Behavioral Characteristics, Stability of Preferences and Entrepreneurial Success

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1.   Introduction

Behavioral characteristics of individuals such as preferences towards risk, time, competition etc. and non-cognitive traits like confidence, perseverance etc. have significant influence on economic decisions made by individuals. Simultaneously, research has also shown significant heterogeneity in these characteristics across countries (Heinrich *et al.* (2010); Falk *et al.* (2018)). Not only does average risk, time and social preferences vary considerably across countries, even within the set of developing nations, large heterogeneity exists it this regard. Falk *et al.* (2018) show that at the country level, there are statistically significant correlations between these preferences and other presumably exogenous variables like agricultural suitability, religion and structure of language. Importantly though, variations in these behavioral preferences is significantly correlated with economic outcomes and behaviors. For example, social-preferences have been shown to effect behavioral outcomes like pro-sociality, including trust and trustworthiness, which can have considerable influence on social and economic development. While Arrow (1972) argues that virtually every commercial transaction has within itself some elements of trust, these traits are of particular importance in environments where contracts may be incomplete, where the rule of law and the ability of courts to enforce contracts is limited. Trust or lack of trust within societies can lead to lack of social cohesion and ultimately to conflicts within the society. A good example is the poor economic performance of many African nations, which are also characterized by lack of trust in political institutions and leaders (see Nunn and Wantchekon (2011) and Acemoglu and Robinson (2012)).

At the micro (individual) level, behavioral characteristics can affect different dimensions of lives of individuals in both developed and developing countries. For example, (i) risk preferences have significant effects on occupational choices, schooling decisions and technology adoption, choosing to be enrolled in skills training programs (see, for example, Castillo *et al.* (2010), Belzil and Leonardi (2009), Liu (2013), Dasgupta *et al.* (2015)) while (ii) preference for competition have been shown to influence wage differences, educational choices, workplace choices, and influence the evolution of gender differences in the workplace (Niederle and Vesterlund (2007); Gneezy *et al.* (2009); Andersen *et al.* (2013); Flory *et al.* (2015); Buser *et al.* (2014)). At the same time research has shown that individual level difference in non-cognitive traits to be positively correlated with economic outcomes.

For example, confidence is positively associated with wage rates (Fang and Moscarini (2005)), performance in financial markets (Biais et al. (2005)), entrepreneurial behavior (Cooper et al. (1988); Camerer and Lovallo (1999); Bernardo and Welch (2001); Koellinger et al. (2007)), enrollment in programs that aid skill development (Dasgupta et al. (2015)) and can explain the persistence of intergenerational inequality in income and education (Filippin and Paccagnella (2012)).

While behavioral characteristics can influence decision-making in many spheres of life, in this chapter, we focus on one such sphere, entrepreneurship. We focus on entrepreneurship in developing countries where labor markets are characterized by low levels of formality and are generally associated with low productivity (La Porta and Shleifer (2014)). In such an environment, the formal employment sector often fails to provide enough jobs to meet employment needs of the population. Further, returns to education and experience in the formal labor market are low in developing countries relative to high-income countries (Lagakos et al. (2018)) making entrepreneurship a lucrative employment option. According to the data from the International Labor Organization, in 2018, self-employment accounted for 75% of the total employment in low-income countries.[1] This is in stark contrast to high-income countries, where self-employment only accounts for 35% of the total employment. Indeed, the distribution of the share of self-employment is skewed to the right in developing countries (with the mass of the distribution at more than 80%), it is skewed to the left in developed countries (with the mass of the distribution at less than 20%). See (ILO (2020)) All of this makes entrepreneurship a critical vehicle of economic growth in developing countries. See Kerr et al. (2017) and Frese and Gielnik (2014) for a discussion of the role non-cognitive traits in the entrepreneurial process and Åstebro et al. (2014) for a longer discussion of the behavioural economics roots to entrepreneurship.

We start by providing a brief review of literature to identify the main behavioural preferences and non-cognitive traits of individuals that affect entrepreneurial choice and success. We utilise studies conducted in both developing and developed countries, though our primary focus is on those conducted in developing countries. Second, we provide a review of experimental studies from development literature that examine the impact of standard interventions including the provision of finance and business training in improving micro-enterprise performance. We show that behavioural preferences and non-cognitive skills of entrepreneurs are often correlated with the success and failures of these

standard interventions conducted in the developing countries. Finally, we present a discussion on the stability of behavioural preferences and examine whether individuals can be trained to alter these preferences with an aim to make them better

2.   Who becomes a successful entrepreneur?

Uncovering the behavioural differences between entrepreneurs and the rest of the population has been a long-standing focus of research in business and social science disciplines. The starting point of any analysis is the assumption that the world of business venturing is riskier than paid work. Indeed, Åstebro et al. (2014), using data from the USA, providence evidence of this assumption. They show that of the businesses founded in 1996, around 50% of the businesses failed, 10 % achieved more than $1 million in sales and less that 1% made sales of $10 million or higher by 2002. This suggests that entrepreneurship tends to be low median but high variance activity: majority of entrepreneurs fail while some of them are extremely successful.

Given the inherent risk associated with entrepreneurship, a plausible starting point is to examine whether individuals with lower levels of risk-aversion are more likely to engage in entrepreneurship. The seminal work by Kihlstrom and Laffont (1979) theorizes that individuals that are most risk tolerant are more likely to be entrepreneurs, while the less risk tolerant individuals are more likely to get into paid employment. Similarly, their work also predicts that individuals with higher risk tolerance are expected to be more successful once they enter entrepreneurship. A significant amount of research has been conducted to test these predictions.

2.1   Choosing to become an entrepreneur

Let us start by looking at studies that investigate the role of risk on entrepreneurial choice. These studies can be divided into three categories on the basis of how risk is measured. The first set of studies elicit risk-preference using behavior in other domains of life and correlate that with choice of self-employment (as a proxy for entrepreneurial choice). For example, Hvide and Panos. (2014) use individual level administrative data on stock market participation, fraction of wealth invested in stock markets and type of stock portfolio to measure risk tolerance and show that their measure of risk tolerance is correlated with choice to be self-employed . The second set of studies compare entrepreneurial choice and hypothetical risk preferences measured later in life (longitudinal data) and

find a positive relationship between choice to become self-employed and risk tolerance (Ahn (2010); Cramer *et al.* (2002)). While some of the studies in these two sets find a positive relationship risk tolerance and enterprise choice, the literature is quite inconclusive. See Parker (2009) for a discussion.

One of the problems with survey measures which elicit risk preferences is that these measures might pick up other dimensions of behavior that are correlated with a person's risk-preference in addition to the actual risk-preference. For example, survey questions may ask an individual to indicate what their self-perception of their risk is across many different dimensions of life. While answers to these questions are informative about risk-preferences, they are not incentive compatible. Incentives provided in experimental elicitation of risk ensures participants reveal their true preference, hence, reducing the noise associated with measurements. We discuss the relative advantages and disadvantages of risk preferences elicited using survey versus experimental methods in Section 4.1.

In the entrepreneurship literature, there are a number of studies which utilize experimental tasks to elicit risk preferences to investigate whether these preferences differ across entrepreneurs and non-entrepreneurs. Holm *et al.* (2013) utilize a multiple price list technique to elicit risk aversion based on Holt and Laury (2002).[2] Their sample consists of 700 entrepreneurs and 200 non-entrepreneurs in China. They find that entrepreneurs are no more likely to have higher tolerance for risk relative to non-entrepreneurs. List and Mason (2011) elicit risk preferences of 29 CEOs and 101 students in Costa Rica and show that risk preferences do not vary significantly across these two groups.

An alternative explanation for entrepreneurial choice is that individuals who choose to be entrepreneurs are more likely to be more optimistic and/or overconfident than others. To test whether over-optimism is a factor in entrepreneurial choice, Puri and Robinson (2007) measure optimism by comparing a person's self-reported life expectancy to that of statistical tables. They show that optimists are more likely to believe that future economic conditions will improve. Further, they show that relative to regular wage earners, entrepreneurs are more likely to be optimists. In contrast to optimism, overconfidence is a concept that has many facets, one of which is over-placement: specifically how an individual rates his one's ability relative to others. Camerer and Lovallo (1999) designed an experiment to measure over-placement. In this experiment, individuals were to enter a "market" where pay-offs depended on relative ranks amongst all the entrants. In the control condition, individual ranks were

given out randomly and in the skill condition the ranking was based on performance in a trivia task. They showed that relative to the control condition, market entry was higher in the skill condition. This was despite participants predicting excessive entry in the latter treatment. They conclude that participants must be biased about the superiority of their own skills, making the entry profitable in expected terms.

The higher entry in the skills condition as in Camerer and Lovallo (1999) can also be driven by a simple preference for competition and not necessarily overconfidence, *i.e.* individuals get additional happiness from competing against others, irrespective of the outcome. To test whether entrepreneur choice is driven by overconfidence or a higher preference for competition, Holm *et al.* (2013) conduct an experiment with entrepreneurs and a relevant control group. Using a task similar to Camerer and Lovallo (1999), they find that entrepreneurs are significantly more likely to compete relative to the control group when overconfidence is controlled for. Similarly, using German subjects, Urbig *et al.* (2019) find that controlling for other factors, entrepreneurs are more likely to enter competition for the sake of competition rather than the prospect of winning it or personal development.

In summary, results of the studies examining the effect of individual preference for risk and competition, as well as related non-cognitive traits such as optimism and overconfidence, provide a more nuanced picture of entrepreneurial choice relative to the theoretical model of Kihlstrom and Laffont (1979). The studies highlight that it is not risk preferences *per se*, but preferences for competition that drive entrepreneurial choice.

Other behavioral characteristics such as time preference and trust in others have also been investigated as being potentially different for entrepreneurs. Using a sample of Danish entrepreneurs Andersen *et al.* (2014) find that entrepreneurs are more likely to be patient relative to the general population.[3] Fessler *et al.* (2004) compare trust and trustworthiness behavior of CEOs and students in Costa Rica. They elicit trust using the standard Trust game (Berg *et al.* (1995)) and gift-exchange game (Fehr *et al.* (1993)).[4] Fehr and List (2010) find that CEOs are more trusting and exhibit more trustworthiness than students. Holm *et al.* (2013) also investigate the question of trust using Chinese entrepreneurs and non-entrepreneurs and find that entrepreneurs in their sample are significantly more trusting than non-entrepreneurs.[5]

Finally, studies have also investigated the role of other non-cognitive traits on choice of entrepreneurship. One of the broader measures of non-cognitive traits is personality traits, which is measured using the Big-5 model. In this model, personality is defined on the basis of Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. Zhao and Seibert (2006) conduct a meta-analysis of 27 studies and find significant differences between entrepreneurs and managers. Entrepreneurs scored higher on Conscientiousness and Openness to Experience and scored lower on Neuroticism and Agreeableness. Managers and entrepreneurs were not different in terms of extroversion. Other measures of personality traits such as locus of control (LOC) has also been shown to influence entrepreneurial choice. For example, Caliendo et al. (2014) uses a large German household panel to investigate whether to what extent personality traits influence entry and exit decisions into and from self-employment. They find that internal LOC is one of the two personality traits that best predict entry into entrepreneurship.

2.2.   Entrepreneurship growth and success.

Now we turn to entrepreneurship growth and performance. In a meta-analysis of 60 studies, Zhao et al. (2010) show that risk-propensity is not related to entrepreneurial success. Similarly, Kessler et al. (2012) studying 227 nascent entrepreneurs find that their risk-taking preferences is not related to entrepreneurial survival. Using small scale business owners in Tanzania, Berge et al. (2015a) find that risk-preferences and time preference did not determine enterprise performance (profit and sales of firms). They also found that overconfidence did not affect enterprise performance. In fact, the only behavioral characteristics that appears to have a positive impact on entrepreneurial success is that of preference for competition. This view was further corroborated by a later study, where Berge et al. (2015b) show preferences for competition to be an important predictor for enterprise success.

Researchers have also investigated the role of personality traits on entrepreneurial performance. In a meta-study, Zhao et al. (2010) finds that conscientiousness, openness to experience, emotional stability, and extraversion are positively related to entrepreneurial firm performance. In another meta-study Rauch and Frese (2007a) identify that innovativeness and LOC are positively correlated with entrepreneurial success. For a detailed review of the role of personality traits on entrepreneurial success we direct our readers to the reviews by (Kerr et al. (2017) and Frese and Gielnik (2014).

3. Constraints on Entrepreneurship

Given the importance of entrepreneurship in the economies of developing countries a signifcant research effort has been expended recently to understand and improve micro-enterprise performance. In this section, we focus on recent research from development economics which investigate the effect of (i) access to capital and (ii) business training on enterprise success. For a broader review of the literature looking at other dimensions that affects entrepreneurship, we refer the readers to the review by Quinn and Woodruff (2019).

3.1 Access to capital.

As discussed in the introduction, self-employment in developing countries accounts a much larger share of total employment relative to developed countries. This implies that developing countries typically have more entrepreneurs and coupled with the underdeveloped nature of financial markets, potential entrepreneurs are likely to face larger capital constraints relative to entrepreneurs in the developed world. Thus, one of the main areas of research focus in recent development economics in enterprise development has been on access to external finance for entrepreneurs. The working hypothesis of most of these studies is that entrepreneurs do not have access to capital and relaxing constraints will lead to more enterprise success. These studies increase access to capital for enterprises by providing either grants or loans and measure its effect on enterprise level outcomes.

Generally, the results suggest that returns to grants (cash or in-kind) to micro-enterprises are high. For example, De Mel *et al.* (2008) show that providing microenterprises in Sri Lanka with $100—$200 grants led to an average return of 5.7% per month, which was much higher than the prevailing market interest rates. In a follow up survey, they investigated the long-term effects of these grants and found that the firms that received grants were 10 percentage points more likely to survive (De Mel *et al.* (2012). McKenzie (2017) examined the effect of grants on survival for larger enterprises and found that these grants also led to increases in enterprise survival and likelihood of them hiring more workers. However, the positive effects of access to capital *via* grants on enterprise outcomes does not replicate when grants are replaced by micro-loans. In a review of six randomised evaluations, Banerjee *et al.* (2015) conclude that microloans have modest positive, but not transformative, effects on business growth for the average borrower. According to a review conducted by Quinn and Woodruff (2019), the

discrepancy between behaviour under loans and grants can be related to sub-optimal choices made by borrowers who are faced with constraining repayment schedules or the terms under which microloans are made (for example group-lending). Nevertheless, improving entrepreneurial success via grants is extremely capital intensive and as a result may be difficult for policymakers to fund. Given this reality, policymakers have investigated other ways to address the issue of enterprise development. One such way is training potential entrepreneurs to develop skills so that they can take advantage of financial opportunities (like loans) to become successful.

3.2   Access to skills-based business training.

Identifying potential entrepreneurs is not an easy task. This is because many of the traits that are associated with successful entrepreneurship are unobservable. A way in which researchers have tried to tackle this issue is by providing training to potential entrepreneurs to build entrepreneurial skills. In a review article, McKenzie and Woodruff (2013) investigate the role of management practices (marketing, stock-keeping, record-keeping and financial planning) in determining performance of small firms in developing countries. They find that these practices can predict success across firms and also find that better business practices lead to higher survival rates and faster growth in sales.

A plausible starting point for training interventions is to provide potential entrepreneurs with management skills. A review of the evidence from 16 studies was carried out by McKenzie and Woodruff (2013), where they found that class-room based standard business trainings only had modest effects on enterprise performance. However, the effectiveness of training depends on its uptake. McKenzie and Woodruff (2013) show that training programs that had larger effects on management practices led to better enterprise performance. This is echoed by the study of Bjorvatn and Tungodden (2010), who show that participation rates in training programs to be important in determining the successful translation of training to business knowledge. A way in which training can be made more lucrative is by providing more context to participants, particularly with lower levels of cognitive ability. A study conducted by Drexler et al. (2014) shows that relative to a standard accounting training, a simplified rule-of-thumb training that taught basic financial heuristics training led to improved financial practices and revenue for low-skilled micro-entrepreneurs.

4.   Stability of preferences: Evidence from Economic Shocks.

The decision to become an entrepreneur and entrepreneurial success are both moderated by behavioral preferences and non-cognitive traits. It is therefore plausible that individuals, possessing certain preference and traits are more likely choose to become entrepreneurs and become successful entrepreneurs. They are also more likely to benefit from skills training by translating the new skills acquired to newer business opportunities. In a study conducted in Tanzania, Berge *et al.* (2015b) show that both male and female entrepreneurs translate their business training into better business practices. However, when business training is given in combination with access to capital (via grants), it is only male entrepreneurs who can translate them into profitable and productive investments. Female entrepreneurs appear to be unable to take advantage of the potential opportunities provided by the same human capital and financial capital interventions. The authors argue that the significant behavioral differences elicited by lab-in-the-field experiments between male and female entrepreneurs in risk and tolerance for competition can provide potential explanations for this gender difference.

Given the critically important role of behavioral preferences and non-cognitive traits on entrepreneurial choice and success, an important question is whether behavioral preferences and personality traits are malleable. If they are indeed malleable, appropriate interventions can be designed to train individuals to develop them resulting in better stock of potential entrepreneurs in the population *via* policy intervention. In the next two sections, to investigate malleability of behavioral preferences and personality traits: we first review the literature on preference stability in response to major life events (both positive and negative) in developed and developing countries. We follow that with a review of recent studies that investigate whether individuals can be trained to develop certain personality traits that are important for entrepreneurship.

4.1   Shocks and Changes in Preferences

Traditional economic theory has typically assumed that preferences are stable over time. Indeed, without this assumption we are unable to relate changes in opportunity sets and changes in optimal choices. In particular, if preferences are themselves endogenous, they can be affected by policy choices and hence by changes in opportunity sets. While this assumption of stable preferences has been a *given* in neo-classical economics for more than a century, in recent years there is a developing strand of the literature that seeks to investigate the validity and plausibility of this assumption. This literature has

used life-changing events and the responses to such events to understand whether preferences are stable or whether they are endogenous, mutable and open to modifications.

Chuang and Schechter (2015) provide an excellent summary of the literature on stability of preferences (see Tables 1 and 2, Chuang and Schechter (2015)), for a summary of the literature on stability of risk and time preferences respectively). Using panel data from Paraguay they examine the question using two alternative approaches: a survey based approach that uses a social preference survey and also using experimental measures of risk and time preferences. They find that survey based measures of social preferences are stable over long periods of time in the data. Not so with the experimental measures, which are not stable over time. The lack of temporal correlation in the experimental measures of risk and time preference from developing country samples (see also Dohmen et al. (2011)), could be driven by both behavioural biases and low levels of cognitive skills that often characterise the population of developing countries.

Overall in the absence of changes in opportunity sets, there is actually no reason to believe a rational, utility maximizing individual will exhibit temporal variation in preferences. Therefore, to understand whether preferences are stable, the literature has focussed on the effect of shocks on preferences. Chuang and Schechter (2015) study the correlations between preferences and changes in incomes, thefts and health in the past year. They do not find any systematic evidence of shocks being correlated with changes in preferences. Of course, given that the shocks considered are not exogenous, one needs to be careful in interpreting these results. In particular, the shocks could themselves be the consequence of the preferences of the individuals.

To examine whether changes in the economic environment affects preferences, the literature has increasingly used life-changing exogenous events. This has often taken the form of natural hazards and calamities. There are different ways in which natural disasters can affect individual preferences. For example, events like tsunamis, floods, earthquakes, cyclones and hurricanes can make individuals more aware of these life changing events and possibly make their life expectancy lower. In consequence, those experiencing such shocks can become less risk averse and more impatient. On the other hand, individuals affected by such shocks could benefit from the generosity of those around them and this in turn could induce individuals to become more pro-social, more trusting and more

trustworthy. It is, however, not clear the mechanism through which this happens. The psychology literature argues that a particular type of emotion triggered by the negative shock can affect individuals' risk preferences (see, for example, Leith and Baumeister (1996), Lerner and Keltner (2001), Loewenstein *et al.* (2001)).

Additionally, it is also not clear whether the effects are homogeneous by gender and the type of emotion. For example, it has been argued that anger makes males less risk averse and disgust makes female more risk averse (Fessler *et al.* (2004)). If shocks trigger different types of emotions in men and women, the effects of such shocks on preferences (both in terms of magnitude and direction) might also differ by gender.

4.1.2 Evidence from Developed Countries

The question of whether such natural hazards affect preferences is not restricted to developing countries. Indeed, some of the earlier papers examined this question using data from developed countries. Eckel *et al.* (2009) examine the risk preferences of the victims of hurricane Katrina, one of the deadliest hurricanes ever to hit the United States. Almost 2000 people dies as a direct consequence of the hurricane and millions of others were left homeless in New Orleans and the Gulf Coast of the US. Many of the victims of the hurricane were evacuated and in particular a number were provided accommodation in Houston. Eckel *et al.* (2009) consider three samples: recent evacuees to Houston, shortly after the hurricane (Wave 1); a similar sample of Katrina evacuees, one year after the event, when they were considerably less stressed (Wave 2); and finally, a sample of long term residents of Houston matched in terms of observables, but not exposed to the traumatic conditions experienced by the Katrina evacuees (Wave 3). The last two groups participated one year after the event, with the Wave 3 subject acting as a Control group. They identify evolution of risk attitudes among the different waves of post-hurricane refugees, and in particular find that those in Wave 1 were less risk averse.[6] However, it is not clear that the results can be interpreted as a causal impact of the shock, since the characteristics of the evacuees in Waves 1 and 2 were different and this could be a potential confounding factor in attempting to explain the observed differences in risk attitudes between the two groups.

Page *et al.* (2014) examine risk taking behavior of individuals who suffered from considerable losses arising from floods. Specifically, they use the Brisbane floods of January 2011 as the setting for

their natural experiment. These floods, resulted in significant damage and in particular caused substantial damage to homes. The authors compare the risk-taking behavior of individuals affected by the flood (homes below the flood line – what they call the treatment group) and those not affected by the flood (homes above the flood line – what they call the control group). See Page *et al.* (2014), Figure 1. These two groups are similar in terms of other observable characteristics, in house values and in terms of long term flood risks (the last major flood in Brisbane was in 1974). Individuals sampled were offered the choice between a safe asset (a voucher worth $10) and a risky gamble (a lottery scratch card, potentially worth half a million dollars, but having a face value of $10) as a remuneration for taking part in the survey. Their results show that individuals who were affected by the flood were significantly more likely to accept the risky gamble compared to their unaffected neighbors. However unlikely, the risky gamble presents the possibility of breaking even by cancelling previous losses and the findings are consistent with prospect theory predictions regarding the adoption of a risk-seeking attitude after a loss.

One potential criticism of the approach adopted by both Eckel *et al.* (2009) and Page *et al.* (2014) is that the data on preferences is available after the event and not before. This is especially the case for natural disasters because researchers cannot anticipate where natural disasters will occur. They use innovative methods to obtain control groups, so that the effects of shocks on preferences can be interpreted as being causal. However, evidence using data after the event is open to selection bias, arising from potential migration and attrition from the sample of individuals with specific characteristics: for example, it is feasible that individuals who are more risk averse might be excluded from the sample after the event. Hanaoka *et al.* (2018) examine whether individual's risk preferences change after they have experienced a major shock, in this case the 2011 Japan earth quake. Importantly they use panel data from representative household surveys that measure preferences of the same individuals both before and also one and five years after the earthquake. They examine whether individuals who live in regions where the intensity of the earthquake was greater report greater risk aversion or risk tolerance relative to those that live in regions whether the intensity of the earthquake was less.[7] Given the data availability, they also examine whether the effects persist over time and also examine heterogeneity of effects by gender. Indeed, their results clearly show that gender matters. Men

are less risk averse than women (pre-shock, consistent with the existing literature (Eckel and Grossman (2008))) and exhibit a stronger decline in risk aversion after the shock. The change in risk preferences for males are persistent: males who experience shocks of greater magnitude exhibit lower degree of risk aversion not just immediately after the earth quake, but also five years after. Risk preferences as we know have significant effects on economic behavior (including occupational choices, schooling decisions and technology adoption (see, discussion in Section 1) and a natural shock as an earthquake, by altering an individual's risk preferences can have very fundamental effects on economic outcomes of those affected.

4.1.3   Evidence from Developing Countries

Residents of developing countries are more than 10 times more likely to be affected (in terms of mortality and also in terms of economic impacts) by natural calamities. Additionally, factors such as population pressures and infrastructure development in risk prone areas have possibly increased the exposure risk and also the risk of loss and damage due to natural disasters. Understanding how these shocks affect preferences of individuals in developing countries is therefore of crucial importance. The environment in developing countries is unique and this makes it important to examine whether and how individuals are affected by these life changing events (including natural disasters) in these countries.

In recent years a number of papers have examined the effect of life changing events on preferences using lab-in-the-field experiments and surveys conducted in developing countries. While the use of experiments is open to the criticism that experimental results are affected by cognitive and behavioral biases (see Chuang and Schechter (2015)), the lack of systematic survey data on preferences targeted towards answering this question means that lab-in-the field experiments are possibly the only way in which we can collect data on preferences.

The question of how exposure to natural disasters changes perceptions to risk is an important question. If exposure to natural disasters alters the perception of individuals towards the riskiness around their environment, then we might see individuals exhibiting greater risk aversion after experiencing a natural disaster. On the other hand, in the presence of migration it is possible that those remaining in the geographical location after the disaster might be positively selected in terms of their risk preferences and exhibit greater tolerance for risk. Alternatively, those in the high-risk environment

might be less concerned about smaller risks and thus exhibit behavior consistent with greater tolerance for risk.

Cameron and Shah (2015) investigate the relationship between natural disasters and risk preferences using experimental data from Indonesia. They utilize geographical variation in the timing of natural disasters in a region that *would* be affected by a natural disaster (earthquakes and floods): while the exact timing of the occurrence of the shock cannot be predicted with certainty, the majority of locations they sample are likely to be exposed to some form of natural disaster. Subjects participate in a risk task (similar to Binswanger (1980) and Barr and Genicot (2008)).[8] Their results show that participants from villages that experienced a flood or an earthquake in the three years previously exhibit significantly higher degree of risk aversion relative to households residing in villages that have not experienced a natural disaster. They find that the effects are persistent: natural disasters affect risk attitudes beyond the year in which they occur. Importantly, the extent of the persistence of the effect appears to vary depending on the severity of the experience and greater damage or trauma leave a deeper and longer lasting effect on the risk attitudes of individuals.

Turning to the mechanisms, Cameron and Shah (2015) argue that while the actual income loss is significant in explaining the increase in risk aversion, much of the explanation rests on how natural disasters affect beliefs: those recently experiencing a shock have a significantly higher belief of another similar shock happening soon. Given that beliefs and risk preferences can have significant effects on other dimensions of their lives, such shocks can therefore have long term effects on economic outcomes of individuals.

Brown *et al.* (2018) consider the aftermath of Cyclone Evan, which affected Fiji in 2012. They find that being struck by the extreme event changed both the risk perception and beliefs about the frequency and magnitude of future shocks. They use both survey based and experiment based measures of willingness to take risks. The main outcome variable used is average subjective annual expected losses from all natural disasters, which is derived from an experimental survey module that elicits probability distribution over future losses. They also analyze the effects of being struck by Cyclone Evan on risk aversion by analyzing individuals' willingness to take risks using an approach developed by Dohmen *et al.* (2011), where participants are asked to self-assess their general level of risk using a

survey question.[9] Brown *et al.* (2018) find that being struck by an extreme event (like Cyclone Evan) results in significant changes in individuals' risk perceptions and also their beliefs about the frequency and magnitude of future shocks. However, they also find significant heterogeneity in results by ethnicity, with one ethnic group significantly more affected than the other. Brown *et al.* (2018) find that the effects were different across population groups. Indo-Fijians but not the indigenous Fijians (Indo-Fijians and indigenous Fijians are the two main ethnic population groups) were affected by the shocks. This difference in risk perceptions along ethnic lines has the potential to exacerbate ethnic differences and inequalities.

In a recent paper Islam *et al.* (2020), using a field experiment conducted in Bangladesh examine how exposure to natural disaster (in this case Cyclone Aila, which affected large parts of India and Bangladesh) affects risk sharing behavior. In their analysis, villages that were hit with the storm surge are treatment villages, while neighbouring villages that were not affected by cyclone related flooding are control villages. Participants first had to choose from a set of alternative lotteries in a standard risk-taking game (similar to the task used by Cameron and Shah (2015) and Carvalhoa *et al.* (2016)). They were then asked to form a risk-sharing group that pools and shares the gains from the group members' gambles. Finally, participants were assigned into one of the three different information treatments and these treatments varied with respect to the level of exogenous commitments that allowed individuals to defect and whether such a defection was public or private information. They find that participants in disaster-affected areas are more risk loving, form smaller risk-sharing groups, and are less likely to defect in risk-sharing commitments, regardless of the level of exogenous commitment and information. This suggests
a strengthening of the social norms supporting risk-sharing commitments in the wake of natural disasters.

Cassar *et al.* (2017) examine the effect of the Indian Ocean Tsunami of December 2004, which followed what is now known as the Sumatra-Andaman earthquake. Specifically, they focus on how exposure to the disaster can affect trust, risk and time preferences. They conduct experiments in the province of Thailand that was the hardest hit by the Tsunami, almost five years after the Tsunami. Their experimental subject pool consisted of individuals who were affected by the tsunami and also those that

were not affected by the tsunami: experimental sessions were conducted in villages that experienced severe damages and those in nearby villages that were largely spared (Cassar *et al.* (2017), Figure 1). The tsunami was largely unanticipated and in terms of village level characteristics, pre-tsunami, villages that were affected by the tsunami were not significantly different from those that were affected by the tsunami. Subjects participated in a risk elicitation task (Holt and Laury (2002), a task to elicit preferences for time-discounting (Andersen *et al.* (2008)); and a task to elicit trust and trustworthiness (Berg *et al.* (1995)). The risk results are consistent with the literature. As with Cameron and Shah (2015), Cassar *et al.* (2017) also find that residing in a tsunami village results in a statistically significant, 20% increase in risk aversion. Importantly however, the change in behavior is driven by exposure to the tsunami itself and not on how others around them respond to the tsunami Similarly, residents in the tsunami affected villages appear to discount the future more.

Turning to the results on social preferences, Cassar *et al.* (2017) find that individuals living in a tsunami village exhibit significantly higher trust. Importantly, they also examine the mechanisms behind this increase in trust and find that this is driven, to a considerable extent, by the positive experience of receiving help from others (both private and institutional). The authors also find that individuals who experienced financial damage are more trustworthy. These results highlight the role of social capital on how a natural disaster affects preferences.

The issue of change in pro-sociality as a result of exposure to the 2004 Tsunami is also analyzed by Becchetti *et al.* (2017). Their focus is on a sample of microfinance borrowers in Sri Lanka, seven years after the tsunami hit the villages. Their focus is on generosity, as measured by a dictator game (Forsythe *et al.* (1994)). They find that being hit by the tsunami negatively affects generosity: those affected by the tsunami give less (and also expect less in return) than those not affected by the tsunami.

While the experimental evidence on changes in risk preferences in developing countries in response to extreme events is roughly consistent, the same cannot be said for patterns of other preferences. The same tsunami resulted in significant differences in pro-social behavior in different countries and in different populations.

5.   Changing Preferences through interventions

Not all life-changing events need be disasters. Indeed, any (randomized) intervention that exogenously changed the income opportunity set of participants can be viewed as a life changing event. An exogenous shock of this kind can be effectively used to investigate stability of preferences. In this context changes (or otherwise) of preferences can provide us with mechanisms to understand why certain programs/interventions are successful. We next evaluate each of these questions using a specific intervention conducted in Delhi, India (Dasgupta *et al.* (2015), Dasgupta *et al.* (2017) and Maitra and Mani (2017))

We start with some background on the specific intervention. Lack of skills (and more broadly human capital) acts as a significant barrier to the process of development and the problem is particularly severe for women. There is now increased emphasis from policy makers from around the world on developing and encouraging participation in vocational training programs, aimed at providing skills that are readily marketable. The idea is that skill training will ultimately lead to better life outcomes, including better economic outcomes. However, as we know from the fairly large literature on participation in programs that facilitate skill development, participants in such programs are not random. This leads to selection bias in the estimated effects of such programs. The solution is to randomly provide skills training to some individuals. Maitra and Mani (2017) consider the effects of participating in, and completing a vocational education program. The intervention targeted women from low-income households residing in two regions of New Delhi, India. All women aged 18—39, with five or more completed grades of schooling and residing in these specific regions were invited to apply. A randomly selected set of applications were offered the 6-month long training with the remaining acting as the control group.

Indeed, Maitra and Mani (2017) found that participation in the program (assignment to the treatment group) resulted in significant, and temporally non-decreasing effects on employment, hours worked, earnings and entrepreneurship for women. They estimate that the vocational education program increases the monthly earnings of women in the treatment group by a statistically significant 140% (over the mean for the women in the control group) in the short run and by a statistically significant 96% in the medium run. This is however only the direct effect and is possibly an under estimate of the total impact of the program, in that it does not include potential gains from network formation, access

to information and other related effects. Dasgupta *et al.* (2017) argue that the program resulted in an exogenous salient and significant change in the opportunity set for women assigned to the treatment group.

In addition to collecting data on labor market outcomes, a random subset of all applicants to the program were invited to participate in a lab-in-the-field experiments both before and after the training program. The first round of experimental sessions (pre-training session) were conducted after the application process was complete but before the outcomes of the randomization process that defined assignment to the program (treatment or control group) was revealed, i.e., participants in the experimental sessions did not know whether they had been assigned to the treatment group. This was done in order to avoid biases in the choices made that could arise from knowing one's treatment status. Individuals who participated in these pre-training sessions (both from the treatment group and the control group) were invited to participate in a second round of lab-in-the-field sessions (post-training sessions), six months after the training program had finished. While there was attrition (of the 146 women who participated in the pre-intervention sessions, 121 participated in the post-intervention sessions), there is no statistically significant difference in the attrition rates between the treatment and control group. In both sessions individuals participated in a set of experimental tasks, which enables the authors to obtain data on competitiveness, risk preferences and confidence of these women.

Data collected before and after the intervention, therefore, enables an examination of whether preferences are stable, given an exogenous change in the opportunity set. Indeed, Dasgupta *et al.* (2017) find that after accounting for the change in the income opportunity set, the elicited preferences indeed appear to be temporally stable, providing support to a representative agent model of decision-making with temporally stable preferences.

Continuing with the intervention discussed above, one added advantage of lab-in-the-field experiments is that they can help understand the mechanisms as to why some programs are successful. Recall, as Maitra and Mani (2017) show, training resulted in significantly improved labor market outcomes. The question is: what drove this improvement? Was it skills (as one would like) or was it changes in other intrinsic characteristics that could potentially contaminate the impacts of training. It is important question, because we otherwise get biased estimates of the program.

Maitra and Mani (2017) consider the effects of program participation (assignment to the treatment group) on four behavioral characteristics: risk preferences, competitiveness, self-confidence and relative rank. They find that training does not result in any changes in any of the behavioral outcomes considered, a result that is consistent with Dasgupta et al. (2017). These results suggest that changes in skills as opposed to changes in preference drives the program effects.

While the goal of the above-mentioned research was not to change preferences *per se*, there is a set of recent papers that has investigated the question of changing preferences through mindset interventions. These interventions typically involve training individuals to develop mindsets that are associated with career or entrepreneurial success. One example includes the work by Campos et al. (2017), who train individuals into taking personal initiatives (defined as *a self-starting, future-oriented, and persistent proactive mindset*) and measure its impact on enterprise success. In a trial conducted with 1500 microenterprises in Togo, Campos et al. (2017) show that training personal initiatives led to 30% increase in profits 2 years after the intervention was administered. This was significantly higher than a statistically non-significant 11% increase in profits due to traditional class-based training. More generally, there is now a growing body of literature which shows that teaching individuals non-cognitive interpersonal traits can lead to better outcomes. For example, Ashraf et al. (2020) show that training school girls in Zambia to negotiate allows them to attain better school outcomes for themselves by strategically cooperating with their parents.

While training non-cognitive skills and mindset training can lead to better outcomes, RCTs often do not explicitly examine the behavioral channels through which changes occur. This is where lab-in-the field experiments can be very useful. Given the importance of behavioral characteristics in explaining selection into entrepreneurship and also success there-in, experimental tasks can be used to elicit whether mindset trainings indeed effect individual preferences. A template for using experiments to elicit preferences before and after an intervention is provided by Dasgupta et al. (2017), which is discussed in detail in section 4. Further, more novel tasks can be built to measure changes in personality traits that mindset trainings try to address. For example, Alan et al. (2019) administer grit training on school children in Turkey. Grit (see Duckworth et al. (2007), Duckworth (2018)) is a non-cognitive skill that measures a person's ability to bounce back from failure. It has been shown to be highly

predictive of achievement. Alan *et al.* (2019) design a novel experiment using two real-effort tasks, where one of them was more difficult than the other. Lack of grit is measured by the propensity to switch to the easier task in response to failure in completing the harder task. To examine whether grit training actually worked, they investigated behavior of individuals in their control and treatment groups. They found that children in their treatment group were less likely to switch to the easy task relative to the children in the control group. Further, using follow up administrative data, they show that grit training lead to students achieving higher math test scores.

6.   Conclusion

It is now well accepted that the behavioural characteristics and preferences of individuals can affect decisions in a many sphere of lives. In this chapter, we focused on one such sphere, entrepreneurship and discussed how behavioural preferences and non-cognitive traits affect choices to become an entrepreneur and determine enterprise success. We discussed the stability of preferences in response to negative and positive economic shocks. We show that under certain circumstances, individual preferences are malleable. Most importantly, we show that individuals can be trained to develop mind-sets or change preferences that allows them to achieve better outcomes in their careers or businesses. We finally provide examples of how lab-in-the field experiments can complement training interventions to explicitly examine the behavioural channels through which changes occur.

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Endnotes:

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[1] Self-employed workers are those workers who, working on their own account or with one or a few partners or in cooperative, hold the type of jobs defined as "self-employment jobs." i.e. jobs where the remuneration is directly dependent upon the profits derived from the goods and services produced. Self-employed workers include four sub-categories of employers, own-account workers, members of producers' cooperatives, and contributing family workers.

[2] Holt and Laury (2002) use a multiple price list format where participants are presented with a list of 10 decisions. In each decision, they are asked to choose between two paired gambles (Option A and Option B) of different relative risk. The two gambles for each decision are stacked in rows. Across the 10 decisions, the payoff associated with each of the gambles remain the same, the only thing that varies is the probabilities associated with each of the payoffs within the gambles. In the first row, there is only a 10% chance of getting the high payoff for each gamble, and the expected payoff of the gamble in Option A is greater than that in Option B: only a very risk-seeking individual would choose Option B in the first decision row. As we move down the rows, the probability of the high payoff increases for each of the gambles, and by the last decision the choice is between a smaller amount with certainty in Option A and a larger amount with certainty in Option B. Assuming rationality, the participants should be choosing Option B in this decision irrespective of risk preferences. Generally, most people will start choosing Option A and switch to Option B as we move down the list. The switch point is used as a measure of the individual's risk preference.

[3] Time preferences are elicited using the approach developed in Andersen *et al.* (2008). Participants are provided with pay-off tables at symmetric intervals. In each interval participants are provided with two options to choose from: Option A pays out and amount immediately and Option B pays out the amount in Option B with additional rate or return between 5-50% in the future.

[4] The Trust game (Berg *et al.* (1995)) is a two-person game. One person is the sender (or the first mover), the other is the receiver (or the second mover). The sender is provided with an endowment from which they can transfer an amount to the second player. The amount transferred is tripled by the experimenter, *i.e.* for every $1 transferred the receiver (second mover) receives $3. The receiver then decides how much of the amount transferred they want to return. The choice of the first player is interpreted as a measure of Trust and the choice of the second player is interpreted as a measure of trustworthiness. The gift exchange task (Fehr *et al.* (1993)) is also a two-person game and is often used to capture reciprocity in labour market relations. The two players are often categorized as the employer and the employee. The first mover (employer) has to decide first, whether to award a higher salary. Then, the decision of the second mover (employee) about putting extra effort follows. Gift-exchange games are also used to study reciprocity.

[5] To elicit trust in this study, each participant is presented with 10 choice tasks using a multiple price list format. In each task, participants are asked to choose between a socially- risky option (payoff determined by the choice of another player) and a risky option (payoff determined by a standard lottery). Across the 10 options the relative attractiveness of the socially- risky option *vis a vis* the risky option is systematically varied and the switching point at which the participant prefers the risky option over the socially-risky option is used to measure their trust in others.

[6] Participants are presented with a set of 6 gambles (or lottery choices) that involve a 50/50 chance of winning a low prize or a high prize. The gambles are designed so that they increase in expected payoff and risk (standard deviation), and the relationship between expected payoff and risk is linear for all but the last gamble. See Eckel et al. (2009), Figure 5 for the payoffs associated for the 6 lottery choices.

[7] The measure of risk preferences is elicited from a hypothetical lottery question in the Japan Household Panel Survey on Consumer Preferences and Satisfaction (JHPS-CPS), the main data set used in the paper. Respondents were asked about their willingness to pay for a hypothetical lottery with a 50 percent chance of winning JPY 100,000 (US$1,000) or nothing otherwise.