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## EDUCATIONAL PSYCHOLOGY & COUNSELLING | RESEARCH ARTICLE

# Moderated effects of risky behavior on academic performance among adolescent girls living in urban slums of Kenya

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**Abstract:** This paper examines effects of life-skills, mentoring, and counseling education intervention implemented among primary school attending girls aged between 10 and 19 years, living in Nairobi slums. We hypothesized that interaction between the intervention and aspiration, self-confidence and interest in schooling, mediates the impact of risky behavior on academic performance. This quasi-experimental study had two treatment arms of 538 girls and one comparison with 272 girls. The first treatment arm received life skills mentoring, after school support with homework, and parental counseling; the second treatment arm received a package similar to the first arm excluding parental counseling; while the comparison arm received nothing during the implementation period, but they got a secondary school fees subsidy at the end of the intervention. The analysis shows that the intervention had statistically significant effects on some aspects of risky behavior and the mediators. Results from a structural equation model show existence of strong moderated mediation effects of risky behavior on academic performance. The importance of the findings is in demonstrating how inner-character attributes could enhance learning outcomes, especially among adolescent girls in low-resourced environments.

### ABOUT THE AUTHORS

The authors are from the African Population and Health Research Center's Education Research Program. The Education Research Program (ERP) conducts longitudinal and cross-sectional surveys and intervention research in low-resourced environment and among disadvantaged populations in sub-Saharan Africa to understand the issues of access and quality of education. These studies focus on adducing robust evidence on barriers to learning and schooling at individual, household, school, and community levels. The ERP team also designs interventions to address the barriers and conducts impact evaluation as prove of concept on such interventions. The team is interdisciplinary with highest qualifications at master's and doctorate levels in different areas including economics of education, education measurement, education theory and policy, comparative and international education, statistics, and development studies.

### PUBLIC INTEREST STATEMENT

Growing up as adolescent girl in a low-resourced urban environment comes with a myriad of social, economic, and emotional challenges. In the absence of an intervention, such challenges negatively affect behavior and ultimately other developmental outcomes including academic performance. Poor academic performance denies individuals lifetime opportunities that come with education. This article describes the effects of an intervention meant to enhance academic performance through changes in adolescent girls' behavior based on quasi-experimental data gathered from the girls to demonstrate the effectiveness of the intervention in a poor urban neighborhood. Results show that the combined variable of aspiration, self-confidence and interest in schooling, strongly increased academic performance by over six units. These three inner-character attributes explained how the intervention influenced behavior. Understanding the effects of soft skills on academic performance can improve future education programs targeting poor neighborhoods in developing countries.

**Subjects: Counselling; Education Studies; Language & Literacy; Mathematics & Numeracy; Schools & Schooling; Urban Studies**

**Keywords: aspiration; behavior; confidence; interest; adolescent girls; learning**

### 1. Introduction

Enrolling more girls in secondary education is critical in transforming disadvantaged communities such as populations living in urban slums. Available research indicates that providing girls with secondary education is beneficial to the society (Rihani, 2006; UNESCO, 2012). For example, according to Hervish and Feldman-Jacobs (2011), higher education for females is associated with lower fertility rate, smaller family size, and stronger economic status of women. A study by Dollar and Gatti (1999) show that a 1% increase in the proportion of females in secondary school generates 0.3% growth in annual per-capita income. Another study by WorldBank (2005) reports that future earnings by females of between 10 and 20% margins are attributable to education. These findings underscore the importance of providing girls with good education, and especially secondary education. The need to educate girls, and especially transition to secondary education, becomes even more compelling in poor urban contexts where the authorities have been struggling to transform the life of poor populations such as those living in Nairobi urban slums.

Growing up as a teenager is associated with many challenges, among them are the identity crisis, peer pressure, parental, and school expectations. These challenges take place in the context of self-desires of individual adolescents. To muddle this further is the environment in which the adolescents live. In developing countries, including Kenya, it is common to find adolescents who have taken up adult roles and at the same time attend school. This happens especially among adolescents living in disadvantaged communities such as those in urban slums. For instance, in the slums of Nairobi (Kenya), the physical environment is characterized by overcrowded living structures, poor sanitation and water supply, widespread unemployment, insecurity, illicit behaviors such as prostitution, substance, and drug use (APHRC, 2014; Ngware et al., 2013). Adolescents growing in these conditions are more likely to indulge in risky behavior that may in turn affect their growth and progress in school (Jessor & Jessor, 1977; Kabiru, Mojola, Beguy, & Okigbo, 2013). While such vices make all adolescents vulnerable, in some cases, different strategies are required to mitigate the challenges faced by teenage boys and girls. The success of any mitigating mechanism largely depends on the individual adolescent's inner self and character; and the involvement of parents. Parental soft skills and a good understanding that life contexts influence their decisions to support girls' education, enhances parental involvement in children's education (Reynolds, Crea, Medina, Degnan, & McRoy, 2015).

Among the urban poor in Kenya, learning outcomes and transition to secondary education is low. For example, Ngware, Oketch, and Ezeh (2008) show that in the 2006, Kenya Certificate of Primary Education (KCPE) examinations, pupils in the slums of Nairobi scored 38 points lower than the average score of the pupils in the Nairobi county as a whole. In the 2009 and 2010 KCPE examinations, pupils in these same two slums scored an average of 21 points below 250 points out of the possible 500 points. Low scores curtail the chances of admission to the few affordable quality secondary school places available. These results were collaborated by Ejakait, Mutisya, Ezeh, Oketch, and Ngware (2011) when they showed that 69% of pupils from urban slums scored below 250 in KCPE examinations done in 2005 and 2006. In the urban context of Nairobi, transition to secondary education is lower (58.6%) among pupils in slums compared to those in non-slums (87.5%) (Ngware, Oketch, Mutisya, Abuya, & Musyoka, 2012). If this trend continues, the pupils from the urban slums, girls included, will miss out on the opportunities that secondary education provides.

In these poor urban slum contexts, low academic performance and low transition to secondary education has been associated with indulgence in risky behavior, especially among girls. Generally, in such contexts, both teenage boys and girls are disadvantaged. However, girls may be more disadvantaged due to limited coping mechanisms, gender-based power dynamics within households, and

household decision-making processes that are in favor of boys. In this paper, we adopt Jessor (1991) description of risky behavior as one that can compromise adolescent development. Hence, these behaviors potentially hinder people from attaining their full potential.

Literature on risky behavior has identified four groupings that include rebellious, thrill-seeking, reckless, and anti-social risky behaviors manifested in actions such as fighting, risky sex, drugs, and substance use (Gullone, Moore, Moss, & Boyd, 2000). According to Leather (2009), teenagers engage in risky behavior to regulate their feelings and outcome of their interactions with adults and peers. Interestingly, teenagers and adults (including parents) perceive risky behavior differently. For instance, teenage sex may be perceived positively by a 16-year old girl as it provides the much needed physical and emotional pleasure; parents perceive it negatively as it may increase the likelihood of being infected with HIV/AIDS. In this paper, and based on the responses from the respondents, we zero on two groupings of risky behavior. That is, reckless and anti-social; with reckless behavior being proxied by engaging in sex-related activities while anti-social is proxied by aggressive behavior such as threatening to hit an adult. These proxies resonate actions defined by Gullone et al. (2000) as manifesting risky behaviors.

Available literature on adolescent behavior evidence that risky behavior is associated with low-academic performance (Huffman, Mehlinger, & Kerivan, 2000; Mehra, Kyagaba, Östergren, & Agardh, 2014). To families and education practitioners, understanding how the effects of risky behavior can be mitigated to enhance academic performance is relevant in removing barriers to transition to secondary education. One way of improving our understanding can be through piloting the impact of interventions that target to change behavior with a view to improving academic performance and transition to secondary. In a study by Kabiru et al. (2013) in the same context like ours, they conclude that young people maintain high aspirations acquired through education, delinquency, residential mobility, and religion. Furthermore, in this low-resourced environment, youth were found to cope with limited opportunities through adjusting their aspirations.

However, it should be remembered that risky behavior and academic performance have reciprocal influence. As argued by Barriga et al. (2002), poor academic performance is a strong motivator for tolerance of risky behavior. Teenagers who do not do well in school are more likely to indulge in risky behavior; while those who engage in risky behavior will have their academic performance go down. Understanding how to mediate the effects of risky behavior on learning outcomes therefore becomes critical. However, we do not find in the literature, especially in developing country context such as Kenya, how the effects of interventions focusing on risky behavior are mediated to enhance learning.

In the urban slums of Nairobi, to mitigate negative outcomes of risky behavior, girls and their parents were exposed to life-skills and academic support, and parental counseling intervention, respectively. In this paper, we investigate the effects of risky behavior on girls' academic performance as mediated by the interaction of the intervention and girls' inner self and character—referred in this paper as the three constructs of aspiration, self-confidence, and interest in schooling. These three constructs were arrived at after analyzing responses from the girls about themselves. Understanding the direct and indirect effects of the three constructs on the relationship between risky behavior and learning provides an opportunity to education stakeholders to devise interventions that can enhance education outcomes among disadvantaged girls who are at-risk of poor academic performance. We hypothesize that the interaction between the girls' inner self and character (proxied by the three constructs), and the intervention significantly mediates the impact of risky behavior on academic performance.

### **1.1. Context**

To achieve the objective of increased accessibility to schooling and education, the Kenyan government introduced Free Primary Education (FPE) policy in 2003 and a Free Day Secondary Education in 2008. The implementation of FPE led to increased enrollment of children in public primary schools

from 5.9 million in 2002 to 7.6 million in 2006 and 9.9 million in 2011 (Government of Kenya, 2012). However, existing studies show that the implementation of the FPE policy has been marred by questions about the quality of education. For example, Ngware, Oketch, Mutisya, and Abuya (2010) found that the mean score on a standardized math test was less than 50%, and some teachers of grade 6 pupils scored as low as 17% in a teacher math knowledge test. Oketch, Mutisya, Ngware, and Ezeh (2010) observed that in two slums in Nairobi, where the study reported in this paper is based, many parents perceive that the quality of education in public schools is poor and that most prefer to send their children to fee-charging private informal schools rather than government schools. This implies that the Ministry of Education may not achieve its objective of providing FPE to all children under the current policy framework.

Our study is situated in two urban informal settlements in Nairobi city—Korogocho and Viwandani. The population of the two informal settlements is about 86,000 people. Korogocho is to the north of Nairobi and occupies an area of 0.9 km<sup>2</sup>. It is approximately 11 km from Nairobi's central business district. This informal settlement has a total of 12,909 households (KNBS, 2010). Most residents operate small businesses to earn their living as wage employment is difficult to come by. The slum is characterized by high levels of insecurity, poor accessibility, inadequate housing, poor sanitation and water quality, and low access to basic services like health care and education. Viwandani is located to the East of Nairobi and occupies an area measuring 5.7 km<sup>2</sup>. Viwandani has a total of 17,926 households (KNBS, 2010). It is located within the industrial area part of Nairobi, about 7 km from Nairobi's central business district. Like Korogocho, this slum is characterized by overcrowding, insecurity, poor housing and sanitary conditions, and inadequate social amenities (Ochako, Wawire, & Fotso, 2011).

## 2. The intervention

The intervention was a three-year program with two components that were implemented between 2013 and 2015 (Abuya et al., 2014). Each component was administered to an independent treatment group. The two components include, (1) an after school instructional support with homework, mentorship, parental counseling and community sensitization, and a conditional secondary school transition subsidy. In this paper, this component is referred to as treatment 1 or T1; and, (2) The second component had all the elements of treatment 1, except parental counseling and community sensitization on the value of girls' education; this component is referred to as treatment 2 or T2 in this paper. The difference between the two components is the element of parental counseling and community sensitization. The overall aim of the intervention was to improve academic performance and enhance transition to secondary education among disadvantaged adolescent girls living in urban slums.

*After-school instructional support with homework, mentoring, conditional secondary school transition subsidy, parental counselling and community sensitization:* This component focused on increasing learning time for girls aged 10–19 years and in primary school grades 6–8, in order to enhance their academic performance. The after school support was to increase instructional time in mathematics and English language. The support was provided in two sessions, of one hour each, alternated between the two subjects once a week and facilitated by female community volunteers. The volunteers were from the same community as the girls, had completed secondary education with a minimum grade C+ (plus) in their secondary school grade exit examinations. This component also provided mentoring sessions on life skills and positive role modeling aimed at keeping girls away from risky behavior. The life skills sessions were conducted every two weeks for the first six weeks from the beginning of the calendar year; and thereafter once every four weeks for the rest of the year. The conditional secondary school transition subsidy focused on reducing secondary school first grade entry costs that are a barrier to transition to secondary education among girls from low resourced environment. This subsidy, amounting to an equivalent of USD 113, was conditional on the girl attaining a mean score of at least 250 out of 500 in the KCPE done at the end of primary education—grade 8. Receiving the financial subsidy was made conditional due to budget constraints as well as to encourage the girls and their parents to actively participate in the program. The subsidized costs included non-tuition and non-boarding charges that constitute a one-time payment to the

school. These were caution money, library fee, development fee, registration fee, and cost of school uniform and other personal effects.

The parental counseling and community sensitization targeted the girls' parents/guardian and the community leaders who are the gate keepers in the study sites. They were counseled and sensitized on the need and "how to" provide support for education and schooling of girls from poor households in the urban slums. The sensitization sessions included providing information on girl's school attendance and prioritizing their education at community level. The counseling sessions dwelt on time use on household chores, information on girls' social needs and emotional support, need for homework and after school academic support by parents, working with volunteers and mentors and tracking girls' performance in school.

### 3. Conceptual framework

In order to examine the moderated mediation effects of risky behavior on academic performance, we borrow Guilamo-Ramos and Bouris (2008) general framework of factors that influence behavioral intention. From literature on adolescent risky behavior, five constructs have been recognized—expectancies, social norms, self-efficacy, self-concept, and emotions (Guilamo-Ramos & Bouris, 2008). According to this general framework, these are the main determinants of a teenager's decision to execute a behavior. Important to this paper is that for a particular behavior to be executed, the teenager will cogitate at least one of the constructs, and not necessarily all the five.

While there are several possible mediators of the influence of risky behavior on academic performance, the individual's inner character has a greater role to play. This inner character and knowledge of one-self, proxied in this paper by aspiration, self-confidence and interest in schooling (the three constructs shown in Figure 1), interact with the intervention to provide a "mediated-moderation" effect. If such an effect is huge enough, it would significantly improve academic performance. Since the intervention, described in section 2, uses multiple approaches to achieve its end, a theory of change for this intervention can be hypothesized as follows: the direct effects of indulging in risky behavior decreases academic performance, and the indirect effects of indulgence in risky behavior through the three constructs increases it.

In this paper, we conceptualize risky behavior as a key deterrent to academic performance. Risky behavior is an unobserved variable measured by proxy indicators mainly generated through self-reporting. The risky behavior is then influenced by the intervention through the individual's inner character and knowledge, that is, the three constructs. The three constructs are perceived to be multi-dimensional, and manifested in latent intermediate variables. These dimensions of the three constructs interact with the intervention to individually and/or collectively mediate the effect of risky behavior on academic performance. Our main task in this paper is to examine the impact of the intervention using the moderated mediation model as suggested by Kristopher, Derek, and Andrew (2007). Figure 1 presents the authors' conceptualization of the model by Kristopher et al. The model suggests that if a mediating variable ( $M$ ) mediates the relationship between independent variable ( $X$ ) and the dependent variable ( $Y$ ), the strength of an indirect effect may depend linearly upon the value of a moderating variable ( $W$ ) which is measured on an interval or ratio scale. In this study, the independent variable,  $X$ , is the risky behavior, mediating variables  $M$  are the three constructs (individually and as a composite variable), dependent variable,  $Y$ , is academic performance, while moderator  $W$  is the exposure to intervention (T1 and T2). This conceptualization is also consistent with the findings of a longitudinal study by Jessor and Jessor (1977) that revealed the interconnectedness of risky behaviors, as well as the association between risky behavior and academic performance. The value of this paper is therefore in establishing the existence of moderated mediation by the intervention.

In Figure 1, to examine the impact of the intervention on learning outcomes, three paths on how this could happen can be hypothesized. First are the indirect effects of the intervention ( $W$ ), on academic performance through risky behavior. Second are the indirect effects of the intervention ( $W$ ),

on academic performance through moderated risky behavior. The intervention influences the girls inner self proxied by the moderators (*M*), and this inturn interacted with risky behavior to influence academic performance. It is this mediation path that is of interest to this paper. Finally, risky behavior or the intervention can have a direct effect on academic performance. However, its important to acknowledge the limitation of this conceptualization in that there is a possibility of reciprocal effects between risky behavior and academic performance. As argued by Barriga et al. (2002), poor academic performance is a risk factor in indulgence in risky behavior; on the other hand, children who engage in risky behavior are more likely to have low academic achievement. Mediation analysis helps to examine the causal effect of independent variable (*X*) on a dependent variable (*Y*) as transmitted through an “intervening” variable (*M*), that is,  $X \rightarrow Y \rightarrow M$  (Kristopher et al., 2007).

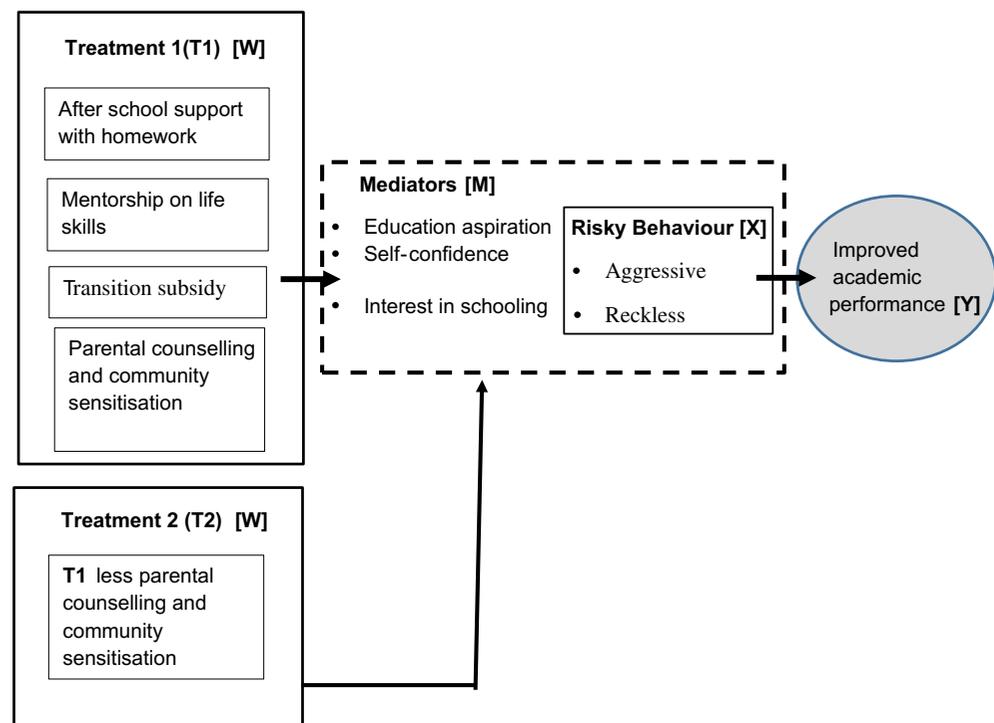
#### 4. Methodology

##### 4.1. Design and inclusion criteria

The context was two comparable urban slums, Korogocho and Viwandani in Nairobi-Kenya, inhabited by low income households, and characterized by inadequate supply of social amenities (Ochako et al., 2011). Using a quasi-experimental design, with two treatment groups and one comparison group, the study targeted households and girls who met the following inclusion criteria: (a) belonging to the households in the bottom 40% quartile in terms of poverty; (b) the households’ information on demographic characteristics were available in the Nairobi Urban Health Demographic Surveillance System’s (NUHDSS) 2012 data system; (c) girls whose individual schooling information was available in the 2010 education survey carried out by “blinded for review purposes”; (d) based on “b” and “c” households should have had girls in primary grades 6–8.

Each of the two slums was partitioned into three similar units based on the density and distribution of households, and number of enumeration areas. Viwandani slums have 34 enumeration areas, while Korogocho has 102. In each slum, two units were for the treatment groups, one for T1 and the other for T2, while the other unit was for the comparison group. The physical layout of the slum area is linear, and this made it possible to have a unit at the middle of this layout, and the other two units on each side of the middle unit. The middle unit was automatically assigned to the comparison

**Figure 1. Hypothesized relationship between the intervention, mediators, risky behavior, and academic performance.**



group while a coin was tossed to determine the allocation of T1 and T2 to the other two units. Households and girls who resided in enumeration areas assigned to T1, T2 or comparison (C) automatically belonged to the respective treatment or comparison groups. The C group did not receive any intervention during the implementation of the intervention, however, the girls in this group who were in grade 8 in 2015, end of the project, received the conditional subsidy to support their transition to secondary school.

#### **4.2. Sample size**

Based on the above considerations, an initial baseline sample of 1270 girls in primary school grades 6, 7, and 8 was identified at the beginning of 2013. At the end of 2013, the grade 8 girls exited the project after they completed their primary school studies hence were not available by design for the midline that was carried out in July 2014. In this paper, we use data from both baseline and midline surveys of the same girls that were being tracked; that is, 227 in T1, 311 in T2 and 272 in C; making a total of 810.

#### **4.3. Methods**

The data used in this paper was collected using a survey instrument and two assessment tools. An individual behavior and life skills questionnaire was used to solicit information on the girls' educational goals and future aspirations; level of self-confidence; personal behavior; substance use; sexual activity; source of information on sex, drugs, smoking, and alcohol; and knowledge about HIV/AIDS and other sexually transmitted diseases. A literacy assessment was a one-on-one tool that examined four skills in literacy—listening, writing, reading, and speaking. This one-on-one tool was complemented by a written composition to assess the girls' skills in creative writing. The other tool was a numeracy assessment that examined three learning domains—knowledge, comprehension, and application of numerical concepts. It focused on the curricular outcome areas of numbers and operations, patterns and algebra, geometry, measurement, and basic statistics.

#### **4.4. Measures**

The measure of girls' inner character was evaluated by asking the girls to rate themselves on a likert-type scale using a series of questions on their future educational aspirations, their self-confidence and interest in schooling. The ratings for aspiration were such that 1 meant "low" and 3 meant "high"; for self-confidence, 1 meant "never" and 4 meant "always"; while for interest in schooling the rating was 1 for "strongly disagree" and 5 for "strongly agree". The preceding high scores (positive coefficients) calculated for each girl indicated positive girls' inner character.

The girls' risky behavior was evaluated using various questions encapsulating aggressive or anti-social and reckless behavior. For aggressive behavior, the girls were asked to give the frequency of involvement in incidence deemed to be aggressive using 1 to mean "never" and 5 to mean "6 or more times". For reckless behavior, girls were asked questions with a binary response (where 1 meant "Yes" and 0 meant "No") on their involvement in sexual-related activities. The preceding low scores or negative coefficients computed for each girl indicated positive behavior

The responses given by individual girl under each context were subjected to a data reduction process using principal component analysis. During data reduction, various extraction iterations were done and the questions whose regression weights were greater than 0.5 retained. The composite variable, of the three constructs, was extracted and used in further analysis as mediating variable while variable risky behavior, was extracted using aggressive and reckless behaviors to act as independent variable. For each latent variable that was constructed, the items internal consistency was calculated using the Cronbach Alpha reliability test. The coefficients obtained were all above 0.7, which is an acceptable threshold and rule of thumb (Field, 2005; Kline, 1999), implying that the items were consistent in measuring the specific latent variables.

Table 1 shows the standardized regression weights of the items that formed the latent variables and their associated Cronbach Alpha reliability coefficients. Girls in the comparison group who showed risky behavior were referred, for follow-ups, to community-based organizations that provide counseling support to adolescents. The follow-ups were scheduled to begin at the end of the intervention period. For those in the treatment groups, the follow-ups were immediate as part of the intervention activities.

#### 4.5. Literacy and numeracy tests

The literacy tool focused on four skills of literacy—listening, writing, reading, and speaking—using one-on-one score cards with pictures and words. A whole class composition exercise tested the students’ skills in reading, writing, grammar, and vocabulary. The numeracy tool assessed the ability to reason and apply numerical concepts focusing on three learning domains: knowledge, comprehension, and application. It also focused on the curricular outcome areas of numbers and operations, patterns and algebra, geometry, measurement, and basic statistics. Test data were analyzed using Rasch methods (Myers, Wolfe, Feltz, & Penfield, 2006). First, the psychometric characteristics of items in the mathematics and literacy were examined and any items that did not conform to the

**Table 1. Regression weights of the factors determining adolescent girls’ behavior**

Aspirations	Regression weights	Cronbach alpha
You will join secondary school?	0.506	0.826
You will finish secondary school?	0.569	
You will go to university?	0.704	
You will have a job that pays well?	0.726	
You will be able to own your own home?	0.620	
You will have a job that you enjoy doing?	0.726	
You will have a happy family life?	0.565	
You will stay in good health most of the time?	0.578	
You will be able to move to a better area?	0.654	
You will be respected in your community	0.589	
<i>Self-confidence</i>		
Do you encourage your friends to feel good about themselves	0.763	0.803
Talk positively about your friends?	0.810	
Discuss with your friends about their physical changes during puberty	0.783	
Discuss with your friends about benefits of safe sex	0.670	
Discuss with your friends about the importance of personal hygiene	0.711	
<i>Interest in schooling</i>		
In general, I like school a lot	0.800	0.780
I try my best in school	0.854	
Doing well in school is important for my future	0.789	
<i>Aggressive behavior</i>		
You hit or threatened to hit an adult	0.773	0.826
You delivered or sold any alcohol (e.g. chang’aa, busaa)	0.773	
<i>Reckless behavior</i>		
Ever been kissed	0.749	0.904
Ever been fondled	0.896	
Ever had foreplay	0.930	
Ever had heavy petting	0.905	
Ever had sex	0.771	

requirements of Rasch measurement were deleted. In this regard, one item was deleted from the mathematics test and three items were deleted from the literacy test. Second, both tests were subjected to Differential Item Functioning (DIF) analyses to examine site bias. There were no items showing serious DIF problems in the mathematics test. However, four items in the literacy test had DIF problems, and therefore, the four items were deleted from the analysis. The number of items in the final mathematics and literacy tests was 44 and 59, respectively. The reliabilities (Cronbach alpha) of these final tests were within acceptable range (0.88 and 0.93 for mathematics and literacy test, respectively).

#### 4.6. Analytical strategy

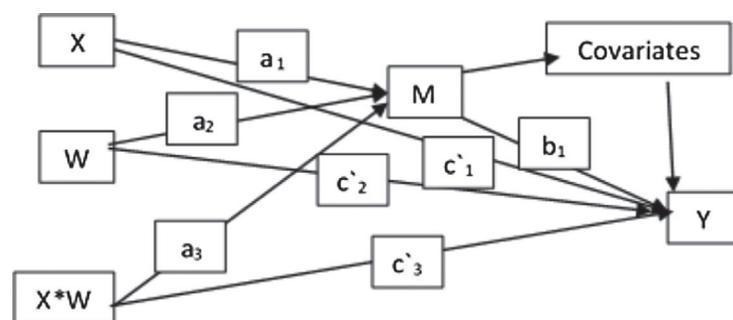
The analysis involves first showing the interaction (direct effect) of  $X$  and  $W$  on  $Y$  and then introducing the mediator  $M$  to the interaction between  $X$  and  $W$  (indirect effect). This is represented diagrammatically by Figures 1 and 2 which are an illustration of the direct and indirect relationships between risky behavior (independent), the three constructs (mediators,  $M$ ) and learning outcomes (dependent variables,  $Y$ ) moderated by the intervention exposure ( $W$ ).

Figure 2 is a diagrammatic representation of the analytical strategy. In the figure, letters  $X$ ,  $W$ ,  $M$  and  $Y$  are the measurement and/or latent variables defined in the legend. The arrows or paths show the hypothesized direction of the effect, while letters  $a$ ,  $b$ , and  $c$  are the effect sizes or path coefficients. The significance of moderated mediation is in examining the importance of the product of the path  $a_3$ ,  $b_1$  as shown in Figure 2. The path coefficient indicated by  $a_1$  is the regression effect of  $X$  on  $M$ ,  $a_2$  is regression effect of moderator on mediator,  $a_3$  is the regression effect of the interaction between moderator and independent variable on the mediator variable  $b_1$  is the regression effect of the mediator on dependent variable. The  $c_1$  to  $c_3$  are the direct effect of independent, moderate, and interacted effect of  $X$  and  $W$ , on the outcome variable. In this paper,  $X$  is risky behavior,  $W$  is the intervention exposure,  $M$  represents the three constructs (aspiration, self-confidence and interest in schooling) while  $Y$  is the academic performance. The parameters  $a_1$ ,  $a_2$ ,  $a_3$ ,  $b_1$ , and  $c_1$ ,  $c_2$  and  $c_3$  are the effects to be estimated.

However, we are aware of the limitations posed by our conceptualization, that is, risk behavior ( $X$ ) is mediated by the three constructs ( $M$ ) to influence academic performance ( $Y$ ). From an academic perspective, the relationship between the three groups of factors can be conceptualized in at least six different ways including (1)  $X \rightarrow M \rightarrow Y$ ; (2)  $X \rightarrow Y \rightarrow M$ ; (3)  $Y \rightarrow X \rightarrow M$ ; (4)  $Y \rightarrow M \rightarrow X$ ; (5)  $M \rightarrow X \rightarrow Y$ . In this paper, we

**Figure 2. Moderated mediation analysis for risky behavior, intervention, the three constructs, and learning outcomes.**

Notes:  $X$  = Risky behavior;  $b_1$  = Effect of  $M$  on  $Y$ ;  $W$  = Intervention;  $c_1$  = Direct effect of  $X$  on  $Y$ ;  $M$  = The three constructs— aspiration, self-confidence, interest in schooling;  $c_2$  = Direct effect of  $W$  on  $Y$ ;  $Y$  = Academic performance;  $c_3$  = Direct effect of  $X*W$  on  $Y$ ;  $a_1$  = Effect of  $X$  on  $M$ ;  $a_2$  = Effect of  $W$  on  $M$ ;  $a_3$  = Interaction effect of the  $X*W$  on  $M$ .



#### Legend

$X$  = Risky behavior  
 $W$  = Intervention  
 $M$  = The three constructs – aspiration, self-confidence, interest in schooling  
 $Y$  = Academic performance  
 $a_1$  = Effect of  $X$  on  $M$   
 $a_2$  = Effect of  $W$  on  $M$   
 $a_3$  = Interaction effect of the  $X*W$  on  $M$

$b_1$  = Effect of  $M$  on  $Y$   
 $c_1$  = Direct effect of  $X$  on  $Y$   
 $c_2$  = Direct effect of  $W$  on  $Y$   
 $c_3$  = Direct effect of  $X*W$  on  $Y$

limit our analyses to the first one due to its potential to inform education interventions that could mitigate the adverse effects of risk behavior on academic performance in a resource poor context.

## 5. Results

Table 2 presents the baseline descriptive profiles of the participating girls' social, schooling and household background characteristics. There was no significant difference among the groups (T1, T2, and C) in most of the background characteristics. However, the girls in the treatment 1 package were significantly younger than girls in comparison group. They were also from households perceived to be significantly "poorer" than girls in treatment 2 and comparison groups; and, their households were significantly smaller than girls in the comparison group. These differences may have been occasioned by selection bias; however, such bias was minimized by controlling for these variables in the moderated mediation analysis.

### 5.1. Impact of the intervention

Table 3 shows the standardized effects of the intervention on a composite variable of three constructs, risky behavior and academic performance. The table also presents the regression coefficients for the null and controlled models of each of the three constructs, risky behavior and academic performance. The covariates in the controlled model included girls' age, social economic background, geographical context, household head level of education and age, and household size. To show the impact of the intervention, we compare its effects between each of the two groups in the study, that is, T1 vs. T2, T1 vs. C and T2 vs. C. The girls in T1 group received after school instructional support with homework and mentoring on life skills, and this was combined with the parental counseling and transition subsidy. Girls in the T2 group received these components of the intervention less parental counseling. For the results of the three constructs and academic performance, a positive coefficient means the effect is in favor of the reference category, for example, when comparing T1 vs. T2, T1 is the reference category; for the aggressive behavior, a negative coefficient favors reference category.

Two linear regression models were estimated, one without covariates (null model) and the other one controlling for the covariates. The results in Table 3 show statistically significant differences of the impact of the intervention on girls' education aspiration, self-confidence, and the three constructs as a composite variable between T1 and T2 groups, in favor of T1. This was true for the null model as well as the controlled model. For instance, in the null model, the education aspiration for girls in T1 increased by 0.591 of a unit compared to that of girls in T2. After controlling for the covariates, the T1 intervention package significantly increased girls' education aspiration by 0.623 of a unit compared to the T2 intervention package. Unlike the effects observed in the education aspiration that were in favor of the T1 package, effects of intervention on girls' self-confidence were in favor of those exposed to T2 package—with an increase of at least 0.356 of a unit. Additionally, girls in the T2 package (with no parental counseling) were more self-confident than girls in comparison group as their self-confidence significantly increased by 0.305 and 0.313 for the null and the controlled models, respectively. Using the composite variable of the three constructs (aspiration, self-confidence, and interest in schooling), T1 package had a statistically significant impact on girls compared to the T2 package and the comparison group. What is emerging from this is that the package (T1) that had after school support, life-skills, parental counseling, and transition subsidy promise had a better impact, probably because of the added element of the parental counseling. However, not all outcomes were in favor of the T1 group, as evidenced in the case of self-confidence.

Table 3 also shows the different effects of the intervention on girls' risky behavior. Indulgence in risky behavior (reckless and aggressive) was measured such that low values indicated non-indulgence in the behavior. Therefore, a negative difference obtained in the risky behavior analysis favors the reference group and is the desired outcome. For example, comparing T1 vs. T2, the coefficients for risky behavior in both null and controlled models are -0.389 and -0.415 respectively. This means

**Table 2. Comparison of the background characteristics of participating adolescent girls at baseline**

Variable	Treatment group (I)	Treatment group (J)	Mean difference (I–J)
Proportion in each of the two study sites	Treatment 1	Treatment 2	-0.163***
		Control	-0.042
Grade (6, 7 or 8) in 2013	Treatment 1	Treatment 2	0.103
		Control	0.029
Girls age in years at date of interview	Treatment 1	Treatment 2	-0.094
		Control	-0.367**
Wealth index: within 3 quintiles	Treatment 1	Treatment 2	-0.424***
		Control	-0.269***
Education level of household head	Treatment 1	Treatment 2	0.063
		Control	0.124
Household head sex	Treatment 1	Treatment 2	0.003
		Control	-0.028
Household head age	Treatment 1	Treatment 2	-0.947
		Control	-1.714
Household size	Treatment 1	Treatment 2	-0.278
		Control	-0.467**
Literacy scores	Treatment 1	Treatment 2	22.063**
		Control	10.026
Numeracy scores	Treatment 1	Treatment 2	5.635
		Control	-3.649
Aspiration score	Treatment 1	Treatment 2	0.085
		Control	0.052
Self-confidence score	Treatment 1	Treatment 2	0.113
		Control	0.098
Interest in schooling score	Treatment 1	Treatment 2	-0.122
		Control	-0.152***
Three constructs/composite score	Treatment 1	Treatment 2	0.039
		Control	0.001
Aggressive behavior score	Treatment 1	Treatment 2	0.045
		Control	0.026
Reckless behavior score	Treatment 1	Treatment 2	0.035
		Control	0.113
Risky behavior score	Treatment 1	Treatment 2	0.054
		Control	0.095

\*Significant at 10%.

\*\*Significant at 5%.

\*\*\*Significant at 1%.

the girls in T2 package significantly indulged in risky behavior by 0.389 and 0.415 of a unit of measure of risky behavior. Additionally, girls in comparison group significantly engaged more in risky behavior than girls in either T1 or T2.

Further analysis of impact of the intervention on the aspects of risky behavior, that is, aggressive and reckless behaviors was done. For the reckless behavior, girls in T1 package were significantly less reckless than girls in T2 package and the comparison group, probably because of the additional parental counseling component. However, the girls in the T2 package were significantly more reckless

**Table 3. Impact of the intervention on the three constructs, risky behavior, and academic performance**

	T1 vs. T2 (n = 538)	T1 vs. C (n = 499)	T2 vs. C (n = 589)
	$\beta$	$\beta$	$\beta$
<i>Models of the three constructs</i>			
Aspiration-null	0.591**	0.448**	0.143
Controlled	0.623**	0.354*	-0.114
Self-confidence-null	-0.356**	-0.051	0.305**
Controlled	-0.457**	-0.160	0.313**
Interest in schooling-null	0.510**	0.608**	0.098
Controlled	0.516**	0.561**	0.087
Composite variable of three constructs-null	0.418**	-0.504**	0.086
Controlled	0.398**	0.386*	0.101
<i>Risky behavior</i>			
Aggressive behavior-null	-0.195	0.037	0.232**
Controlled	-0.199	0.043	0.265**
Reckless behavior-null	-0.376**	-0.150*	0.226**
Controlled	-0.410**	-0.152*	0.292**
Risky behavior-null	-0.389**	-0.077	0.312**
Controlled	-0.415**	-0.074	0.379**
<i>Academic Performance</i>			
Literacy-null	-28.255**	-10.845	17.411
Controlled	-20.263*	-5.304	16.401
Numeracy-null	-13.920	8.007	21.927**
Controlled	-4.097	17.555*	15.402*

\*Significant at 10%.  
 \*\*Significant at 5%.  
 \*\*\*Significant at 1%.

than those in the comparison group; similar results were observed in the analysis of aggressive behavior. This seem to be disapproving the initial hypothesis that providing the T2 group with life skills without complementing it with parental counseling would minimize reckless and aggressive behaviors—in fact, this may have been counterproductive. The girls may have felt empowered to experiment more on undesired behaviors and this may have been reinforced by increased self-confidence and the absence of close parental involvement in what the girls were engaged in.

The intervention significantly improved the girls’ academic performance in numeracy and literacy by various margins. On achievement in literacy, we found statistically significant difference between girls in T1 and T2 in favor of T2 (group without parental counseling). Still, on academic performance, we found strong evidence in support of better numeracy scores for girls who were exposed to the T2 intervention compared to those in the comparison group. Interestingly, T2 is the group that turned out to be more self-confident, indulged more in risky behavior, and showed better academic performance. One possible explanation for this result, could be, that their enhanced self-confidence resulted to the better academic performance; and their indulgence in risky behavior could be attributed to the absence of the parental counseling intervention. Though these results are not conclusive, it is evident that the presence of the intervention is creating a difference in academic performance.

**5.2. Moderated mediation**

In Table 4, we present the moderated mediation effects of risky behavior and its individual aspects (reckless and aggressive) on academic performance. Moderated mediation is as a result of the

**Table 4. Direct and moderated mediation effects of risky behavior on academic performance**

Independent variable	$\beta$ (1)	Moderated mediation	$\beta$ (2)	Dependent variable
Risky behavior	-0.071**	Three constructs	6.623**	Numeracy
Direct effect			3.187	
Risky behavior	-0.069**	Three constructs	5.645	Literacy
Direct effect		-	6.783	
Aggressive behavior	-0.032	Three constructs	6.364*	Numeracy
Direct effect		-	-0.777	
Aggressive behavior	-0.030	Three constructs	5.460	Literacy
Direct effect		-	9.470**	
Reckless behavior	-0.072**	Three constructs	6.825**	Numeracy
Direct effect		-	5.868*	
Reckless behavior	-0.073**	Three constructs	5.129	Literacy
Direct effect		-	-0.449	

\*Significant at 10%.

\*\*Significant at 5%.

\*\*\*Significant at 1%.

interaction between the intervention and the three constructs (aspiration, self-confidence, and interest in schooling). We hypothesized that the intervention influences the three constructs, as demonstrated in Table 3, and that influence mediates the effect of risky behavior on academic performance as shown in Table 4.

In Table 4, column 1 shows the coefficients for the direct effects of risky behavior on the three constructs without moderation. Column 2 presents coefficients for (1) the moderated mediation effects of risky behavior on academic performance (literacy and numeracy) through the three constructs; and, (2) the direct effects of risky behavior on academic performance, shown by the rows labeled “direct effect”. Since one of the interests of this study is to show the moderated mediation effects, the focus in Table 4 is more on column 2. In the structural equation model analysis, the moderated mediator is the intermediate outcome variable that interacts with the intervention to influence risky behavior and also mediate the effects of risky behavior on academic performance. To compute the moderated mediation effects, the PROCESS script was used in the path analysis to disentangle the different types of effects presented in Table 4 (see for example Hayes, 2012). For risky behavior, and each of its aspects (reckless and aggressive), we estimate two models one each for numeracy and literacy. For each of the model estimated, we controlled for girls’ age, household wealth index, household head sex and level of education.

From Table 4, for each of the model using risky behavior as the independent variable to estimate academic performance, we found a significant direct effect between risky behavior and the composite variable of the three constructs (results in column 1). A unit increase of the composite variable significantly reduces indulgence in risky behavior by 0.07 units in both numeracy and literacy. Additionally, the moderated mediation effects of the composite variable of the three constructs, significantly increases numeracy scores by 6.62 units. This implies that the moderated mediated effects of risky behavior influenced numeracy scores through the interaction of the intervention and the three constructs. However, there were no statistically significant moderated mediated effects on literacy scores.

Risky behavior was further disaggregated into aggressive and reckless behaviors. For each of the model using reckless behavior as the independent variable to estimate academic performance, we found a significant direct effect between reckless behavior and the composite variable of the three

constructs. The moderated mediation effects of the composite variable of the three constructs, significantly increased numeracy scores by 6.8 units. However, there were no statistically significant moderated mediated effects of reckless behavior on literacy scores. For each of the models using aggressive behavior, there was no statistically significant direct effect to the composite variable of the three constructs or moderated mediated effects on either numeracy or literacy scores.

## 6. Discussion

In this paper, we focused on the moderated mediation effects of three constructs—aspiration, self-confidence and interest in schooling—in the relationship between risky behavior and academic performance measured by numeracy and literacy scores. The intervention moderates the mediators. Government, Civil Society Organizations (CSO) and communities have invested in girls' education through various interventions such as learning and teaching materials, school uniforms, menstrual management, and teacher training. Though these resources are necessary in enhancing access to schooling and academic performance, they are not sufficient to promote girls' inner character and self-determination. Evidence on the girls' "who they are" and risky behavior offers prospects for understanding what can supplement tangible resources to improve academic performance. In the context of our study, a low-resourced environment, this evidence is critical in informing policy-makers and development practitioners of possible cost-effective ways of increasing learning outcomes among girls.

In our study, we confirm that the intervention packages have the potential to improve girls' academic performance through reducing their indulgence in risky behavior. The T1 package included life skills, mentoring, after school support with homework, and parental counseling and community sensitization; and, the T2 package included T1 less parental counseling and community sensitization. All the girls in the treatment groups and also those in the final year in the comparison group were eligible for the conditional education subsidy to support transition from primary to secondary school. On the girls' inner character, *the intervention had an impact on their education aspiration and self-confidence. However, the group of girls exposed to the T1 package had higher educational aspiration and had higher interest in schooling than the girls in other groups (T2 and C).* This difference may have been occasioned by the parental counseling enjoyed by the girls in the T1. Parents are the immediate role models and counselors of their own children. Studies in similar contexts, for example, Bellon, Ngware, and Admassu (2016) posit that in low-resourced environment, parental involvement in children's education has a positive and strong contribution to their education and schooling outcomes. The intervention strengthened the participating parents' capacity to play the "involvement" role through creating a good home environment. Since they were counseled on the best way to support their girls, this could have led to the effective support to the girls' soft skills which in-turn shaped the girls' academic mind-set and enthusiasm. This argument, that parents are the first line providers of education support including counseling, is consistent with findings from a NUHDSS nested qualitative study done in 2008 by Mudege, Zulu, and Izugbara (2008) which involved 36 focus group discussions and 51 key informant interview in the same study context. The Mudege et al. study concluded that ensuring school children do not get into crime as well as assuage their fears and perception on crime has positive impacts on school attendance and retention. This can lead to interest in schooling and prospects of higher education attainment. This argument is also consistent with findings from a longitudinal study done by Carter and Wojtkiewicz (2000) in USA using data from national Education Longitudinal Study with over 25,000 eighth graders. The USA study, though from a different context, found that parental involvement in adolescent education helped their daughters to improve their educational aspirations and test scores. Our argument is also consistent with the a recent study by Okigbo, Kabiru, Mumah, Mojola, and Beguy (2015), in the same context like ours, which concluded that cross-gender interaction with parents is associated with a delay in first sexual intercourse among slum-dwelling adolescents, and this may have reduced sex-related risky behaviors among this group. Reduced engagement in risky behavior could create educational opportunities such as engaging more with academic work during the time that could have been set free from engaging in

risky behavior. More recent literature asserts that parental behavior has a huge influence on a child's educational achievement and general well-being (Mora & Escardibul, 2016). According to Mora and Escardibul study in Spain, a conducive home environment enhances the chance that parents get involved in their children's homework, and more so for girls. This could be what we are witnessing with girls in T1 whose parents received counseling that could have enabled them to create a conducive social environment at home.

If risky behavior among adolescent is left unchecked, it could lead to poor performance in school, truancy, dropping out of school, and inability to socialize well with peers and the community. *The intervention packages had the desired impact of reducing risky behavior among the girls.* We think that this was due to the enhanced knowledge on the consequences and coping mechanisms of being reckless or aggressive provided to girls during life-skill sessions. This is consistent with a meta-analysis done by Durlak, Weissberg, Dymnicki, Taylor, and Schellinger (2011) of over 200 school-based universal social and emotional learning programs involving over 270,000 students. The social emotional learning programs provided soft skills similar to what was provided in our study. *Our study found that students who were exposed to such interventions demonstrated significantly better social behavior and academic performance. Providing girls with information on life-skills also enabled them to process information on a risky behavior and make the appropriate decision.* For example, information on the consequences of substance and drug use enhances the knowledge on the risk they expose themselves to including addiction, crime and truancy. This knowledge deters them from engaging in risky behavior.

However, this may not always be the case because it is possible some of the girls exposed to the intervention could become risk-takers now that they are empowered on how to navigate the risk cognizant of the negative consequences. The intervention described in this paper aimed at altering knowledge and perceptions hence influencing how the girls engage in risky behavior. This is similar to the concept referred to in the literature as the "consequences" approach that endeavor to moderate risky behavior by mere provision of information (Chowdry, Kelly, & Rasul, 2013; Flay & Collins, 2005). Fray and Collins posit that while literature acknowledges the success of the "consequences" approach in increasing knowledge on risky behavior among adolescents, it is not conclusive on the impact this has on behavior change. They continue to assert that in some instances, the increase in knowledge enhances adolescents' ability to engage in risky behavior. In our study, we found similar effects; *girls who received the knowledge on life-skills and support from their parents had higher incidences of reckless behavior*, an indication that may have felt well empowered to take the risk. Since our measure for reckless behavior was indulgence in sex-related activities and the life-skills enhanced the girls' understanding of their puberty and sexuality, this improved their confidence in managing the risks involved. Furthermore, at the adolescent stage, girls have to deal with both inner and peer pressure for emotional support. It is possible that the observed indulgence in reckless behavior could be what American Psychological Association (2002) described as normal experimentation as opposed to high risky behavior, and which is expected to fizzle out with time. Otherwise, the expectation from parental counseling and mentorship for girls was that both would become comfortable to discuss culturally sensitive areas such as sex, substance use and general safety concerns with a view to helping girls assess the risks and make what Ponton (1997) describes as the best decisions possible.

*The existence of an impact of the intervention on academic performance demonstrates presence of a mediation that cannot be ignored.* Based on our conceptual framework, Figure 1, this moderated mediation is through the three constructs of aspiration, self-confidence, and interest in schooling. This moderated interaction influences changes in academic performance among girls. For example, the life-skills aspect of the intervention strengthen girls' self-confidence which then enables them to effectively deal with exposure to risky behavior in a way that they optimize time use with most of it going to academic work. Optimized time implies more learning opportunities and this could contribute to improvements in test scores. Shoemaker (2010), study posit that there exists a positive correlation between self-confidence and academic performance. Confident students are more active in class and openly engage the teacher on unclear concepts and this provides them an opportunity to

learn. The Shoemaker study observed that changes in measures of self-confidence compared well with changes in academic performance, hence concluding that this was an indication of student learning. Other studies with a similar approach on the impact of an intervention on an outcome included a cluster-randomized controlled study conducted by O'Leary et al. (2012) in Eastern Cape Province involving sixth grade South African students. The Eastern Cape Province study examined the mediation and moderation effects of social cognitive theory through a sexual-reduction intervention on behavior changes.

## 7. Conclusions

The aim of this paper was to investigate the moderated mediating effects of aspiration, self-confidence and interest in schooling on the relationship between the intervention and indulgence in risky behavior. The ultimate outcome of these interactions was assessed through achievement in numeracy and literacy scores among upper primary school-going girls from a poor urban context. Our analysis show the existence of moderated interaction effects of the composite variable of the three constructs. This moderated interaction influenced the way girls indulged in risky behavior in a way that learning time was enhanced leading to improvements in academic performance. Even after controlling for other covariates in the relationship between risky behavior and academic performance, the composite variable of the three constructs still remained a significant moderated mediator of the relationship between risky behavior and academic performance. Of importance to note is that the three constructs are not tangible but in form of soft-skills embedded in inner-self. Developing these inner-self skills provide policy-makers and education practitioners with an opportunity to improve academic performance in low-resourced environments.

Visible education inputs, such as learning materials and good teachers, are important but not sufficient to improve academic performance in low-resourced environments. This paper demonstrates that equally important are the soft-skills in the drive to improve learning in low-resourced environments, and therefore they cannot be ignored. The policy implication of these findings is twofold: First, soft-skills development among adolescents as part of family and community engagement in schooling could enhance education outcomes. Second, providing disadvantaged adolescent girls in low-resourced environments with programs targeting soft-skills such as aspiration, self-confidence, and interest in schooling, could go a long way to improve their academic performance.

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