcomes. Our results further

demonstrate the positive relationship between locus of control and educational aspirations in line with previous studies (Jia et al., 2021; Sagone & Carole, 2014). Further, our results somewhat challenge more established research demonstrating the negative effect of inequality of opportunity and outcome on educational outcomes (Bandura, 1997; Jia et al., 2021; Marrero & Rodríguez, 2013; Johnson & Reynolds, 2013). However, these studies showing the negative effect of inequality on educational outcomes did not suffer from the same limitations as our study did. Because we did not successfully tease apart the perception of inequality of opportunity from the perception of inequality of outcome, we should be cautious about interpreting our results that were and were not successful in supporting our hypotheses.

Also, our results, despite the unsuccessful manipulation and somewhat difficult-to-explain significant results, have some important implications for people working in educational settings. Our results demonstrate that having an internal locus of control is positively related to educational aspirations on its own and within people low and high on perception of inequality. Inequality, on the other hand, seems to matter less in determining students' educational aspirations. Although our scale used for measuring locus of control only attained a reliability score of $\alpha = .61$, and therefore warrants caution for drawing conclusions, previous research using the original Academic Locus of Control Scale (Trice, 1985) in similar research areas suggests results would still be similar to our results (Jia et al., 2021; Sagone & Caroli, 2014). Therefore, it might be more fruitful to design interventions aimed at moving students towards adopting a more internal locus of control.

Recommendations for Future Research

First, as mentioned before, 'learned optimism' might offer an alternative explanation for our surprising results demonstrating highest educational attributions in the control group

participants with an external locus of control (Seligman, 1991). Therefore, we would recommend including scales such as Life Orientation Test Revised (LOT-R; Scheier et al., 1994) or Optimism-Pessimism Scale (OPS; Dember et al., 1989). These scales measure people's level of optimism and pessimism in life. Including such scales could potentially offer support or rule out the alternative explanation of 'learned optimism' (Seligman, 1991). However, as we suggested, it might be that students with an external locus of control who perceive inequality end up emulating the same patterns as those with an internal locus of control. Therefore, it would also be recommendable to set up studies that investigate whether our reasoning holds true. Thus, we would also recommend future studies to select participants who have an external locus of control, to manipulate them towards perception of inequality, and then measure whether their resulting locus of control suddenly has changed within the context towards having an internal locus of control.

Perhaps, also, our manipulation was not emotionally impactful enough. Therefore, another suggestion for future research is to create a VR environment that emulate scenarios involving inequality of opportunity and inequality of outcome. An example of such scenarios would be putting the participant in a first-person view of a person experiencing inequality. In the perception of inequality of opportunity the participant would observe how they, for example, are working hard and obtaining good results on a project. However, they are ignored by the teacher while someone else, who obtains same or even worse results, is being favoured by that same teacher. In the perception of outcome scenario, on the other hand, the participant observes how they are working on a project together with someone else and both are putting in same effort and input. However, one is awarded with an amazing grade, whereas the participant, the observer, is awarded with a poor grade. VR can, namely, have the impact necessary to evoke stronger feelings (Martingano & Persky, 2021). This way, participants could for a moment feel what it is like to be disadvantaged due to inequality of

opportunity or outcomes. Such an approach, depending on success or failure in invoking different emotions and cognitions related to the inequalities as separate constructs, could simultaneously offer further insights towards the question of whether inequality of opportunity and outcome are truly separate emotional and cognitive constructs.

Conclusion

We found that locus of control was a better predictor of educational aspirations than perceptions of inequality in college students. More specifically, possessing a more internal locus of control positively impacts educational aspirations. This was in line with already more established studies on the impact of locus of control. Most surprisingly, we found educational aspirations to be highest in the inequality group participants with an external locus of control. Research offers possible explanations for these results, such as ‘learned optimism’ (Seligman, 1991) but demonstrates the need for further research. However, perhaps, the more important results lie in the difficulty we had in manipulating the difference in perception of inequality of opportunity and outcome. These difficulties have highlighted the importance of future studies creating and utilizing better tools for assessing perceptions of the two inequalities for a better understanding of the role of the more internal workings of inequality of opportunity and outcome in future studies.

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Appendix

Educational Aspirations

1. Up to what level do you wish to study?

A0. I am not interested in getting a degree, I am considering dropping out.

A1. Associate Degree

A2. Bachelor Degree

A3. Master Degree

A4. Specialized Professional Degree (e.g. Law or Medicine)

A5. Ph. D. Degree

2. Realistically speaking, up to what level do you expect to study?

A0. I am not interested in getting a degree, I am considering dropping out.

A1. Associate Degree

A2. Bachelor Degree

A3. Master Degree

A4. Specialized Professional Degree (e.g. Law or Medicine)

A5. Ph. D. Degree

3. At what level are you currently studying?

A0. I am in the process of dropping out, I am not interested in getting a degree.

A1. Associate Degree Program

A2. Bachelor Degree Program

A3. Master Degree Program

A4. Specialized Professional Degree Program (e.g. Law or Medicine)

A5. Ph. D. Candidate

4. What is your target GPA for this academic year?

A0. 2.2 or lower

A1. 2.3 – 2.6

A2. 2.7 – 3.1

A3. 3.2 – 3.5

A4. 3.6 – 3.9

A5. 4.0

5. How confident are you in your academic performance?

A: 0. Not at all important – 5. Very important

6. How important is achieving good grades to you?

A: 0. Not at all important – 5. Very important

7. How important is it to you to fully master the knowledge and skills that are taught in your courses?

A: 0. Not at all important – 5. Very important

8. How determined are you to pursue further education after completing your current degree?

A: 0. *Not at all important* – 5. *Very important*

9. How driven are you to perform well in the upcoming exam?

A: 0. *Not at all important* – 5. *Very important*

10. To what extent do you set high academic goals for yourself?

A: 0. *Not at all important* – 5. *Very important*

11. How important is your education for the job that you pursue?

A: 0. *Not at all important* – 5. *Very important*

12. How important is it to you to pursue a job that pays well?

A: 0. *Not at all important* – 5. *Very important*

13. How important is it to you to pursue a job that is fulfilling?

A: 0. *Not at all important* – 5. *Very important*

14. How important is it to you to pursue a job that has a positive impact on society?

Locus of Control	True	False
1. College grades most often reflect the effort you put into classes.	<input type="radio"/>	<input type="radio"/>
2. Some people have a knack for writing, while others will never write so well, no matter how hard they try.	<input type="radio"/>	<input type="radio"/>
3. Professors sometimes make an early impression of you and then no matter what you do, you cannot change that impression.	<input type="radio"/>	<input type="radio"/>
4. There are some subjects in which I could never do well.	<input type="radio"/>	<input type="radio"/>
5. Some students, such as student leaders and athletes, get free rides in college.	<input type="radio"/>	<input type="radio"/>
6. Studying every day is important.	<input type="radio"/>	<input type="radio"/>
7. I consider myself highly motivated to achieve success in life.	<input type="radio"/>	<input type="radio"/>
8. What I learn is more determined by college and course requirements than by what I want to learn.	<input type="radio"/>	<input type="radio"/>
9. Things will probably go wrong for me some time in the near future.	<input type="radio"/>	<input type="radio"/>
10. I feel I will someday make a real contribution to the world if I work hard at it.	<input type="radio"/>	<input type="radio"/>
11. I think that academic opportunities are available and accessible to those who seek them regardless of one's socio-economic background and income.	<input type="radio"/>	<input type="radio"/>
12. I think that access to quality education relies solely on external circumstances and luck.	<input type="radio"/>	<input type="radio"/>
13. One's motivation and effort play a significant role in influencing academic success.	<input type="radio"/>	<input type="radio"/>

14. I lack significant control over my academic performance due to other challenging factors in the environment, such as the teacher's bias and expectations.

15. Having a positive outlook enables one to overcome educational challenges, despite the circumstances.