

Running head: THE IMPACT OF POVERTY ON HOPE

The Impact of Poverty on Hope:
A Correlational Study with Mexican Adolescents

Francisco Gerardo Camarena Espinoza

ANR: 419379

Supervised by: Arnoud Plantinga

Second Asessor: Joeri Wissink

Tilburg University

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To Jorge and Saúl, friends giving hope from the afterlife.

Abstract

Research aimed at understanding the causal factors of persistent poverty has focused mostly on external constraints. Recent research from the field of behavioral sciences has given an alternative view that highlights the role of internal constraints in perpetuating poverty traps. It is believed that poverty has a negative effect on hope, leading to dysfunctional behaviors with the potential to create poverty traps, but little psychological research has examined the relationship between poverty and hope. We explored the relationship between poverty, hope and dysfunctional behavior in two correlational studies. Study 1 analyzed data from a sample of 30 Mexican States and 1,644 Municipalities. Study 2 aimed to build a mediation model where poverty predicts lower levels of hope and lower levels of hope can predict dysfunctional behavior, using data from questionnaires answered by 79 Mexican adolescents currently studying their final year of secondary school. At the state level we identified a strong negative relationship between poverty and hope ($r = -.66$) but at the municipal level there is not a clear relationship between both variables ($r = -.09$). A mediation analysis showed that poverty has a small and no significant effect on hope ($b = -.12$, $se = .14$, 95% $p = .406$) or on dysfunctional behavior ($b = -.21$, $se = .29$, $p = .466$) Results did not confirm our hypotheses and there is not enough evidence to support the idea that poverty has a negative effect on hope or that low levels of hope can predict dysfunctional behavior.

Keywords: poverty, hope, behavioral poverty traps, school dropout.

The Impact of Poverty on Hope:

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“Everything that is done in the world is done by hope. No husbandman would sow one grain of corn, if he hoped not it would grow up and become seed [...]; no merchant or tradesman would set himself to work, if he did not hope to reap benefit thereby. How much more, then, does hope urge us on to everlasting life and salvation?" (M. Luther, 1848, cited in Lybbert & Wydick, 2018).

“I have it, I lose it again. Sometimes I sleep with it and sometimes I sleep alone. But I never had a recipe hope, bought in a tailoring shop, a dogmatic hope. It is a living hope and, therefore, not only is it safe from doubt, but it feeds on doubt”. (Eduardo Galeano, *Hope*, 1993).

Poverty not only limits access to education, basic services and economic growth (United Nations, 2015a), it also affects people’s cognitions and decision-making processes (*see* Campos & Paiva, 2017), which in return can create *behavioral poverty traps*. In other words, poverty can make people more prone to engage in behaviors or make decisions that are most likely to keep them trapped in poverty. One of these behavioral poverty traps has been identified as a *lack of hope* (Duflo, 2012), meaning that poverty has a negative impact in hope, and a lacked hope can restrain people from engaging in programs or services that have the potential to help them escape poverty.

The current research proposes that poverty has a negative effect on hope, that both poverty and low levels of hope can predict school dropout –identified as a dysfunctional behavior and measured as not enrolling into high school– and that hope mediates the interaction

between poverty and school dropout. We present two studies that aim to clarify the relationship between poverty and hope and the influence of both of these variables in the decision of not enrolling in high school. Study 1 provides some insights regarding the relationship between poverty and hope using data sets at state and municipal level, whereas Study 2 measured poverty, hope and some other variables at the individual level.

Poverty and Behavioral Traps

In the year 2000 leaders from 189 countries endorsed the *Millennium Declaration*, which was translated into a roadmap setting out eight time-bound and measurable goals to be reached by 2015, known as the Millennium Development Goals. The first one of them was the eradication of extreme poverty and hunger (United Nations, 2000). This was probably the biggest global commitment at the time to tackle poverty worldwide. There has been marked progress on reducing poverty over the past decades. The world attained the first Millennium Development Goal target—to cut the 1990 poverty rate in half by 2015—five years ahead of schedule, in 2010 (World Bank, 2018a). In 1990, almost 4 in 10 people were living under the international extreme poverty line of \$1.90 USD a day, whereas in 2013 that proportion had fallen to just over 1 in 10 (World Bank, 2018b).

However, poverty levels still remain unacceptably high (World Bank, 2016). According to the United Nations (2015) 767 million people live below the international poverty line of \$1.90 USD a day. Beyond its different definitions and various ways to measure it, poverty is a complex issue, that constrains not only the satisfaction of the most basic needs and development of people living in it, but also can have a profound impact in how people behave and take decisions, which could reinforce the cycle of poverty.

Until very recently, the research aimed to understand the causal factors of persistent poverty or the so-called *poverty traps*, as well as the design of policies to reduce it, has focused mostly on external constraints such as education, health and infrastructure (Lybbert & Wydick, 2018), credit or insurance market imperfections (Banerjee and Newman, 1993), malnutrition (Dasgupta and Ray, 1986) and institutional or governmental failures (Bardhan, 1997). However, recent research from the field of behavioral sciences has given an alternative view that highlights the role of *internal* constraints in perpetuating poverty traps (Dalton, Ghosal & Mani, 2016). According to a growing literature, all individuals can present the same bias in their cognitions and behaviors, but in poverty the same behaviors can lead to worse outcomes (Bertrand, Mullainathan & Shafir, 2004). Poverty imposes additional external constraints on the poor that greatly exacerbates the adverse effects of the behavioral bias present in all people (Dalton, Ghosal & Mani, 2013). These internal constraints can create poverty traps where there is not necessarily one, which raises the term *behavioral poverty trap*. For example, it has been documented that when teachers who counsel parents about which track to choose for their children express pessimism about the higher education potential of students from migrant backgrounds, they can lead to migrant parents to place their children on the shorter, technical tracks (El-Mafaalani 2012, cited in Flechtner, 2014). These low aspirations can lead to underachievement: a trap occurs when these aspiration failures contribute to persistent poverty and persistently low future aspirations, perpetuating a negative cycle (Fletcher, 2014).

As well as in the previous case, there is evidence for behavioral poverty traps related to self-control (Bernheim, Ray & Yeltekin, 2013; Banerjee and Mullainathan, 2010), aspirations (Dalton et al, 2016; Banerjee and Duflo, 2011; Ray, 2006), cognitive capacity (Schilbach, Schofield, & Mullainathan, 2016; Mullainathan and Mullainathan, 2013; Mani, Mullainathan,

Shafir & Zhao, 2013); anticipation of future poverty (Laajaj, 2017), stigmatization (Perova and Vakis, 2013) or shame (Baumberg, 2016; Purdam, Garrat & Esmail, 2016).

These behaviours and biases are present in every human being, but its prevalence and impact is worse for people living in poverty than for the non-poor (Shafir and Mulainathan, 2013). Because of that, recent research aimed to find out how to reduce or eliminate these behavioural traps that limit people's access to programs (e.g. training, scholarships, micro credits) and services (e.g. vaccines, clean water, deworming pills, fertilizers, etc.) that can improve people's wellbeing (see Banerjee and Duflo, 2011; Miguel and Kremer, 2004).

Poverty and Hope

Among the above mentioned internal constraints, it has been also stated that hope (or more specifically the lack of hope) can be the source of a behavioural poverty trap and can cause an individual "to rationally decide to hold back his or her efforts, avoid investment, and thus achieve even less than he or she could otherwise have attained" (Duflo, 2012, p. 32) and that poverty actually "stifles" hope (Fletcher, 2014). However, those statements have been provided from inside the field of economics or with evidence referring more to expectations and aspirations (Dalton et al, 2016; Fletcher, 2014; Gutman & Ackerman, 2008; Ray, 2006; Appadurai, 2004) than to hope itself.

This is easy to understand: Approaches to hope from psychology have been scarce: sixty years ago Cohen (1958, cited in MacInnis & Chun, 2006) pointed out that "Although life without hope is unthinkable, psychology without hope is not, judging by the conspicuous absence of any study of hope from the literature" (pg. 100). Less than twenty years ago, Lazarus (1999) stated that, "With a modest number of exceptions . . . there has been a great reluctance on the part of psychologists to address the concept of hope" (pg. 653).

The word “hope” is a common word in everyday language (Shimanoff, 1984) and its definition varies across researchers and fields of study, like philosophy, theology, nursing, medicine, psychology and marketing (for a compilation of definitions across these fields of study see Guimaraes, 2010). While some scholars conceptualize hope as an emotion (MacInnis & Chun, 2007; MacInnis & de Mello, 2005; Lazarus, 1999) characterized by a strong desire for a highly unlikely but still possible outcome (Guimaraes, 2010; Lazarus, 1991), others consider it as a cognitive set based on the perceived capability to derive pathways to desired goals, and motivate oneself via agency thinking to use those pathways (Snyder, 2002; Snyder, Irving & Anderson, 1991). According to Day (1991), hope has both emotional and cognitive components, involving a combination of belief, which has cognitive purport, and desire, which does not. Hope, thus, would be a construct which mixes a cognitive and an emotional component at the same time (Guimaraes, 2010).

Despite the different definitions, all of them seem to have some elements in common: hope arises from the belief or expectancy that a future outcome, which is positive and goal congruent, important, but uncertain, can possibly be achieved (Guimaraes, 2010). These specific characteristics differentiate hope from other psychological constructs such as expectations optimism, confidence and desire (MacInnis and Chun, 2007). Hope has unique motivational properties that facilitate goal-striving particularly when outcome expectancies are low (Nelissen, 2017) and is endowed with a degree of built-in resilience and frames the achievement of goals as a gain rather than as a potential loss that was avoided (Miceli & Castelfranchi, 2010).

People can hope for different objects, outcomes and for themselves through several domains, such as social (e.g. the enhancement of social welfare) and personal (e.g. a better standard of living, wealth; MacInnis & Chun, 2007). Hope can have either a promotion or

prevention focus (MacInnis & De Mello, 2005), which means that one can hope that a favourable outcome will be achieved (e.g. to obtain an academic degree) or that an undesired outcome will be avoided (e.g. not having HIV). Because the experience of hope only requires the perception of a mere possibility for goal-attainment, people who experience hope are more likely to persist in their efforts at goal-striving if they receive negative feedback on goal-progress (Nelissen, 2017). Individuals who experience hope have a goal of some kind, see a viable pathway to that goal and believe they have the agency to progress along this pathway (Lybbert & Wydick, 2018).

High-hope individuals are sometimes able to increase the odds of success by remaining open to alternative pathways that reframe the challenge in new ways (Snyder, 2002). Higher levels of hope are related to greater reported scholastic and social competence (Lopez, Robinson, Marques & Pais-Ribeiro, 2009), elevated creativity (Onwuegbuzie, 1999), problem-solving abilities and academic achievements (Lopez, Bouwkamp, Edwards, & Teramoto Pedrotti, 2000).

On the contrary, it is believed that a lack of hope can explain behaviors such as not taking opportunities of employment (Bryan, Chowdhury and Mobarak, 2012) or not engaging in savings opportunities (Banerjee and Mullainathan, 2010), both key strategies in poverty reduction policies. Additionally, when people are constantly exposed to negative shocks (i.e. unanticipated adverse events that have the potential to endanger one's wellbeing) they are more prone to seeing the future in a bleak light (i.e. they have less hope about a better future), which in turn makes them even more prone to experiencing more negative shocks (Duflo, 2012, p. 44). And because people living in poverty are more vulnerable to shocks than non-poor people (Daminger, Hayes, Barrows and Wright, 2015), it would be reasonably to believe that, as a result, people living in poverty experience lower levels of hope and, thus, are more exposed to the poverty behavioral trap of the so called *lack of hope*.

Poverty and School Dropout

The City of Leon, Mexico, is the 4th most populated city in the country and the one with the biggest population of people under 18 years old (INEGI, 2015). It also the 4th city with the highest number of people living in poverty, with 522,736 individuals living in such condition (CONEVAL, 2017). Despite the fact that in the last decade the average number of school years effectively studied increased up to 9.1 years, the number of people with a completed high school education remains low. Additionally, 39.9% of adolescents between 15 and 17 years old are not enrolling to high school after graduating from secondary school, and of those who do enroll, 21% drop out of school before the end of the first year (Camarena & López, 2016).

In 2011, the Mexican Public Education Ministry conducted a survey to identify the main causes of school dropout during high school, with a sample of $N = 13,014$ participants between 15 and 24 years old (49.73% women), where 36.4% of participants revealed that the main reason why they dropped out from high school was the lack of money to for school supplies, bus tickets or school registration. This percentage was higher in the quartile with the lowest income (46%), but also the lack of money was the main reason to dropout from high school for participants from the quartile with the highest income (17%) (SEP, 2012).

The United Nations Educational, Scientific and Cultural Organization –UNESCO- has found that higher levels of education, especially among girls, are related with a decrease in child marriages and child pregnancy, as well as with an improvement on nutrition and health (UNESCO, 2013), all of these conditions that are believed to reduce poverty. Increasing levels of education also has been related with a decrease of inequality (Coady & Dizioli, 2017; United Nations, 2015*b*), improvement of productivity, social mobility and poverty reduction (INEE, 2011).

Education provides not only an initial labor market advantage but also a permanent advantage that increases with time in the labor market (Brunello & Comi, 2000), whereas the less educated poorer members of society can be exposed to a decrease in earnings, even if there is economic growth in the country (Ulrich, 1998). Data from Mexican surveys revealed that there is a positive relationship between years of schooling and wages (INEE, 2014), where the average hourly wage of the salaried subordinated workers increased with the complete levels of schooling (p. 111), and according to the Economic Commission for Latin America and the Caribbean those who graduate from the high school receive on average a salary higher by 30% than those who did not attend it (CEPAL, 2010).

Research Question and Hypotheses

This research aimed to explore if an internal constraint, a *lack of hope*, can lead people living in poverty to hold back their efforts to enroll in high school or continue their education, creating a behavioral poverty trap where originally there is none. No previous research to the knowledge of the author has ever measured if, as stated, people living in poverty actually experiences lower levels of hope compared to not impoverished individuals. Thus, we aim to answer to the research question: *does poverty have a negative impact on hope and, if so, could low levels of hope predict dysfunctional behaviors?*

For the purposes of this research, hope was understood as the belief or expectancy that a future outcome, which is positive and goal congruent, important, but uncertain, can possibly be achieved (Guimaraes, 2010). In line with the approach of MacInnis and Chun (2007) this research aligns with the idea that hope can be present in different domains or areas of one's life – *e.g.* one can hold high hopes regarding a job opportunity, the efficacy of a medical treatment or the solution of a social issue—. Hope on the *personal domain* can refer to a person's belief or

expectancy that she will experience a desired wellbeing in the future (MacInnis & Chun, 2007).

Hope on the *social domain* refers to a person's belief or expectancy that her society will be better in the future (MacInnis & Chun, 2007)– .

In order to answer our research question, two studies were conducted: Study 1 consists of a correlational study using data from three Mexican Government Agencies. Based on my framework, I hypothesized that:

H1. There is a negative correlation between poverty and hope in the personal domain, so higher poverty levels are related to lower levels of hope regarding a personal desired wellbeing in the future.

H2. There is a negative correlation between poverty and hope in the social domain, so higher poverty levels are related to lower levels of hope regarding the future of their society.

H3. Lower levels of hope both in the personal and social domains are better explained by poverty levels (i.e. correlation coefficients are stronger) than by other variables, such as demographic characteristics of population, insecurity, violence, inequality, unemployment rate and Gross Domestic Product (GDP) per capita.

Study 2 consists of a survey designed to assess poverty, hope and their impact in behavior related to high school enrollment. For that we hypothesized that:

H4. There is a positive correlation between poverty and dysfunctional behavior (i.e. not looking for high school enrollment); and such behavior can be explained by lower levels of hope.

Study 1: Relationship between Poverty and Hope

In Study 1 we tested hypotheses H1, H2 and H3 using data extracted from the survey *Child and Youth Consultation 2015* administrated by the Mexican National Electoral Institute,

whose variables of interest for the present research included data of 487,600 adolescents between and 14 to 17 years old (54.95% female). Due to the procedure of data analysis and publication of results by the National Electoral Institute, results were only available at the level of state and municipal averages, integrating a sample of $N=30$ States and $N=1,644$ municipalities.

Measures

Hope. Hope in the personal domain was measured with the question “*My life will be better as an adult than now*” and hope in the social domain was measured using the question “*My country will be better in the future than it is now*”. The given answers to these questions were collected in agree/do-not-agree percentages, so for the purposes of the research, the percentage of agreement with each statement will be considered as the level of hope, 100 being the higher possible score and 0 the lower.

Poverty. Poverty was assessed as the poverty rate at the State and Municipal level provided by the National Council for the Evaluation of Social Development Policies (CONEVAL), Mexican Government’s Agency responsible to define, identify and measure poverty.

Other variables of interest. In order to test $H3$, other variables of interest were also assessed using data at the State level provided by different Mexican public institutions. For each one of those variables different measures were used: *i*) violence (measured as murder rate, variation in the murder rate in the five years previous to the National Child and Youth Consultation and self-reported adolescents’ victimization rate); *ii*) insecurity (measured as the percentage of adolescents that does not feel safe on their houses, their schools and surroundings and on the streets), *iii*) economy (for which we used the monthly work income per capita, Gross Domestic Product –GDP– per capita and the unemployment and underemployment rate), *iv*)

inequality (measured as the Gini Coefficient) *v*) education issues (measured as the high school dropout rate, the Net High-School Rate and the average grade of schooling of the population), and *vi*) demographic characteristics of the population (measured using the indigenous population rate and the size of the population).

Results

Table 1 summarizes the correlations at the State level between hope in both the economic and social domain and the other variables of interest. The results show that the higher the poverty rate is the lower hope level is experienced, but mainly in the personal domain of hope. Four out of the six measures of poverty are strongly and negatively correlated with hope in the personal domain, with the highest correlation being the measure of child poverty rate $r(28) = -.70, p < .001$, followed by the general poverty rate $r(28) = -.66, p < .001$. On the other hand, only one of the measures of the child poverty rate showed a negative correlation with hope in the social level $r(28) = -.35, p = .056$, but this was not significant.

To test *H3*, we also analyzed correlations between hope in the personal and social domain and other variables of interest, *i.e.* violence, insecurity, economy, inequality, education and demographics, and for each one of them different measures were used, having a total of 21 variables. To avoid type 1 errors, we used a Bonferroni correction, setting the p-value at 0.0023.

We found that the strongest correlation is a negative one between child poverty rate and hope in the personal domain. However, it also seems that insecurity has strong negative correlations with experienced hope: not feeling safe in their schools has a negative correlation of $r(28) = -.64, p < .001$ with hope in the personal domain.

Table 1. Summary of correlations at the State level.

Independent Variable	Measure	Hope Personal Domain	Hope Social Domain
POVERTY	Poverty Rate	-.67*	-.29
	Child Poverty Rate	-.70*	-.35
	Extreme Poverty Rate	-.45	-.16
	Food Poverty Rate	-.41	-.05
	Income under minimal Wellbeing Line Rate ¹	-.54*	-.25
	Income under Wellbeing Line Rate ²	-.63*	-.26
VIOLENCE	Murder Rate	.34	.27
	Variation in Murder Rate 2010 -2015	-.39	-.31
	Adolescents' Self-reported Victimization Rate	-.02	-.23
INSECURITY	Percentage of adolescents that do not feel safe in their Houses	-.68	-.26
	Percentage of adolescents that do not feel safe in their Schools and surroundings	-.64*	-.50
	Percentage of adolescents that do not feel safe in the Streets	-.40	-.48
ECONOMY	Monthly Work Income per capita	.49	.19
	GDP per capita	.28	-.12
	Unemployment and Underemployment Rate	-.10	.02
INEQUALITY	Gini Coefficient	.01	-.12
EDUCATION	School Dropout Rate (High school)	.05	-.36
	Net School Rate (High school)	-.12	-.17
	Average Grade of Schooling	.36	.01
DEMOGRAPHICS	Indigenous Population Rate	-.18	-.15
	Population size	-.26	-.07

N= 30.

* $p < 0.0023$.¹ Minimal Wellbeing Line: Income of approx \$ 67 USD per month per family integrated by 4 members.² Wellbeing Line: Income of approx \$ 137 USD per month per family integrated by 4 members.

Results of Study 1 suggest that poverty and hope are negatively correlated and this negative correlation is stronger and more significant on the personal domain than ..., which refers to the expectancy or belief that one will experience a desired wellbeing in the future.

In addition to the correlations using data at the State level we were also interested in analyzing correlations using data at the Municipal level, for which we analyzed data from 1,644 municipalities. Unlike with the information at the State level, the Mexican National Institute of Geography and Statistics has less data sets at the municipal level, so for this analysis only 10 variables were considered. Like before, a Bonferroni correction was used, setting p-value at 0.005.

Table 2. Summary of correlations at the Municipal level.

Independent Variable	Measure	Hope Personal Domain	Hope Social Domain
POVERTY	Poverty Rate	-.09**	.08**
	Food Poverty Rate	-.06	-.05
	Income under Wellbeing Line Rate	-.10**	.06
INSECURITY	Percentage of adolescents that do not feel safe in their Houses	-.16**	-.10**
	Percentage of adolescents that do not feel safe in their Schools and surroundings	-.30**	-.24**
	Percentage of adolescents that do not feel safe in the Streets	-.15**	-.22**
VIOLENCE	Adolescents' Self-reported Victimization Rate	-.08**	-.05
INEQUALITY	Gini Coefficient	.08**	.02
EDUCATION	Average Grade of Schooling	-.01	-.21**
DEMOGRAPHICS	Population size	-.02	-.14**

N= 1644.

* $p < 0.005$., ** $p < 0.001$.

As we can see on Table 2 there are no strong correlations between hope and poverty. There is only one medium size correlation, between hope in the personal domain and insecurity in school and surroundings $r(1642) = -.30, p < .001$, and unlike with data at the State level, here it seems that the stronger correlations are between hope and insecurity. These results were different to what we expected, so we decided to do an additional analysis at the within-state level, analyzing correlations between hope and poverty for the municipalities of each one of the 30 states to identify if results could vary across states.

Figure 1 shows the correlations between poverty rate and hope in the personal domain across states. As we can see, in most of the states there are not strong significant correlations. However, it strikes as a surprise that in some states, like Colima, Hidalgo and Tabasco there are medium size positive correlations between poverty and hope, contrary to what we expected.

We decided to explore further if some other variables available at the municipal level might have influence in the relationship between poverty and hope, so we decided to analyze correlations between poverty and hope again with municipal data controlling for three variables: urbanity³, average educational level⁴ and level of social cohesion⁵. Controlling for urbanity did not change significantly the values of the correlations between poverty and hope on the personal domain $r(1642) = -.09, p < .001$ and poverty and hop on the social domain $r(1642) = .09, p < .001$. Controlling for social cohesion increased the value of the correlation between poverty and hope on the personal domain $r(1642) = -.11, p < .001$ and decreased the value of the correlation between poverty and hope on the social domain $r(1642) = .00, p = .881$. Finally, controlling for

³ The Mexican National Institute of Geography and Statistics considers that a municipality is urban when its population is higher than 2,500 people.

⁴ The average estimates the number of years that the population over 15 years old has studied.

⁵ Social Cohesion is an Index generated by the Mexican Council for the Evaluation of Social Development Policies that allows that institution to approximate the level of equity and solidarity that exists in a society.

the average educational level increased the values of the correlations between poverty and hope on the personal domain $r(1642) = -.15, p < .001$ and poverty and hope on the social domain $r(1642) = -.11, p < .001$.

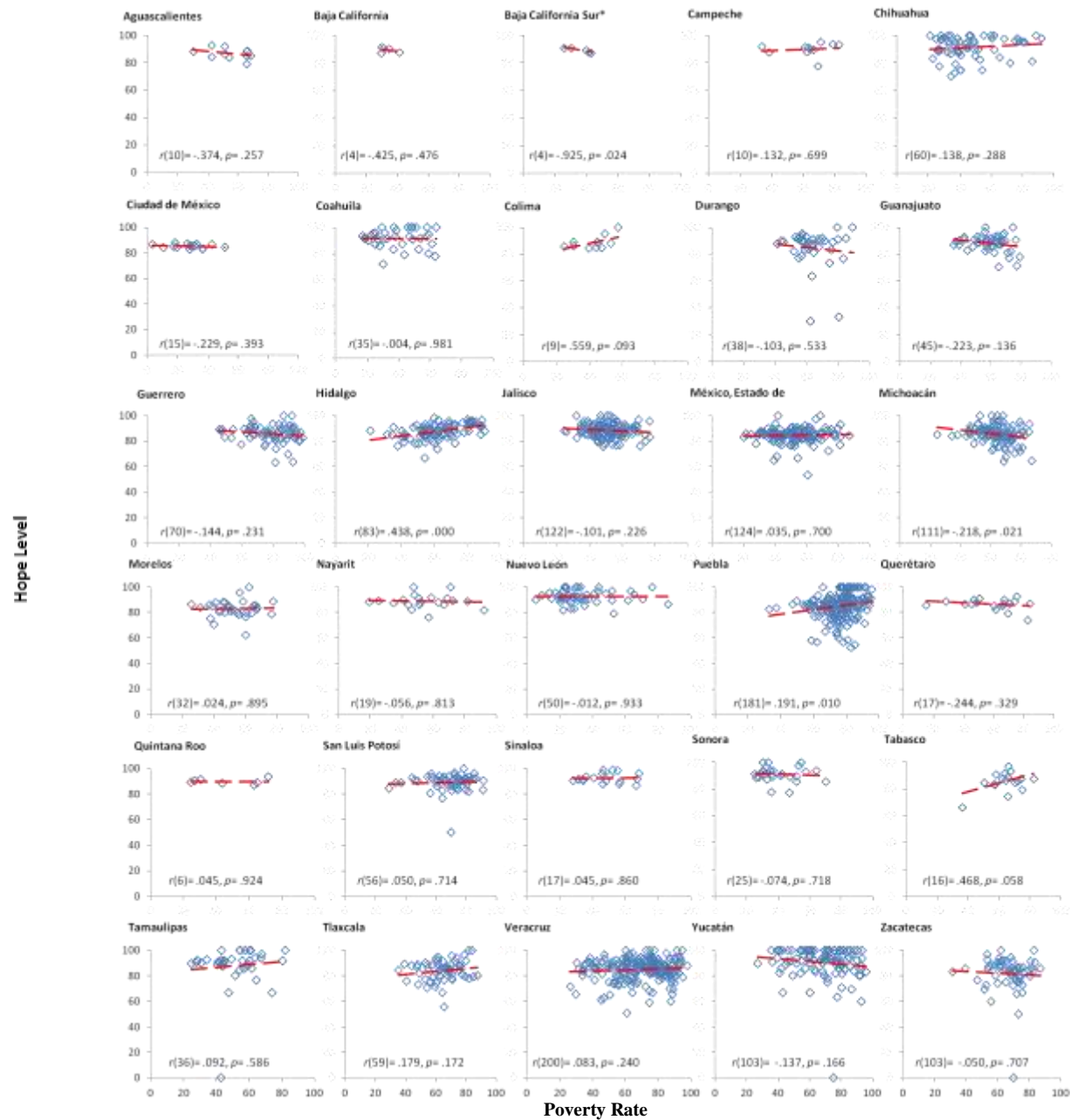


Figure 1. Relationship between poverty and hope across states.

Discussion Study 1

Using data at the State level Study 1 supported our hypothesis that there is a relationship between poverty and hope and that such relationship is manifested in a negative correlation. It additionally provided information that also insecurity and hope are negatively correlated. Data also suggested that there might be a relationship between hope on the social domain and school dropout rate, $r(28) = -.37, p = .05$, behavior that could be considered dysfunctional. Previous research has demonstrated that school dropout limits people's access to better job opportunities and economic growth (Ulrich, 1998) and that lower levels of education are part of a vicious cycle that traps people in poverty (see Perry *et al*, 2006). Despite the correlation between hope on the social domain and school dropout rate is not significant and it only applies to our sample, future research could provide evidence to find out if indeed there is a relationship between hope and school dropout. Precisely in this line of ideas, Study 2 explores the relationships between poverty, hope and dysfunctional behavior (*i.e.*, not looking for high school enrollment) at the individual level, aiming to have a better understanding of how these variables interact within a person.

Also, since the decade of the 70's it has been recognized that poverty is also an individual feeling and not only an objective status (van Praag & Ferrer-i-Carbonell, 2006; Gouedhart *et al*, 1977). This line of research states that measuring poverty only in objective terms can undermine the way we understand it and how we assess its consequences (*see* Buttler, 2013; Chambers, 2006; Ravallion & Lokshin, 1999). The measures of poverty used in Study 1 were objective ones and therefore they probably cannot totally account for the interaction between poverty – a condition with an important subjective component – and hope –another subjective experience. Therefore, it could be the case that some populations were identified as living in poverty with the

used measurements, but they do not have a subjective perception of being poor, or vice versa, which raises the question if perceived poverty rather than objective poverty is the condition that could be accounted for lacking hope. Drawing on this line of ideas Study 2 also considered subjective measures of poverty to clarify the role that perceived poverty could play in the experience of hope.

Study 2: Poverty, Hope and Dysfunctional Behavior

As was stated in the introduction, increasing levels of education could lead people to escape from poverty, whereas dropping out of school or not continuing an educational process could expose low educated people to low earnings, creating a poverty trap. Study 2 aims to examine the relationship between poverty, hope and dysfunctional behaviors (i.e. not looking for options to enroll into high school and continue their education) and to build a mediation model where poverty predicts lower levels of hope and lower levels of hope predict dysfunctional behavior. Also, inspired by previous research regarding causes of school dropout (see Perry *et al.* 2006), Study 2 included as covariates peer influence, status quo, educational family background and perceived family support.

Participants. A survey was conducted in a secondary school located in the city of Leon, Mexico, with students that are currently doing their third year of secondary school⁶. A total of 82 adolescents participated in the research (50.63% female, $M_{age} = 14.59$, $SD_{age} = .5434$). Sample size was estimated a priori based on the results of Study 1 where we found that there is a negative correlation between poverty and hope of $r(29) = -.666$ $p < .001$. We used the software G*Power 3.1.9.2, selecting the statistical test *Correlation: Bivariate normal model* and setting

⁶ In the Mexican Educational System the third year of secondary school equals to the 9th year of schooling; students of this level are in average 15 years old. It is after completion of this schooling year that students can enroll into high schools.

the correlation p *HI* at 0.6 after the above mentioned r value, $\alpha = 0.05$, $power = .95$, which projected a needed sample size of at least $N = 30$ participants. The secondary school's Department of Psychology promoted the research among students during their weekly announcements and in the end more participants than needed volunteered for taking part in it.

Measures. The survey consisted of a 10 item questionnaire (see Appendix A) which assessed hope, poverty, dysfunctional behavior (i.e. not looking for options to enroll in high school), status quo tendency, peer influence, educational background of one's family and perceived family support.

Poverty. Study 2 considered objective and subjective measurements of poverty. To assess objective poverty, next to the demographic questions (sex and age) included in the questionnaire, participants were asked to indicate the colony/community where they are currently living. Based on that, we identified the *Degree of Social Lag*⁷ for each colony/community using data provided by the CONEVAL, which was used as our poverty measurement. The Degree of Social Lag is estimated as High, Medium and Low.

Subjective poverty was measured using a 10-steps "Economic Ladder Question" (ELQ), an approach that uses qualitative categories in the welfare space (Ravallion & Lokshin, 2000). ELQ consists of a pictorial ladder that is presented to respondents, with the bottom step representing the 'most poor' and the top step representing the 'most rich', asking respondents to identify in which step they feel they stand on (Howe *et al*, 2012).

⁷ Unlike poverty measurements at the national, state and municipal level, there is not an official poverty measurement for each colony/community in Mexico. However, the CONEVAL provides a *proxy* variable of poverty denominated *Degree of Social Lag*, in which Basic Geostatistics Areas (AGEBs) are order into three degrees of social lag: High, Medium and Low. For more information regarding the Degree of Social Lag measurement see Appendix B.

Hope. Whereas in Study 1 hope was assessed using the percentage of agreement with a statement, in Study 2, while maintaining the same statement used in Study 1 (“My life will be better as an adult than now”), hope was assessed asking participants to indicate their agreement with it. Ratings were made in scale from 1 (*totally disagree*) to 7 (*totally agree*), allowing more variance in the responses.

Dysfunctional behavior. As mentioned above, we considered not looking for options to enroll in high school as a dysfunctional behavior that could create a poverty trap. Participants were asked to answer “yes” or “no” to the statement “In the last three months I have looked for information regarding the enrollment in high school, for example: searching for information of high schools in internet, contacting directly any high school or talking to a teacher in my current school about high schools”.

Covariates. Four additional statements were included in the questionnaire: “The normal step for a person like me would be to enroll in high school after graduating from secondary school” (*status quo*), “Most of my friends or classmates will enroll in high school after graduating from secondary school” (*peer influence*), “At least one member of my family has graduated previously from high school” (*family educational background*) and “If I decided to enroll in high school my family would support me” (*perceived family support*). For the statements regarding *status quo* and *perceived family support* participants were asked to indicate their level of agreement in scales from 1 (*completely disagree*) to 7 (*completely agree*). For the statements related to *peer influence* and *family educational background* participants were asked to answer “yes” or “no”.

Results

Three questionnaires were incomplete, so they were excluded from the analysis, having a final sample of $N = 79$ participants. Measurement of objective poverty was also excluded from analyses because all participants were identified as living in colonies with the exact same *Degree of Social Lag*. Table 3 summarizes correlations between all variables. Dysfunctional behavior, peer influence and educational family background were measured as binary variables, therefore percentages might be useful to describe better obtained results: 75.94% of participants have not looked for options to enroll in high school, 69.62% do not have family that have graduated from high school and 94.93% answered that most of their friends/classmates are not going to enroll in high school.

Table 3. Descriptive statistics and correlations.

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7
1. Subjective Poverty	5.75	1.15	–						
2. Hope	5.25	1.39	.15	–					
3. Dysfunctional Behavior	0.24	0.43	-.16	-.08	–				
4. Status Quo	5.80	1.62	.30**	.30*	-.33**	–			
5. Peer Influence	0.05	0.22	-.10	.00	-.13	-.22*	–		
6. Perceived Family Support	6.56	1.02	-.02	.27*	-.19	.45**	.04	–	
7. Educational Family Background	0.30	0.46	-.12	-.18	.27*	-.28**	-.15	-.23**	–

$N=79$

* $p < 0.05$, ** $p < 0.01$.

In contrast to our hypotheses, poverty and hope are not significant correlated $r(77) = .15$, $p = .178$. Neither are poverty and dysfunctional behavior $r(77) = -.16$, $p = .157$ nor hope and dysfunctional behavior $r(77) = -.08$, $p = .474$. Interestingly, dysfunctional behavior has a negative significant correlation with status quo $r(77) = -.33$, $p = .003$ and a positive significant correlation with educational family background $r(77) = .27$, $p = .015$.

We also tested for a mediation effect using the PROCESS macro for SPSS by Andrew F. Hayes (2013), considering Subjective Poverty as Independent Variable, Dysfunctional Behavior as the Dependent Variable, and Hope as the Mediator. The analysis included as Covariates Perceived Family Support, Family Educational Background, Status Quo and Peer Influence. Main results are shown in Table 4.

Mediation analysis revealed that the used measurement of subjective poverty does not predict hope ($b = -.11$, $se = .14$, $p = .406$, $CI [-0.16, 0.40]$) or dysfunctional behavior ($b = -.21$, $se = .24$, $p = .466$, $CI [-0.78, 0.36]$). Hope also did not predict dysfunctional behavior ($b = -.12$, $se = .22$, $p = .584$, $CI [-0.31, 0.56]$). The indirect effect of poverty on dysfunctional behavior through hope was small and not significant ($b = -.01$, $se = .24$, $p = .467$, $95\% CI [-0.04, 0.23]$). We found no mediation effect in the proposed model (See Figure 2).

Table 4. Results of mediation analysis investigating whether hope mediates the relation between subjective poverty and dysfunctional behavior, including covariates.

Predictor	coeff	se	Z	p	LLCI	ULCI
constant	1.85	2.24	0.73	0.467	-3.14	6.84
Hope	0.12	0.22	0.55	0.584	-0.31	0.56
Subjective Poverty	-0.21	0.29	-0.73	0.466	-0.78	0.36
Status Quo	-0.50	0.23	-2.15	0.032	-0.96	-0.04
Peer Influence	-22.09	30337.60	0.00	0.999	-59482.70	59438.51
Perceived Family Support	0.03	0.34	0.08	0.935	-0.64	0.69
Educational Family Background	0.77	0.62	1.24	0.215	-0.45	1.99

Regression between status quo and dysfunctional behavior ($b = -.5042$, $se = .2348$, $p = .0318$, $CI [-.9643, -.0440]$) shows data that suggests that there might be an effect of status quo on dysfunctional behavior. No other covariate showed a significant effect on dysfunctional behavior or on hope.

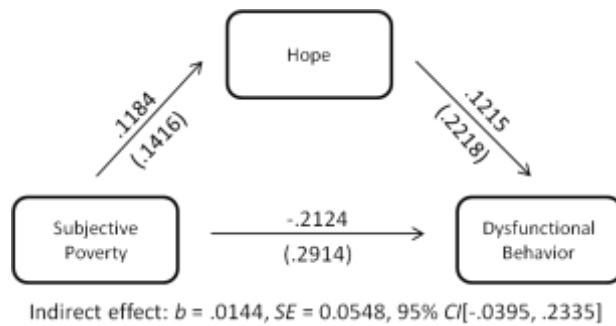


Fig. 2. Proposed model of mediation, where the relationship between subjective poverty and dysfunctional behavior is mediated by hope. Unstandardized regression coefficients are shown, and standard errors are given in parentheses. No significant coefficients were found.

In order to control for the possible effect of other variables on dysfunctional behavior and to assess the unique effect of hope on dysfunctional behavior above and beyond that of other variables, we performed a logistic hierarchical regression in three steps: Step 1 of this analysis regressed dysfunctional behavior on hope. In step 2 we included subjective poverty into the regression equation. Step 3 included the same covariates used in the mediation analysis and added the covariate *Gender*. Main results are shown in Table 5.

Table 5. Hierarchical logistic regression model used to predict dysfunctional behavior.

Predictors	Step 1		Step 2		Step 3	
	<i>b</i>	Odds ratio	<i>b</i>	Odds ratio	<i>b</i>	Odds ratio
Hope	-.14	.87	-.10	.90	.20	1.22
Subjective Poverty			-.34	.71	-.29	.75
Status Quo					-.59*	.57
Peer Influence					-21.87	3.18
Perceived Family Support					.17	1.18
Educational Family Background					.86	2.36
Gender					-1.08	0.34

$N=79$

* $p < 0.05$

Consistent with our previous mediation analysis, the hierarchical logistic regression shows that hope has a small and not significant effect on dysfunctional behavior ($b = -.14, p = .470$). When subjective poverty was added to the regression equation, the effect of hope on dysfunctional behavior decreased ($b = -.10, p = .594$), and the effect of subjective poverty on dysfunctional behavior was also not significant ($b = -.34, p = .183$). After controlling for the covariates, the effect of hope on dysfunctional behavior changed from a negative effect to a positive effect, but also not significant ($b = .20, p = .405$). Interestingly, also like in our mediation analysis, data from the hierarchical logistic regression suggests that status quo might have an effect on dysfunctional behavior ($b = -.59, p = .018$).

Discussion Study 2

Contrary with what we hypothesized, in Study 2 we did not find a significant effect of poverty on hope or on dysfunctional behavior, and the mediation analysis did not support our proposed model. Results from Study 2 resemble to what we found in Study 1 using data across states and at the municipal level: small and not significant correlations between poverty and hope, different to what we found with data at the state level, where there was a strong and significant negative relationship between poverty and hope.

We have to acknowledge some important limitations Study 2 had. First of all, sample was homogenous: participants resembled each other in terms of economic situation and the selection of participants might have caused a *volunteer bias* (Salkind, 2010). Additionally, all variables were measured using only one question, and even though previous research have measured variables such as expectations and hope using single questions to assess them (e.g. Nelissen, 2017), it is hard to believe that one question alone can account for the complexity of the variables considered in this study.

In the specific case of *dysfunctional behavior*, we cannot say for sure that students that did look for information to enroll in high school are actually going to enroll: It could be the case that participants who looked for information and are interested in studying high school will end up not enrolling. Data from the National Survey on High School Dropout (SEP, 2012) revealed that 67.1% of high school droppers were actually interested in continuing their studies. On the contrary, it could also be the case that some participants did not look for information themselves, but rather their parents or tutors are the ones taking responsibility of the whole process regarding their enrollment in high school. Future research could include the assessment of interest and perceived utility of studying high school, as well as longitudinal data to have more information regarding the relationship between looking for information to enroll in high school and enrollment/dropout rates.

Finally, despite the benefits of using subjective measurements of poverty (see Rojas, 2008; Gandhi Kingdon & Knight, 2006; Bradshaw & Finch, 2003) the use of the ELQ represents some methodological problems and rises some questions for future research. Previous research has identified a number of problems that cloud the inferences that can be drawn from survey responses on subjective welfare; for example, relatively stable personality traits influence how people respond to subjective welfare questions (Ravallion & Lokshin, 2000). Additionally, it is considered that this approach is unlikely to provide a sufficient statistic for multidimensional poverty comparisons (Ravallion, 2012, p. 18). As for the questions for future research, we do not know for sure what was the reference group with which students compared themselves and if it might have affected the obtained results; while some respondents could have compared their condition using their neighbourhoods as their reference group, some others could have thought about the city or even the country as their reference point. There are reasons to believe that

differences in reference groups have an effect in perceived wellbeing (see Ravallion & Lokshin, 2000). Future research could identify if asking participants to compare themselves with specific reference groups translates in significant different results and if those differences have an impact in other variables such as hope.

General Discussion

In two correlational studies we aimed to explore the relationship between poverty, hope and dysfunctional behavior (i.e., not looking for information to enroll in high school). In Study 1 we were able to identify a strong negative relationship between poverty and hope, but only using data at the state level; data at the municipal level did not provide enough evidence regarding a significant relationship between both variables, however, it provided some information that make us think some other variables – i.e. social cohesion and the average years of schooling – could be playing a role in the relationship between poverty and hope. This information was not conclusive, but it opens some questions for future research to identify what specific role these variables play.

When we used municipal data and within-states data to measure the relationship between poverty and hope results were different than those observed with data at the State level. This could have happened due to several reasons: First, the data at the State level provided the averaged information of all the municipalities that are part of that State, thus having more representative samples, whereas the samples of participants on some municipalities were really small: 137 municipalities out of 1,644 had a sample of 10 or less participants. However, results did not change after controlling for the size of each municipality's sample of participants.

Secondly, Mexico is a diverse country and with several socio-cultural dissimilarities across States. Just as an example, besides Spanish there are 68 spoken indigenous languages in

the country, with 364 linguistic variations (INALI, 2008), but the population that speaks indigenous languages is mainly clustered in the south-east of the country, as we can see on Figure 2. Another important difference across states is their economy: in 2015 six states alone generated the 50% of the GDP of the country – Mexico City, Mexico, Nuevo León, Jalisco, Veracruz and Guanajuato –, while some other states had marginal contributions to the annual GDP (INEGI, 2016). Even though this research used a different definition of hope, some scholars (*see* MacInnis & Chun, 2007; Lazarus, 1999) understand hope as an emotion, a feeling of wanting something but being unsure about the possibility of getting it (MacInnis & de Mello, 2005) and previous research has stated that cultural differences play an important role in the way emotions are experienced (*see* Mesquita & Walker, 2002) and affect the prevalence and patterns of emotional outputs (Abu-Lughod, 1986). It could be the case then that cultural differences somehow influence the relationship between poverty and the experience of hope, which are positively correlated in some States while it is negatively correlated in some others. However our research does not have enough data to support this claim.



Figure 3. Percentage of population that speaks indigenous languages per State, Mexico 2015.

Source: INEGI (2015*b*) Speakers of indigenous language in Mexico.

Additionally, the dissimilarities between states would require controlling for more variables that could be interacting with hope than the ones used in this Study; however, due to the lack of data at the municipal level, it was not possible to include them in this analysis. Future research could aim to gather more information at the municipal level to try to clarify the way in which other variables might interact with hope.

In Study 2 we aimed to build a mediation model where poverty predicts lower levels of hope and lower levels of hope can predict dysfunctional behavior; however we did not find significant relationships between the three variables. Our mediation analysis showed that poverty has a small and not significant effect on hope, and that neither poverty nor hope have a significant effect on dysfunctional behavior. A second look to the data through a hierarchical logistic regression analysis revealed that there is not a unique significant effect of hope on dysfunctional behavior above and beyond that of the covariates considered in this study. The pattern of results was similar to what we found in Study 1 using data at the municipal level: a small and not significant relationship between poverty and hope.

We have to acknowledge some important limitations Study 2 had. First of all, sample was homogenous: participants resembled each other in terms of economic situation and the selection of participants might have caused a *volunteer bias* (Salkind, 2010). Additionally, all variables were measured using only one question, and even though previous research have measured variables such as expectations and hope using single questions to assess them (e.g. Nelissen, 2017), it is hard to believe that one question alone can account for the complexity of the variables considered in this study.

In the specific case of *dysfunctional behavior*, we cannot say for sure that students that did look for information to enroll in high school are actually going to enroll: It could be the case

that participants who looked for information and are interested in studying high school will end up not enrolling. Data from the National Survey on High School Dropout (SEP, 2012) revealed that 67.1% of high school droppers were actually interested in continuing their studies. On the contrary, it could also be the case that some participants did not look for information themselves, but rather their parents or tutors are the ones taking responsibility of the whole process regarding their enrollment in high school. Our assessment of dysfunctional behavior could be more related to the intention or level of interest of enrolling in high school and be little reliable to predict school dropout. Future research could include the assessment of interest and perceived utility of studying high school, as well as longitudinal data to have more information regarding the relationship between looking for information to enroll in high school and enrollment/dropout rates.

Finally, despite the benefits of using subjective measurements of poverty (see Rojas, 2008; Gandhi Kingdon & Knight, 2006; Bradshaw & Finch, 2003) the use of the ELQ represents some methodological problems and rises some questions for future research. Previous research has identified a number of problems that cloud the inferences that can be drawn from survey responses on subjective welfare; for example, relatively stable personality traits influence how people respond to subjective welfare questions (Ravallion & Lokshin, 2000). Additionally, it is considered that this approach is unlikely to provide a sufficient statistic for multidimensional poverty comparisons (Ravallion, 2012, p. 18). As for the questions for future research, we do not know for sure what was the reference group with which students compared themselves and if it might have affected the obtained results; while some respondents could have compared their condition using their neighbourhoods as their reference group, some others could have thought about the city or even the country as their reference point. There are reasons to believe that

differences in reference groups have an effect in perceived wellbeing (see Ravallion & Lokshin, 2000). Future research could identify if asking participants to compare themselves with specific reference groups translates in significant different results and if those differences have an impact in other variables such as hope.

Acknowledging that this was an exploratory research, we cannot but point out some important limitations regarding the measurement of poverty and hope. On the one hand, due to the methodology by which poverty is measured by the Mexican Government across different levels – country, state, municipality and colony/community – we were not able to work with the same measurement in both studies, and due to the own limitations of the measurement of poverty at the colony/community level we ended up eliminating our objective measurement of poverty in Study 2.

On the other hand, it is considered that “just as [hope] has received relatively little attention from researchers in various disciplines, so too has its measurement” (McInnis & Chun, 2007, p. 161). Additionally, there are important differences in how to measure it: while some scholars have developed whole scales, like Snyder’s *Hope Scale* (Snyder *et al.* 1991), some other researchers have used single questions to assess it (e.g. Nelissen, 2017). We did not propose a specific method to measure hope – such exercise was beyond the scope of this research – but rather used a question that we believed approached the most to the definition of hope that we assumed. It could be the case, however, that such measurement accounted more for positive outcome expectancies than for hope itself.

As Lybbert & Wydick (2017) stated, “understanding the role hope plays in shaping poverty dynamics is a daunting pursuit because the two subjects are nuanced and complex even when viewed in isolation [...] This complex relationship will only be understood though the

accumulation of careful theoretical and empirical study.” (p. 1). Luckily, hope and its relationship with poverty have caught the attention of economists in recent years (see Lybbert & Wydick, 2018). This represents a big opportunity for behavioral scientists to collect evidence that allows a better understanding of the interactions between poverty and behavior, aiming to create insights that can be helpful in the design of development policies and a pro-poor agenda.

Future seems to be promising for such task: just recently the World Bank Group created the *Mind, Behavior and Development Unit*, a team that uses behaviorally informed research to make development policies more effective (World Bank, 2018c). Also recently, the UN Secretariat and the UNDP Innovation Facility have launched a small team of behavioral science experts — the UN Behavioural Initiative (UNBI) — charged with translating behavioral science insights into more effective and efficient UN programming and operations towards the accomplishment of the 2030 Agenda (United Nations, 2016), and even in Mexico some Government Agencies are starting to use behavioral insights related to poverty in their evaluations of public education policies (see INEE, 2014) and welfare (see INEGI, 2017).

As for the current research, we believe that it makes valuable contributions to the study of hope and its relationship with poverty: on the one hand, it sheds some light about the possible influence of culture on the experience of hope. Our data is not conclusive but future research could explore if culture plays a key role in the relationship between poverty and hope.

On the other hand, if as our data suggests poverty actually has a small effect on hope, then it might be that poverty does not have a negative impact on hope as some researchers have stated (Fechtner, 2014; Duflo, 2012), but rather on aspirations, expectations or other related psychological constructs. Future psychological research will be helpful in order to assess the impact of poverty on hope while differentiating it from some constructs that are not typically

distinguished from hope, such as wishing, wanting, optimism, expectations and faith (McInnis & Chun, 2006; p. 100).

We are convinced that psychology still has a lot to clarify about the nature and dynamics of hope and that it is necessary to keep researching the relationships between poverty and psychological aspects to identify and understand better behavioral poverty traps, so we are able to improve the current policies to reduce poverty.

Final remarks. That higher education attained during youth leads to higher incomes later in life is probably the most documented finding in empirical microeconomics (Perry *et al*, pp. 167). However it is estimated that it is going to take until 2041 for Mexico to guarantee universal access to high school (INEE, 2014). In a country that it is currently struggling with high rates of poverty, school dropout and child labor as a family strategy to cope with poverty (STPS, 2014), but at the same time has become one of the 15 strongest economies in the world (World Bank, 2017), identifying all the constraints that adolescents are facing to enroll to and graduate from high school, including the internal ones, can improve public policies so they can speed the way out of poverty and benefit the poor from the economic growth the country is experiencing.

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APPENDIX A

Questionnaire to Assess Poverty, Hope and Dysfunctional Behavior

(Spanish version)

Hola,

El siguiente cuestionario es parte de una investigación que busca comprender mejor la deserción escolar. Te pedimos que leas cuidadosamente cada una de las siguientes preguntas y que las respondas de la manera más sincera.

No hay respuestas correctas o incorrectas.

Si estás interesado en conocer los resultados de la investigación puedes solicitar una copia digital enviando un correo electrónico a ...@tilburguniversity.edu

¡Muchas gracias por tu participación!

1. ¿Cuántos años tienes? _____

2. Marca con una “X” tu sexo: Hombre () Mujer () Prefiero no responder
()

3. ¿Cuál es el nombre de la colonia/comunidad en la que actualmente vives? (Menciona solamente el nombre de la colonia/comunidad, sin indicar la calle ni el número de tu casa):

A continuación, leerás varias declaraciones. Lee cada una de ellas con mucho cuidado.

Para cada afirmación, marca con una "X" la opción que represente mejor tu opinión.

4. Creo que cuando sea una persona adulta voy a vivir mejor que ahora.

Totalmente en desacuerdo	Fuertemente en Desacuerdo	Moderadamente en desacuerdo	Ni de acuerdo ni en desacuerdo	Moderadamente de acuerdo	Fuertemente de acuerdo	Totalmente de acuerdo
()	()	()	()	()	()	()

5. Si decidiera inscribirme a la escuela preparatoria mi familia me apoyaría.

Totalmente en desacuerdo	Fuertemente en Desacuerdo	Moderadamente en desacuerdo	Ni de acuerdo ni en desacuerdo	Moderadamente de acuerdo	Fuertemente de acuerdo	Totalmente de acuerdo
()	()	()	()	()	()	()

6. Lo normal para una persona como yo sería inscribirse en la preparatoria después de graduarse de la secundaria.

Totalmente en desacuerdo	Fuertemente en Desacuerdo	Moderadamente en desacuerdo	Ni de acuerdo ni en desacuerdo	Moderadamente de acuerdo	Fuertemente de acuerdo	Totalmente de acuerdo
()	()	()	()	()	()	()

A continuación marca con una "X" en las opciones Sí () o No () a las siguientes afirmaciones dependiendo de tu respuesta a cada una de ellas:

7. En los últimos tres meses he buscado información sobre inscripciones en preparatorias (por ejemplo: buscando información en internet, contactando directamente a alguna escuela preparatoria o hablando con algún maestro/psicólogo en mi escuela sobre opciones para estudiar la preparatoria).

Sí No
() ()

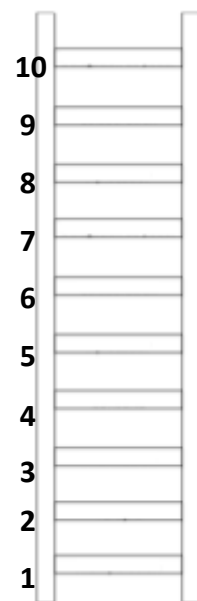
8. Al menos un integrante de mi familia se ha graduado previamente de la preparatoria.

Sí No
() ()

9. La mayoría de mis amigos o compañeros de generación se inscribirán en una escuela preparatoria al graduarse de la secundaria.

Sí No
() ()

10. Finalmente, mira el dibujo de la escalera e imagina que hasta abajo, en el primer escalón, se encuentra la gente más pobre y hasta arriba, en el escalón 10, se encuentra la gente más rica. Marca con una “X” en qué escalón sientes que estás tú ahora.



-----Fin del Cuestionario -----

APPENDIX B

Identifying the Degree of Social Lag per Colony/Community

Degree of Social Lag

In order to have as much information as possible of social development indicators at more specific levels of territorial disaggregation, the CONEVAL uses the stratification of the Basic Geostatistical Areas (AGEB by its Spanish acronym) of the urban localities of the country in three Degrees of Social Lag, based in the information available from the National Institute of Statistics and Geography (INEGI).

According to the INEGI definition, an urban AGEB is a geographical area occupied by a set of blocks perfectly delimited by streets, avenues, walkways or any other trait of easy identification in the land and whose land use is mainly housing, industrial, services, commercial, etc., and are only assigned to the interior of the urban localities that are those with a population greater than or equal to 2,500 inhabitants.

The estimated Degrees of Social Lag at the AGEB level are High, Medium and Low and they are calculated using the information available from the Population and Housing Census made by the INEGI.

The Degree of Social Lag is estimated using 14 variables that are related to those that are considered in the measurement of poverty (see Table 6).

Table 6. Relationship between indicators associated to the measurement of multidimensional poverty and the estimation of the degree of social lag.

Indicator associated to the measurement of multidimensional poverty	Variables for the estimation of the Degree of Social Lag
Education Lag	1. Percentage of population of 15 years and more who is illiterate 2. Percentage of population of 6 to 14 years old who does not attend to school 3. Percentage of population of 15 and more who has not completed basic education 4. Percentage of population of 15 to 24 years old who does not attend to school
Access to Health Services	5. Percentage of population without access to health services
Housing Quality and Space	6. Percentage of houses with dirt floor 7. Percentage of people living in overcrowded housing
Access to Basic Housing Services	8. Percentage of houses without toilet. 9. Percentage of houses without piped water connected to the public network 10. Percentage of houses without sewage 11. Percentage of houses without electricity
Income (house assets)	12. Percentage of houses without a washing machine 13. Percentage of houses without a refrigerator 14. Percentage of houses without telephone

Source: CONEVAL (n.d.)

The full methodology used by the CONEVAL to estimate the degrees of social lag per AGEB can be found in the following link:

https://www.coneval.org.mx/Medicion/IRS/Paginas/Rezago_social_AGEB_2010.aspx

Identification of Degree of Social Lag per colony

The information regarding the degree of social lag per AGEB published by the CONEVAL does not include names of colonies. Instead, each AGEB is identified with an alphanumeric code, created by the INEGI to identify each one of the 51,034 AGEBs across the country. The city of León, Guanajuato, is divided in 524 AGEBs.

Using the [Digital Map](#), a digital tool published online by the INEGI, it is possible to search colonies by their names. After searching for a name, the Map shows its location and a 13 digits alphanumeric code. Each one of these codes is divided in four parts: State Number, Municipality Number, Locality and AGEB.



Fig 4. Example of identification of AGEB using INEGI's Digital Map.

Once the AGEB code is located in the Map, it is possible to identify the degree of social lag in the data set published by the CONEVAL.