Perceived Self-Efficacy, Poverty and Economic Development

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ABSTRACT Traditionally focused on external constraints, economists are increasingly recognizing the importance of internal constraints that reflect perceptions as much as reality. Perceived self-efficacy (PSE) – individuals' perception of their domain specific capabilities – fundamentally shapes these internal constraints and thereby drives economic behavior. Without sufficient PSE, there is little reason to try harder or attempt anything new. Individuals with higher PSE set more ambitious goals, exert more effort and persist more diligently. Such proactive engagement in perceiving and creating possibilities is often ignored or implicitly assumed in simple optimization models. Growing evidence from psychology and economics suggests that PSE deserves careful attention. We review this theoretical and empirical literature on PSE with a focus on its relevance to our understanding of poverty and economic development. We discuss promising avenues for future research at the interface of PSE and poverty as part of the broader frontiers of behavioral development economics.

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Content

1. Introduction

In *Moving Out of Poverty*, Pritchett and Kapoor (2009) report an interview with a successful vegetable trader from Thailand. Her reflections on her success provide a nice point of departure for this review.

> *"I have more confidence. When I put my heart into doing something and think that I can do it, and then am able to do it, there is more confidence […] Don't do things halfway or in between. When you are committed to doing something, do it. Some people do trade half-heartedly and quit. To be in trade, one needs determination, concentration, perseverance"* (Pritchett & Kapoor 2009, p.128).

The way this Thai vegetable trader uses the term "confidence" is virtually indistinguishable from perceived self-efficacy (PSE): *"the beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments"* (Bandura 1997, p.3). While this concept was first formalized by Albert Bandura (1977), its essence has been understood by great leaders and inspiring individuals for centuries. Consider, for example, this statement by Mahatma Ghandi:

> *"Man often becomes what he believes himself to be. If I keep on saying to myself that I cannot do a certain thing, it is possible that I may end by really becoming incapable of doing it"* (Deats & Jegen 2005, p.108).

Of course, there is another side of the PSE ledger: if high PSE motivates, then low PSE can even demotivate and demoralize. Wuepper and Drosten (2016) and Wuepper and Sauer (2016), for example, show how individuals can internalize external constraints. Individuals who were not capable of something in the past due to external constraints are less likely to be capable of it in the future – even when circumstances, constraints and incentives change. These low PSE dynamics reflect a version of learned helplessness (Maier & Seligman 2016).

PSE fits to the growing interest of economists to consider concepts from psychology, sociology, and anthropology, as exemplified by economic models on identity (Akerlof & Kranton 2000), confidence (Compte & Postlewaite 2004), and self- motivation (Bénabou & Tirole 2005). PSE affects the aspirations of people, how hard they try to achieve their goals, how they feel in the process, and how persistent they try (Bandura 1977, Bandura 1997, Bandura 2012). As such, it can be of high relevance to economics, and especially development economics, as recently argued by Alkire (2005), Carter (2015), and Lybbert and Wydick (2016a).

To further introduce PSE and its effects on human behavior, consider two experiments. First, Weinberg et al (1979) studied individuals in an athletic competition who were given different beliefs about their competition. The control group was informed that they were competing against professional athletes, which was true. This lowered their aspirations because they expected to

lose, which in turn lowered their motivation. The treatment group was informed that they were competing against individuals who recently recovered from an injury, which was not true. This increased their aspirations and expectations of their ability to win, which in turn motivated them to try hard. As a result, the treatment group performed significantly better than the control group. Clearly, however, beliefs alone do not an athlete make – and both control and treatment individuals lost. In the second round of competition, the performance gap between control and treatment individuals grew because the two processed the first round experience very differently. While the treatment group believed they just had not tried hard enough the first time and increased both their effort and performance, the control group was quite sure now that they had no chance to win and further decreased their effort and performance.

This experiment, while insightful, has limitations that risk confusing rather than clarifying the concept of PSE. First, PSE is concerned with challenges requiring the complex orchestration of one's skills, whereas the experimental task was very simple. Second, by design the treatment group was deceived into overconfidence that was not an accurate assessment of relative abilities, which is different than having high PSE. Third, the competition offered a winner-take-all format, which is not representative to many real life situations where PSE might shape behavior of the poor.

The second experiment addresses these limitations. Bandura and Wood (1989) recruit individuals to manage simulated companies with payoffs as a linear function of performance. The PSE of the individuals was manipulated by giving them distinct descriptions of the controllability of the companies. Individuals had to set goals for their companies and make complex management decisions. As hypothesized, subjects with high induced PSE set more ambitious goals, showed better managerial skills than the control group, and experienced less stress and negativity, which improved cognitive capacities (Bandura & Wood 1989). Thus, companies managed by individuals with high PSE outperformed companies managed by individuals with low PSE.

There is a large collection of similar research in psychology, showing similar results (Bandura 1997, Maddux 2009, Schwarzer 2014). Most of this work is based in urban areas of developed countries (primarily, the U.S.). Development economists are beginning to extend this work to developing countries and the poor in rural and semi-urban areas. Given the starkly different production and consumption circumstances of individuals in these settings, promising contributions are beginning to emerge. Moreover, as part of the broader frontiers of behavioral development economics, research into the causes and effects of PSE among the poor is generating insights that are relevant to the design of future development policies, programs and interventions.

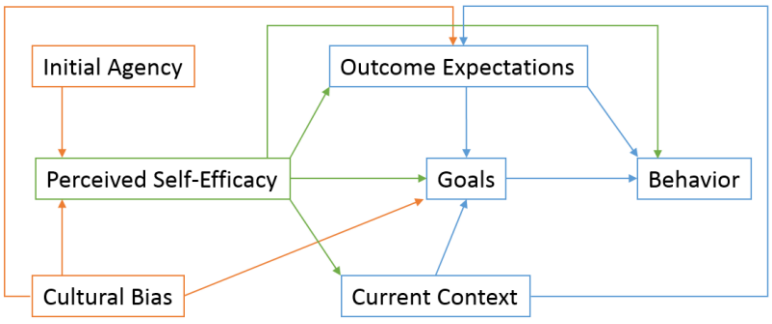
2. Concept

PSE is closely related to other familiar concepts, but distinct in some important ways. Given these similarities and the important if nuanced differences, there is frequently confusion about what PSE is and what it is not (Anderson et al 2016, Maddux 2009). Often, these concepts are not precisely defined and used interchangeably. This section explores PSE in greater detail in order to clarify the concept and distinguish it more clearly from others.

PSE was first developed by psychologist Albert Bandura (1977) as part of the larger social cognitive theory (Bandura 1986). Since the 1970s, the concept of PSE has been further developed and refined (Bandura 1986, Bandura 1997, Bandura 2012, Maddux 1995, Maddux 2009, Pajares 1997, Pajares 2002, Schwarzer 2014). As an alternative to the idea that individual behavior is entirely a response to external circumstances, this underlying framework sees individuals as proactive, self-reflecting, self-regulating, and motivated by subjective assessments of their own capabilities (Bandura 1997). This reasoning is related to the work on hope by Charles Snyder (1994), which builds *inter alia* on perceived agency (PA), fate control and locus of control as developed by Coleman (1968) and Rotter (1966) (Anderson et al 2016).

In contrast to more general concepts, PSE is domain-specific such that most individuals have high PSE in some domains and low PSE in others. Within a given domain, the degree of PSE has real and measurable effects. Individuals with high PSE aspire higher, try harder, persist longer, and feel less anxious about these attempts. Thus, the PSE concept connects naturally to the emerging economic literature on aspirations (Dalton et al 2016, Genicot & Ray 2014, Guyon & Huillery 2016), and grit (Duckworth et al 2007) and "non-cognitive" skills in general (Cunha et al 2010, Heckman & Kautz 2012, Heckman et al 2006), which largely reflect PSE (Bandura 1997, Pajares 2002). As a depiction of the different pathways by which PSE influences behavior, Figure 1 shows how PSE affects how individuals perceive their current context, their outcome expectations, goals, and behavior. In this heuristic, PSE is itself a function of initial agency and a cultural bias.

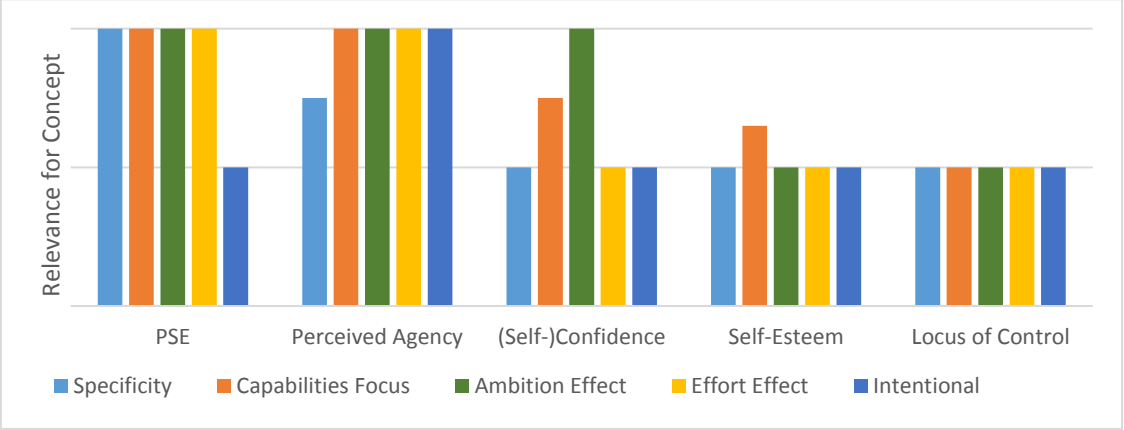
Figure 1. The Concept of Perceived Self-Efficacy



An important question is how PSE differs from competing concepts. To begin with, it is important to show that PSE differs from actual capabilities. To add explanatory power to economic research, PSE must be defined as a cognitive bias. Such a bias can stem from cultural evolution, i.e. individuals learn from their parents what they learned from their parents, and do not individually investigate how much potential they actually have. In many developing countries, earlier generations were more constrained than later ones, but this is not necessarily perceived by the individual, depending on the extent of individual learning versus imitation of social peers (Richerson & Boyd 2008).

As an empirical matter, defining and measuring PSE as distinct from related traits and attributes can be challenging. Often, the distinction between PSE and related concepts such as self-confidence, locus of control, and self-esteem is not sharp, which raises specific identification challenges in empirical analysis. Even in an experimental setting with greater control, these concepts typically have very similar statistical relationships with behaviors and outcomes, which implies a role for theory to offer distinctions and inform interpretations. While one cannot ignore the inherent correlation between these concepts, we offer one way to compare and contrast them along six dimensions in Figure 2.

Figure 2. Stylized distinction between PSE and related concepts



Often, PSE and perceived agency (PA) are used interchangeably. However, PA is slightly less specific and implies an intent to act (Drosten 2016, Rand & Cheavens 2009). As a consequence, perceived agency can increase anxiety (Fernandez et al 2015) whereas PSE can reduce it (Bandura 1997). Mostly for linguistic simplicity, many authors call PSE confidence. This term, however, can mean a range of different things and is often rather a characterization of a person, instead of being a domain-specific belief about capabilities (Bandura 1997). There are other reasons than one's perceived capabilities to be confident (e.g. underestimating the challenge). Also, a person might be generally confident but have low PSE in specific domains. Even though the concept of generalized self-efficacy has been proposed (Schwarzer 2014), it is especially the domain-

specificity that makes PSE so useful in explaining behavior and outcomes (Bandura 2012). Some authors use the term "confidence in one's abilities" with reference to domain-specific applications (Compte & Postlewaite 2004), which is essentially indistinguishable from PSE. In contrast, self-esteem is concerned with individuals' judgement of self-worth, which can be highly correlated with one's PSE. It is often observed, for example, that raising PSE also raises self-esteem (Gardner & Pierce 1998, Lane et al 2004). On the other hand, self-esteem and PSE need not be so highly correlated: increased self-worth does not necessarily translate into domain-specific confidence in one's abilities.

Locus of control (LoC) captures whether individuals feel to be generally in control of their life, which can have many reasons. However, also LoC can be domain-specific, and if the domain is challenging, it is a close proxy for PSE. In general, having an external LoC is often associated with low PSE and having an internal LoC is often associated with high PSE (Bandura 1995). Individuals with low PSE often tell themselves that their capabilities do not matter, to protect their confidence and self-esteem (Bandura 1997). Perceiving that outcomes are not affected by one's actions also lowers PSE (Bandura & Wood 1989).

An important question is whether PSE is a fixed personality trait, an acquired skill, or something in between (Cunha et al 2010). According to Bandura (1997), the main origins of PSE are (1) One's family, (2) one's social peers, and (3) school. The mechanisms are (a) one's own past experiences, (b) the observed experiences of social peers, (c) emotions, and (d) persuasion. Especially interesting from a policy perceptive are schools. Here, social inequality can be addressed especially effectively at an early point in individuals' lives. In schools, children receive critical feedback on their capabilities and problem solving skills, in absolute terms and relative to their peers. Thus, schools have the power to build up or destroy PSE, in general, and distinctly for individuals from different backgrounds (Oettingen 1995).

This has also implications for well-intended policies, such as affirmative action. If formerly discriminated individuals have low PSE, they may need more than just the removal of external

constraints[12] (Hoff & Pandey 2006, Hoff & Pandey 2014). In such cases, internal constraints may hamper performance as much as these external constraints. Only making opportunities available for individuals with low PSE, without additional support, can easily lead to a reinforcement of negative stereotypes (of and about the group).

To express the development of PSE in economic terms, we can use e.g. Generalized Bayesian Learning, such as proposed by Just (2002):

$$PSE_{ijt+1} = \frac{{PSE_{ijt}}^{P} l(\pi_{it}, \pi_{-it}, \xi_{it}, \kappa_{-it} | c_{it})^{U}}{\int_{-\infty}^{\infty} {PSE_{ijt}}^{P} l(\pi_{it}, \pi_{-it}, \xi_{it}, \kappa_{-it} | c_{it})^{U} d(c_{it})}$$

where PSE_{ijt} is the initial prior and PSE_{ijt+1} is the posterior belief. P and U give weight to the prior and new information l. The learning signals about one's capabilities c_{it} are own experiences π_{it}, peer experiences π_{-it}, emotions ξ_{it}, and persuasion from others κ_{-it}. Except for some external shocks (e.g. a policy intervention), the individual and his peers' experiences depend on their initial level of PSE, and the same is true for their emotions. How much priors are updated depends on the strength (or resilience) of PSE, captured by U and P. All taken together, this makes PSE a strong, self-reinforcing belief, which tends to be highly persistent within individuals and social groups, possibly over many generations. However, it can also be highly responsive to policy.We might compare this with the economic literature on "motivated beliefs" (Bénabou 2015, Bénabou

[1] Importantly to note, there are other internal constraints that can work similar to low PSE. As an example, Hoff K, Pandey P. 2005. Opportunity is not everything. *Economics of Transition* 13: 445-72 asked Indian students from high and low Castes to solve mazes and found that anticipated discrimination reduces the performance of the low Caste students when caste was publicly salient. Similarly, Bulte E, Beekman G, Di Falco S, Hella J, Lei P. 2014. Behavioral responses and the impact of new agricultural technologies: Evidence from a double-blind field experiment in tanzania. *American Journal of Agricultural Economics* 96: 813-30 find that supplying a treatment group of smallholder farmers with a modern seed-variety can demotivate the control-group and thereby create a performance gap. Both studies reveal the effects of powerful internal constraints that are conceptually distinct from PSE.

[2] When it comes to gender, very little can be generalized about the relationship with PSE. Cultural and institutional differences lead to lower PSE amongst girls in Ethiopia and India, and higher PSE amongst girls in Vietnam (compared to boys), as found by Dercon S, Singh A. 2013. From nutrition to aspirations and self-efficacy: gender bias over time among children in four countries. *World Development* 45: 31-50.

& Tirole 2002, Bénabou & Tirole 2003, Bénabou & Tirole 2016) and the learning of "non-cognitive" skills (Almlund et al 2011, Borghans et al 2008, Cunha et al 2010, Heckman & Kautz 2012, Kautz et al 2014). In this literature, individuals have some control over what they learn, and this follows a cost-benefit calculation. PSE is more fundamental and individuals have less control over it. As with "non-cognitive skills", the most efficient point to improve individual's PSE is during childhood, in schools (Cunha et al 2010, Krishnan & Krutikova 2013) and families (Dercon & Sánchez 2013). An interesting additional source are electronic media (Bernard et al 2015, La Ferrara 2015).

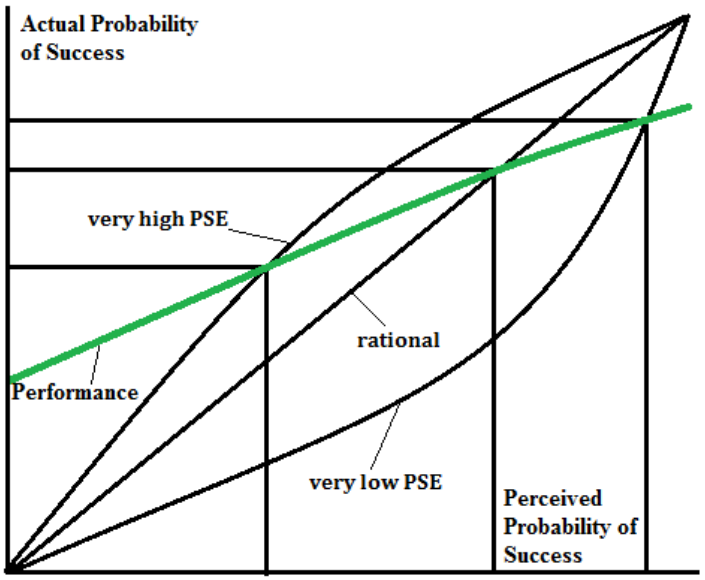
3. Theoretical Models

Building on these conceptual definitions and discussion of PSE, we survey the relevant literature that has contributed to our understanding of the topic via theoretical models. These models demonstrate how PSE differences lead to distinct performance, knowledge, and achievement.

3.1. Effects

A widely-cited model by Compte and Postlewaite (2004) explores how PSE can directly improve performance by making individuals feel more secure. In this model, the probability distribution over the outcome is not exogenously given but depends instead on a person's PSE, which is a function of recalled past successes and failures. Thus in contrast to neoclassical and prospect theoretic preferences, perceived capabilities positively affect actual capabilities. Interestingly, in this modeling framework, higher PSE is monotonically better than low PSE, and even clear overconfidence is an improvement over an accurate perception. This is graphically depicted in figure 3.

Figure 3. The Relationship Between Confidence and Performance



Notes: The figure relates perception and reality. Because a more positive perception increases performance it translates into a more positive actual outcome. A person with a negative perception of her abilities might feel so insecure that her prior basically becomes self-fulfilling. Adapted from Compte and Postlewaite (2004)

An innovative model proposed by Lemoine (2016) demonstrates how low PSE can lead to low effort and poor outcomes. This model shows how one's own future self, as well as other individuals who are interested in one's success (e.g. superior or spouse) prefer one to have as much PSE as possible – again, even to the point of overconfidence. In this model, learning drives this result: PSE fosters the accumulation of human capital and empowers the individual to learn

more effectively, which is beneficial for the rest of one's life. The basic mechanism is that the marginal utility of exercising effort in a task is an increasing function of individual ability. However, what matters for behavior is more the perceived ability than the actual ability. Individuals then trade off marginal utility with marginal costs of effort but they are ignorant about the feedback from effort on beliefs and ability. Under the assumption that effort increases ability over time, individuals with low initial PSE suffer both from not learning about their true ability and from not improving it.

The model of Filippin and Paccagnella (2012) also shows how differences in PSE lead to a divergence in human capital accumulation between otherwise identical individuals. Because PSE often correlates with socio-economic background, this causes persistent inequality (see also Piketty 1998). In this model, individuals make distinct choices, with some alternatives being inexpensive with low payoff and others being more expensive but promising a higher payoff. Individuals with low PSE choose consistently under-ambitious tasks, where they learn little compared to individuals who have high PSE and thus choose ambitious tasks where they learn a lot. Similarly Weinberg (2009) shows that extreme overestimation of one's ability leads to failure, because overambitious tasks are chosen, but slight overestimation leads to better results than a perfectly correct perception. Underestimation of one's ability, on the other hand, undermines both effort and outcomes.

Of course, low effort can also be a self-control problem and not initially chosen. As an example, Duflo et al (2011) empirically demonstrated that Kenyan smallholder farmers underinvest in fertilizer, not because they do not want to use it, but because they have difficulty saving up their income until the investment is due. Bénabou and Tirole (2002) and Bénabou and Tirole (2004) show how PSE mitigates self-control problems. According to Bénabou and Tirole (2003), if the individual is "pessimistic as to the likelihood of his eventually caving in to temptation, he will ask himself "what is the point?", and decide that he might as well start indulging himself right away rather than waste effort on a doomed attempt at self-restraint". In the model of Bénabou and Tirole (2004), individuals differ in their PSE to control themselves and those with higher PSE are able to control themselves better because they do not want to lose their positive self-perception. In the three period model of Bénabou and Tirole (2002) individuals can choose to invest costly effort in a task that generates a payoff as a function of their ability. Initially, individuals are uncertain about their ability, but if they invest effort, they can learn about it. Generally, individuals are at risk of underinvesting effort, because they have imperfect self-control. Higher PSE compensates for this, because it leads individuals to believe that the payoff from effort is higher or more certain, and the costs of effort are lower.

A general framework proposed by Lybbert and Wydick (2016a) is based on Hope Theory from psychology (Snyder 1994) and includes perceived agency, but applies equally well to social cognitive theory and PSE. The model begins with a reference dependent utility function, in which utility depends on outcomes in relation to aspirations and the utility function is convex over losses and concave over gains. As long as aspirations matter and outcomes are uncertain, individuals are risk-takers to achieve their aspirations, because every realization below their aspiration is perceived as loss (Kahneman & Tversky 1979). Once they achieve their aspiration, however, they become more risk averse again. Because PSE increases aspirations, individuals with higher PSE are less risk averse. Importantly, PSE also enters the model through individual's perceived productivity, which has a similar effect as in the model of Lemoine (2016). The model assumes that higher PSE leads to a higher expected return on effort and that the actual economic outcome is a function of effort, ability, and a random shock. Individuals then solve a simple optimization problem, maximizing the difference between expected payoff and the cost of effort. Low PSE means that individuals either do not try at all, or they do not invest sufficient effort. Either way, they forego their opportunity to learn about their true capabilities. In contrast, individuals with accurate or too much PSE both try and thus their posterior converges to reality.

The model of Lybbert and Wydick (2016a) is closely related to the literature on aspiration failures, such as exemplified by Dalton et al (2016) and Genicot and Ray (2014). In the former model, a poverty trap is created by the following mechanism: Final wealth is a function of initial wealth, so poor individuals have to make a greater effort for the same outcome and individual's aspirations are their reference points. Notably, effort and aspirations are jointly determined in equilibrium, so that aspirations increase effort and effort increases aspirations. Because individuals are ignorant of the feedback effect from effort on aspirations, poor individuals are likely to choose an aspiration-effort combination that keeps them poor. In the model of Genicot and Ray (2014), general economic outcomes shape individual aspirations, which affect the investment incentives of these individuals. Through its impact on investments, aspirations in turn affect socio-economic outcomes. It should be noted, however, that aspirations are an outcome of PSE but clearly not the same as PSE. Individuals with high aspirations and low PSE can become depressed (Greenaway et al 2015), or turn to criminal means to achieve their goals (Baron 2004).

3.2. Causes

There are fewer theoretical models about the causes of perceived self-efficacy than there are about its effects (which is why we lead with the latter). The existing models are especially concerned with its historical evolution and social transmission. The basic idea is that individuals receive information about their capabilities from their parents and social peers and this information can be biased by past, random events.

Broadly, the transmission mechanism can be genetic or cultural, with epigenetic transmission as an intermediate. Evolutionary forces rarely affect only culture or only genetics, so these channels can be tricky to disentangle (Henrich et al 2008, Richerson & Boyd 2008, Richerson et al 2010). An interesting aspect about the cultural mechanism is that it can lead to genetic-like persistence of a trait but it can change dramatically when exposed to a shock (Boyd et al 2011, Henrich 2015). There is evidence that PSE is predominantly cultural (Bandura 1997, Wuepper & Drosten 2016, Wuepper & Sauer 2016). This suggests that low PSE can be persistent over decades but effectively increased with the right policies, as shown in the empirical section below.

In the genetic evolutionary model of Waldman (1994), males are competing for wealth, which in turn determines their reproductive success. Individuals are assumed to have disutility from effort, which creates the risk of underinvestment if individuals are not sufficiently confident regarding their ability. The model produces the result that overestimating one's ability can be optimal from an evolutionary point of view. A similar result is obtained by Johnson and Fowler (2011), in whose evolutionary model individuals compete for resources, and depending on the environment, overconfidence can be optimal. As discussed in the section above, overconfidence usually leads to accurate PSE over time. A model starting from the opposite end is the agent based model of Wuepper and Drosten (2016). Based on the work of Bandura (1997), they argue that historical subsistence farmers all had low PSE. However, depending on environmental feedbacks, some developed high PSE over time. This cultural evolution is driven by agricultural returns on investment. Where the return on investment was sufficiently high, individuals began experimenting with investing and gradually built up self-efficacy. In environments where the return on investment was low, individuals were trapped in a low equilibrium – and often transferred these low expectations to entirely new settings.

Whereas the model of Wuepper and Drosten (2016) demonstrates how PSE can grow, Haushofer and de Quidt (2016) develop a model on how it can shrink. In this model, exogenous, negative shocks lower individual's PSE (again modelled as lower perceived returns to effort). The problem is that individuals misinterpret the random shock as signal about their ability. This leads these individuals to exhibit depressive symptoms and reduced labor supply, possibly ending in a poverty trap. Haushofer and de Quidt (2016) do not consider how the random shock affects what the next generation believes and how they will behave. However, cultural evolution would suggest that once parents have low PSE, their children are likely to inherit low PSE as well (Bisin & Verdier 2010, Jones & Prinz 2005, Wuepper & Sauer 2016). Another social source of PSE are networks. Bénabou and Tirole (2000) demonstrate how one's social network has an incentive to increase one's PSE in order to increase performance. A similar results is obtained by Lemoine (2016). Thus, individuals' social network affects their PSE passively and implicitly by demonstrating success,

failure and inaction and actively and explicitly by persuading individuals to acquire, to nurture or to lack capabilities.

Building on the work of Compte and Postlewaite (2004) and Akerlof and Kranton (2000), Hoff and Stiglitz (2010) show how our social identity affects our performance and create a stable economic equilibrium. The basic idea is that the belief about our abilities is affected by our identity, such that stereotypes can be self-fulfilling beliefs. See also Hoff and Stiglitz (2016) for a discussion.

3.3. Discussion

Above we have reviewed several theoretical contributions to our understanding of the causes and effects of PSE. The models show how PSE makes us perform better, how it increases our aspirations, effort, accumulation of human capital, and willpower. Nevertheless, an important effect of PSE has been relatively neglected so far: PSE increases resilience. Individuals with strong PSE commonly increase their effort after failure or when they anticipate difficulties (Bandura 1997, Bandura 2012). This is critical because many ambitious goals require persistent effort to be achieved, and the first attempts commonly fail (White 1982). The review of Pritchett and Kapoor (2009), especially the stories covered in chapter 4, show just how important it is especially for the poor, not to endure misery, but to come back after backlashes with new information gathered from earlier tries. This seems to be a promising area for continued theoretical contributions.

A second promising direction for research is the development of a theoretical model showing how contemporary influences shape the development of PSE. Just as there are models how individuals learn about new technology from interacting with their peers (Bandiera & Rasul 2006, Conley & Udry 2010), so we would like to see models about how individuals develop PSE through social interactions. Such a model could resemble the models of Doepke and Zilibotti (2008) on how parents decide how to raise their children and also include stereotypes and identity, which has been proven interesting empirically (Aronson et al 1999, Hoff & Stiglitz 2016, Steele & Aronson 1995).

4. Empirical Studies

There is a fast growing body of empirical evidence identifying the effects of PSE and the determinants of individual heterogeneity in PSE. The research is based on experimental, quasi-, and observational (non-experimental) data. This methodological diversity helps to mitigate possible concerns over internal validity, external validity, or common biases shared by similar research designs (see also Bandura and Locke (2003) for discussion). It also covers a range of contexts, suggesting a certain general relevance of the concept.

4.1. Effects

Krishnan and Krutikova (2013) investigate whether it is possible to improve the PSE of poor and whether this improves their educational and labor market achievements. They analyze the program of an NGO which offers a multi-faceted program in several urban slums, including lessons, activities, and mentoring schemes, specifically designed to raise PSE and self-esteem. In the lessons, the teachers talked about values and skills, such as PSE, compassion, and self-control. The children kept diaries in which they recorded their daily encounters with such values and skills. They participated in sports and created a theater play. They also discussed their aspirations with a mentor and received psychological counseling. The causal effects of PSE are identified by comparing the first students who were treated with two comparison groups. The first comparison group are peers of the same sex and age, from the same neighborhood. The second comparison group comes from the same school and the same neighborhood. Using both comparison groups, unobservable school and neighborhood effects were controlled for. It is found that the program raised PSE and self-esteem, both by a remarkable one standard deviation, which led to significantly better final test scores and early labor market outcomes.

Ghosal et al (2015) experimentally raised the PSE of Indian sex workers, investigating whether this can make them less fatalistic and encourage more forward-looking behaviors. The treatment group received eight "psychological empowerment" workshops over eight weeks. Most participants had initially very low PSE and self-esteem. After the treatment, individuals showed significant psychological improvements. This led to increased efforts to improve future outcomes, as measured by significant increases in savings and health-seeking behaviors.

Bernard et al (2014) raised the PSE of poor smallholder farmers using a peer effect. As described by Bandura (1997), observing somebody similar to ourselves master a challenge increases our believe that we too, are able to do it. Bernard et al (2014) divided Ethiopian farmers into three groups: A treatment group, a placebo group, and a control group. The treatment group watched videos in which social peers talked about their business success through productive investments. The placebo group watched regular Ethiopian TV, and the control group was only surveyed. To

study the effect of treatment intensity, the proportion of treated households was varied across villages and network data was obtained to investigate additional peer effects. In a first post-treatment survey, six months later, the farmers in the treatment group had significantly increased aspirations. Both direct treatment effects and network effects were significant. Furthermore, the treated farmers increased their savings, reduced leisure time, sought more credit, and invested more into education. The study is ongoing and long term outcomes are more important than what happens shortly after treatment. However, it is remarkable that watching videos for an hour can change attitudes and behavior as much. New results are available soon.

A related approach is taken in the "Oaxaca Hope Project" in Mexico, for which first results are reported by Lybbert and Wydick (2016b). The project is conducted with female community bank members, divided into a treatment and a control group. A baseline survey was conducted including several psychological concepts. Furthermore, the women filled out a 3x3 matrix of hypothetical levels of sales based on interactions of levels of effort (low, medium, high) and luck (good, normal, bad) to capture their PSE. The intervention had three aspects. First, individuals in the treatment group watched a documentary about four women who were particularly successful in using their loans to expand their enterprises. Secondly, the women who watched the documentary received a refrigerator magnet, reminding them about their goals, agency, and perceived avenues to take. At the bottom of the magnet, the women were asked to write down their personal goals. The third aspect was a four-week workshop, in which the women discussed the concept of hope and its relationship with business problems. Five weeks after the treatment, a follow up survey was undertaken. The treatment effect was found stronger for aspirations than PSE at this point in time. Furthermore, the treatment increased log sales (+17.7%), log profits (+19.1%), and log savings (+14.2%), even though these increases were not yet significant. Nevertheless, these early results indicate two important aspects: First, it is usually easier to raise aspirations than PSE. Second, the effect of higher aspirations is heterogeneous (e.g., depending on PSE, actual ability, and individual context). Interestingly, the observed effects are stronger for Catholic women than for Evangelical women, as discussed in Dowd et al (2016). The project is set up to be a long-term project, so as with the research of Bernard et al (2014) the most interesting results are yet to come.

Bryan et al (2012) investigate why not more individuals migrate during the lean pre-harvest season in Bangladesh, when poverty and hunger are widespread and urban employment should be attractive. They randomly assigned a $8.50 incentive to some households to out-migrate during, which induced 22% of the households to send a seasonal migrant. This increased consumption in the origin by 30% (500-700 calories per person and day), showing how large an untapped potential there actually was. A year later, migration was still 10% higher in treatment

areas, and 8% three years later. Although not explicitly considered, the research implicitly suggests low PSE to find a job outside one's village as a major barrier.

In Ghana, Wuepper and Sauer (2016) investigate whether PSE improves the profitability of contract farming for smallholder pineapple farmers. The tested hypothesis is that farmers with higher PSE are more reliable business partners. In contrast to the previous studies, they use an instrumental variables framework as identification strategy. They exploit a natural experiment created by the British colonial government in the 1930s. To improve cocoa production for export, the British established cooperatives all across the cocoa growing areas. The performance of these cooperatives was not only affected by the farmers but also by infrastructure, agro-ecology and geography, which created exogenous variation in the performance of these cocoa cooperatives. Wuepper and Sauer (2016) demonstrate that the historical performance of the cocoa cooperative strongly shaped the PSE of the farmers and their descendants regarding similar business opportunities and that this can be used as an instrumental variable. This illustrates how random historical events can explain why similar farmers in the same region respond distinctly to the same business opportunity.

Also in Ghana, Wuepper and Drosten (2016) exploit a second natural experiment, also using an instrumental variables framework. The experiment is a historical dependency on different kinds of crop. The important dimension is not the absolute profitability of the crops but how much it incentivized agricultural investments. The theoretical model is mentioned above. The basic idea is that descendants of farmers from high return-on-investment regions develop high PSE and descendants of farmers from low return-on-investment regions develop low PSE. Wuepper and Drosten (2016) use the historical dependency on different crops as instrument for the PSE of Ghana's pineapple farmers and find a significant effect on various agricultural investments as well as income. Taken together, the two studies from Ghana show that farmers with high PSE invest more in agricultural production and in business relationships, are more resilient to adversity, and they are generally, economically more successful. The studies also show that PSE is culturally inherited as a function of historical circumstances. It should be noted that the more a belief is cultural, the less it is updated in a Bayesian fashion. Thus, PSE is unlikely to converge in equilibrium, unless subject to an external force.

Beaman et al (2012) identified a situation in West Bengal, India, in which for political reasons, one third of all village councils was randomly reserved for a female chief councilor. This created another natural experiment. They investigate whether observing female political leaders raises the aspirations of girls and their parents. They find that female politicians reduce the gender gap in aspirations by 25% for the parents and 32% for their children. The gender gap in educational attainment was entirely erased in treated locations and girls spent less time on household chores.

As so often is the case, low PSE was wide-spread and persistent among female villagers. However, an external shock (in this case, observing the success of social peers) broke this persistence.

Investigating the effect of PSE on educational aspirations and performance, Pasquier-Doumer and Brandon (2015) study indigenous children in Peru. As Ames (2012) reports, daily school life of Peruvian indigenous children entails constant, negative messages about their identity and culture. Pasquier-Doumer and Brandon (2015) thus investigate whether this might decrease their PSE, leading to low aspirations and performance. Interestingly, they do not find that the children have internalized the negative messages. However, it is their low socio-economic status that leads to their low aspirations, which in turn explains the poor educational outcomes and contributes to persistent inequality. Chiapa et al (2012) find that also poor Mexican parents and their children underinvest in education because of their low educational aspirations. However, through an anti-poverty program called PROGRESA, individuals interacted more or less frequently with more educated individuals (doctors and nurses), and the more they did, the more they increased their educational aspirations. The result is that children from high-exposure households receive significantly more education than low-exposure households.

Moya and Carter (2014) investigate the effect of negative emotions on attitudes and economic outcomes and show how violence negatively affects one's perceptions of upwards mobility and thus reduces actual upwards mobility. They conduct their analysis in Colombia and collect a vector of "pre-treatment" characteristics of their survey respondents (using recall data) to demonstrate the absence of selection bias. Based on past, current, and expected future well-being, they find that expectations have their own, unique predictive power. On the flip side of victimization and exposure to violence, Glewwe et al (2016) study international child-sponsorship that provides kids with financial and moral support for school and find that this positive support increases PSE amongst children in Indonesia and Kenya. They make use of a clear-cut age-eligibility rule, that nicely allows the comparison of sponsored and not-sponsored siblings. Borrowing established techniques from child psychologists, they use self-portraits to capture the psychological state of the sampled children according to 20 characteristics. This increase in PSE appears to be a central mechanism that explains why international child-sponsorship has a significant long-term economic payoff (Wydick et al (2016)).

In the very different context of climate change adaptation, adaptive capacity shapes the actions people take. While this capacity was initially thought to be mainly a function of financial means (see e.g. Smit & Pilifosova 2003), PSE and related factors are increasingly appreciated as essential to adaptive capacity. Specifically, Protection Motivation Theory proposes four more factors to explain why some individuals take adaptive measures: the perceived severity of climate change effects, the perceived vulnerability to such effects, the efficacy of the recommended preventive

behavior, and especially, PSE (Floyd et al 2000, Rogers & Prentice-Dunn 1997). Gebrehiwot and van der Veen (2015) survey drought prone farmers in Ethiopia and investigate their intention to undertake farm-level risk reduction measures. They find PSE to be a significant explanation for the intention to adopt adaptive practices. This is also found amongst smallholder farmers in China (Burnham & Ma , Zheng & Dallimer 2016) and Cambodia (Ung et al 2015). Zarafshani et al (2010) present evidence that Iranian farmers with higher PSE are more problem focused after a drought. This allows them to mitigate their loss of energy and money. Farmers with lower PSE are more emotion focused and lose more energy and money.

In the studies above, causal identification is often challenging. Wuepper et al (2016) use a generalized difference-in-difference framework and an instrumental variables approach to address this challenge. They operationalize PSE using a factor variable from four proxies and use a peer-effects as instrument. They also use a factor variable to control for the objective farming skills of the individuals. They find that after farmers experienced lower than usual rainfall, individuals with higher PSE are more likely to respond with the adoption of a "climate smart" innovation, mulching, whereas individuals with lower PSE are not, which has a significant income effect. Interestingly, when they dichotomize PSE, individuals with low PSE become less likely to adopt the innovation, whereas those with high PSE become more likely. It is also found that objective farming skills and PSE are strongly additive in determining the adaptive capacity of the farmers.

A remarkable multi-country intervention by Banerjee et al (2015) demonstrates that in contrast to the many failed development interventions that are reported in the literature , interventions that simultaneously address internal and external constraints can have significant success on a broad spectrum of outcomes. They provided their treatment groups with productive assets, health care, and life-skill coaching and found significant improvements in all 10 outcomes that they measured, such as food security, household income, and health, in all six countries that they targeted. This is a major point from the literature: Low PSE and large external constraints together create poverty traps and addressing both simultaneously is an efficient way to help people out.

4.2. Causes

As already briefly mentioned above, Wuepper and Drosten (2016) propose that heterogeneity in agro-ecologies, geography and infrastructure have produced distinct paths of cultural evolution. In regions were individuals depended on crops that encouraged investments, individuals learned about their capabilities to produce desired effects by their own actions. In other environments, these learning effects were less likely if individuals depended mostly on crops that discouraged high investments. In another setting, Galor and Özak (2014) also investigate the long-term effects of distinct returns on agricultural investments. They find distinct time preferences as an outcome

and argue that the mechanism is genetics. However, their findings are also consistent with cultural evolution creating differences in PSE, which then causes differences in time preferences.

Another historical cause of PSE differences are distinct institutions. Just as our natural environment shapes our beliefs, so does our social environment, which is predicated in important ways on prevailing institutions. In Europe, Tabellini (2010) and Guiso et al (2016) show that historical institutions explain long-term differences in PSE. The effect of historical institutions on PSE has been detected in developing countries as well. In Ghana, Wuepper and Sauer (2016) find that the performance of colonial cocoa cooperatives shaped not only the PSE of the participating farmers, but also that of their descendants.

A large, on-going research effort is the Young Lives study (www.younglives.org.uk). The study follows the lives of 12,000 children in Ethiopia, India, Peru, and Vietnam. Amongst others, the study tracks the evolution of PSE over 15 years of the children's lifetime. So far, is has been found that PSE evolves over an individual's lifetime just as it does over generations. Children who grow up experiencing helplessness develop lower PSE, because they do not learn about their capabilities. Low PSE then reinforces itself through either limited or negative feedback. Dercon and Krishnan (2009), Dercon and Sánchez (2013), and Dercon and Singh (2013) find that childhood nutrition and poverty significantly impede the development of PSE. A representative result is that a one standard deviation increase in height-for-age increases PSE, self-esteem, and aspirations by 10.4%, 6.4% and 5.1%, respectively.

Finding that poverty reduces PSE suggests a possible poverty trap. However, as already mentioned above, Krishnan and Krutikova (2013) show that PSE can be effectively improved with targeted programs in schools, and there are several studies describing other effective interventions (Ghosal et al 2015, Glewwe et al 2016). In other words, it is possible to help individuals out of this trap because the dynamics that create the low-level equilibrium are not structural but behavioral. As we learn more about how importantly PSE shapes economic decision making and outcomes, we increasingly realize how much more there is to learn about how interventions might be tweaked to leverage these behavioral pathways.

Finally, an important source of PSE are social interactions. Both Lybbert and Wydick (2016b) and Bernard et al (2014) use video-documentaries about the stories of successful peers to increase the PSE of poor individuals. A natural experiment on the same mechanism is reported by Jensen and Oster (2009). When women in India got access to cable TV and thus information, their acceptance of domestic violence and pro boy bias sunk, together with pregnancy rates, whereas their autonomy grew. It has been suggested several times that media based interventions might be effective to achieve psychological and cultural change (Bandura 2001, Bernard et al 2015, La Ferrara 2015).

4.3. Discussion

A major characteristic of recent economic research is the focus on clean identification of hypothesized effects. This poses a significant incentive to choose research questions that do not involve too many feedbacks (optimally, none or just one) and not too many causal channels (optimally, just one). The concept of PSE suggests that it can be quite generally relevant for a broad range of economic questions but also, that there are multiple causal channels and feedback effects. There is almost always the concern about omitted variables (e.g., how to rule out that PSE does not just reflect unobserved but accurate potential) and reverse causality (PSE and performance improve each other). The trend towards randomized control trials can address this issue when it comes to the identification of well defined, individual effects. For example, the question of how observing successful social peers affects investment decisions and business performance through PSE is a well suited question for an experiment (Lybbert & Wydick 2016b). However, the question how much current investment decisions and business performance can be explained by historical events that shifted PSE is a question that is far less feasible for an experiment (Wuepper & Sauer 2016). Furthermore, attention must be paid towards the exact mechanism that is identified with a given experimental treatment.

As Lybbert and Wydick (2016b) find, it can be easier to raise aspirations than it is to raise PSE. Moreover, PSE itself consists of degree, strength, and generality, so that even if PSE is increased, attention must be paid regarding what aspect of PSE has been changed. Most importantly are degree and strength. Naturally, individuals inherit an initial degree of PSE from their parents, which is then reinforced throughout their childhood. An adult with a naturally high degree of PSE commonly also has strong PSE, because lifetime experience provided ample information about what the person can achieve and what not. If an adult with naturally low PSE has increased PSE, say from an experimental treatment or other persuasion or observing successful social peers, the person might have a high degree of PSE but it can still be weak, implying a low resilience to eventual difficulties or throwbacks. Bernard et al (2014), for example, demonstrate how individuals raise their aspirations and investments after having seen videos about successful social peers. However, these individuals might need further support in order to avoid disappointment. Since the researchers have selected the most successful individuals as examples, it is not clear whether the outcomes in the treatment group will match the raised expectations. Naturally developed PSE is comparably resilient against setbacks but raised PSE from observation and persuasion can be weak. In the worst case, disappointment can lower PSE in the long-term. It is thus advisable to complement the observation of successful peers with further treatments, such as workshops and personal interactions (Ghosal et al 2015, Krishnan & Krutikova 2013, Lybbert & Wydick 2016b). In the successful program described by Banerjee et al (2015) e.g., individuals where supported in multiple ways, psychologically, medically, financially, and otherwise, so that

individuals were basically set on an alternative development path of reinforcing, positive experiences.

As we have seen that PSE is often an outcome of either individual or collective history, we cannot solely rely on our own experiments but must also find credible natural experiments. Finding credible exogenous variation in PSE is obviously not a trivial task. Most instrumental variables used in the literature are historical, which makes it necessary to show that it is not historical outcomes of higher PSE that cause the observed positive economic effects but it is current PSE that directly produces these effects. As an example, Wuepper and Sauer (2016) go to great lengths to establish that the historical performance of cooperatives caused current PSE differences amongst potential and actual contract farmers, and that neither historical differences in PSE, nor other persistent differences bias the estimates. Similarly, Wuepper and Drosten (2016) have to show that historically distinct farming systems only affect current investment and incomes through PSE, and the farmer neither inherited distinct degrees of physical nor human capital.

From a methodological point of view, it is advantageous that both experimental and non-experimental data is used to quantify the different effects of PSE and that even within the studies using instrumental variables, these are varied. A promising approach for future research is the use of also other research designs, such as regression discontinuity designs (RDD) and differences-in-differences (DiD)(Angrist & Pischke 2008). As a recent example from sports, Rosenqvist and Skans (2015) use a RDD to show the effect of PSE on performance at golf tournaments. They exploit that almost equally skilled players are separated into successes and failures half-way into the tournaments (the "cut"). They find that players who (marginally) succeeded in making the cut in a tournament substantially increase their performance in subsequent tournaments relative to players who (marginally) failed to make the cut.

Currently, it is plausible that we sometimes compare the outcomes of a particular treatment for individuals who have self-selected according to their PSE. In that case, we perhaps overestimate the profitability of new technologies, education, or credit. On the other hand, we might also overestimate the severity of many constraints, as individuals with higher PSE might well be able to overcome. For the encouraging effect of PSE on risk taking, see Krueger and Dickson (1994). This connects PSE also to domain-specific risk attitudes (Nicholson et al 2005, Weber et al 2002). Regarding policy interactions, one could think of a nutrition intervention for poor farmers, where higher PSE results in a larger treatment effect and where a larger treatment effect results in higher PSE (because undernutrition and low PSE can be self-reinforcing).

A further exploration of the inter-linkage between PSE and poverty seems generally promising. On the one hand, there is the literature on how poverty negatively affects individual's ability to make sound decisions (Haushofer & Fehr 2014, Mani et al 2013, Mullainathan & Shafir 2013). Also

poverty lowers PSE (Dercon & Krishnan 2009, Dercon & Sánchez 2013). On the other hand, PSE can improve psychological resilience and thus improve decision making (Bandura 1995, Bandura 1997, Bandura & Wood 1989). Thus, PSE can be a mechanism that allows individuals to break out of poverty traps, but it can also be destroyed by poverty. This depends on the strength of PSE, which is mostly a function of whether PSE was developed early enough in the life of an individual that this individual could make sufficient mastery experiences (Bandura 1997).

Another topic for future research is how extension services should take into account PSE. A simple implication is to complement the mitigation of external constraints with a mitigation of internal constraints. A more difficult implication concerns the question who should become a demonstration farmer. To develop PSE, demonstration is crucial. However, if the chosen farmer is known to be amongst the best, many others will not take his experiences as representative. If, on the other hand, the chosen farmer is amongst the worst, he is likely to fail and possibly lower the PSE of the observers. Suggestive evidence is reported by Macours and Vakis (2014), who show that in Mexico, the local leaders were feasible role models, as they had a good chance to succeed in an anti-poverty program, but were still perceived as sufficiently representative.

It would also be interesting and possibly policy relevant to analyze PSE difference on a larger scale. Olsson and Hibbs Jr (2005) establish that historical bio-geography has a strong, not fully understood, effect on economic development. Similarly, Michalopoulos et al (2016) find that in Africa, ancestral lifestyles have a strong, not fully understood, effect on individual's education and income. Recall that Wuepper and Drosten (2016) find that historical bio-geography affects the long-term evolution of PSE.

5. **Conclusion**

There is now ample theoretical and empirical evidence that PSE is an important source of economic heterogeneity. The standard economic framework assumes that individuals correctly perceive what they can achieve and what they cannot. The literature discussed in this review questions this assumption and shows how stronger believing in one's capabilities can have a list of economic benefits and why individuals and groups differ in this regard.

Complementing the research from other disciplines, a strength of economic research is its rigorous theoretical and empirical models. Recently published theoretical models show how PSE affects which goals individuals pick, how much effort they invest, how resilient they respond to adversity, and what they learn. Other theoretical models demonstrate how history and social context can explain differences in PSE and why it often differs from actual abilities.

In empirical research, economists are making important contributions by focusing on individuals that are relatively neglected in most psychological research, namely poor individuals in

developing countries. Furthermore, the focus on clean identification of causal effects helps economists to importantly complement the findings from other disciplines, where the focus is stronger on other research aspects. In this context, both internal and external validity is relevant.

An interesting aspect is that poverty reduces PSE and PSE reduces poverty. This implies that PSE can be a major contributor to economic inequality, as some individuals are on a development path of mutually reinforcing PSE and mastery experiences, whereas others are stuck with low PSE and economic hardship. Thus, a major area for future research is the exploration of the dynamic effects of policy interventions. Considering extension services, education, and provided training, we discover that economic effects can be limited when PSE is neglected. When individuals only need to learn practical know-how, there is no need to encourage people, to motivate them, and to build up a more positive self-and world-view. Especially, if only practical know-how is relevant for economic success, failure can be positive, as one can learn a lot from failure. If, however, we learn that PSE is important for economic success, we are much more concerned about how individuals feel and how they perceive themselves and their context. Individual failure can then be costly. In many context, this means that aspirations should not raise to quickly, and rather build up slowly as a result of growing PSE, to avoid failure and frustration.

Importantly, PSE improves what an individual can achieve by allowing the individual to more effectively orchestrate his skills and to make better choices. PSE does not make all external constraints go away. As an example, PSE can allow farmers to mitigate the adverse economic effect of a drought by taking effective adaptive measures. However, this requires that effective adaptive measures are available, the farmers can afford to buy the necessary inputs, they have the farming skills to apply them efficiently, and the drought is not too severe. There is compelling evidence that without PSE, individuals cannot exploit their full potential, so PSE can be a binding constraint. The capacity to adapt to environmental change is called adaptive capacity in the climate change literature (Adger et al 2013, Grothmann & Patt 2005). This closely resembles the concept of allocative ability, which is the capacity to respond efficiently to economic change (Schultz 1975, Schultz 1980). An important research topic for the future is to compare the relative importance of PSE and other factors for the adaptive capacity / allocative ability of poor farmers in developing countries. Especially promising in this regard are again dynamic considerations, as we have seen above that PSE increases the accumulation of human, social, and financial capital over time.

Another important contribution of economists is to put PSE not only on the research, but also on the policy agenda. Development initiatives are commonly reflecting the current economic models, so incorporating PSE is likely to change both content and methods of development initiatives. It has often been found that a sole focus on external constraints is less effective in mitigating poverty

than expected (Banerjee & Duflo 2011). In contrast, interventions targeting external and internal constraints together can produce remarkable results (Banerjee et al 2015).

Still, there is much about PSE that we do not know. On-going research aiming at improving our understanding includes two long-term randomized control trials, one in Ethiopia, and one in Mexico, investigating how experimentally induced PSE affects poverty dynamics (Bernard et al 2014, Wydick & Lybbert 2016). So far, in both cases aspirations and attitudes have changed, and some early effects can be observed. However, long-term outcomes are yet to be analyzed. Furthermore, there is also long-term research on the development of PSE in India, Ethiopia, Peru, and Vietnam (www.younglives.org.uk). As this study is considerably longer than common, it has the potential to reveal the dynamic changes in PSE and economic circumstances, and how the two interact.

For economic theory, PSE brings us yet further away from the neoclassical models that have shaped current development economics. It contributes to the trend of appreciating more the diversity of individuals and emphasizes the role of psychology and culture in economic choices.

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