



# 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, individuals have little reason to invest greater effort or attempt anything new. Individuals with higher PSE set more ambitious goals, try harder, and persist more diligently. Such proactive engagement in perceiving and creating possibilities is often either ignored or implicitly assumed in simple optimization models. Growing evidence from psychology and economics suggests that PSE deserves greater attention. We review the theoretical and empirical literature on PSE with a focus on its relevance to poverty and economic development. We discuss promising avenues for future research at the interface of PSE and poverty as part of the broader frontier of behavioral development economics.

## 1. INTRODUCTION

In *Moving Out of Poverty*, Pritchett & Kapoor (2009, p. 128) report an interview with a successful vegetable trader from Thailand. Her reflections on her success are insightful.

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.

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). Although 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 Gandhi: “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 demotivate and even demoralize. Wuepper & Drosten (2016) and Wuepper & Sauer (2016), for example, show how individuals 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. This kind of feedback cycle can create PSE dynamics akin to 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, 2012). As such, it can be highly relevant to economics and especially development economics, as recently argued by Lybbert & Wydick (2016a).

To further introduce PSE and its effects on human behavior, we consider two experiments. First, Weinberg et al. (1979) studied individuals in an athletic competition who were given different information 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 harder. 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. Whereas 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, though revealing, 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 of many real-life situations in which PSE might shape behavior of the poor. These limitations raise obvious external validity concerns.

The second experiment addresses these limitations. Bandura & Wood (1989) recruited 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 who were randomly induced to have relatively high 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.

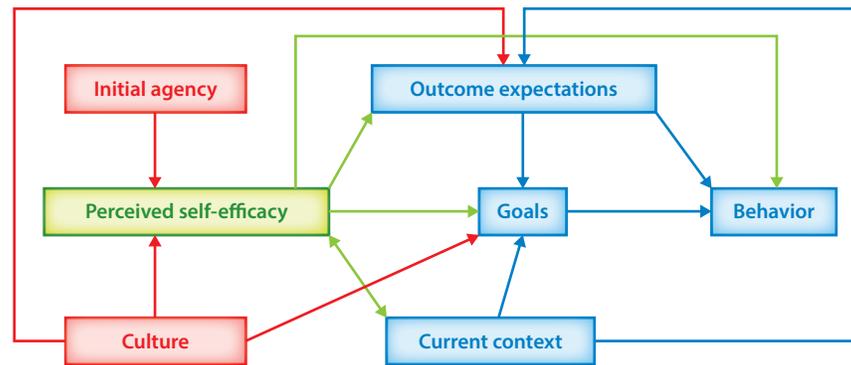
A large collection of similar research in psychology shows similar results (Bandura 1997, Maddux 2009, Schwarzer 2014). Most of this work is set in urban areas of developed countries (primarily the United States). Development economists are beginning to extend this work to developing countries to better understand internal constraints among the poor in rural and periurban 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. THE CONCEPT OF PERCEIVED SELF-EFFICACY

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). These concepts are often not precisely defined and frequently used interchangeably. This section explores PSE in greater detail to clarify the concept and to 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, 1997, 2012; Maddux 1995, 2009; Pajares 1997; 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, fate control, and locus of control (LoC), as developed by Coleman (1968) and Rotter (1966) (Anderson et al. 2016). Readers are also referred to Alkire (2005) for a discussion of theories and empirical measurement.

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), grit (Duckworth et al. 2007), and noncognitive skills in general (Cunha et al. 2010, Heckman & Kautz 2012, Heckman et al. 2006). As a depiction of the different pathways by which PSE influences behavior, **Figure 1** shows how PSE affects how individuals perceive their



**Figure 1**

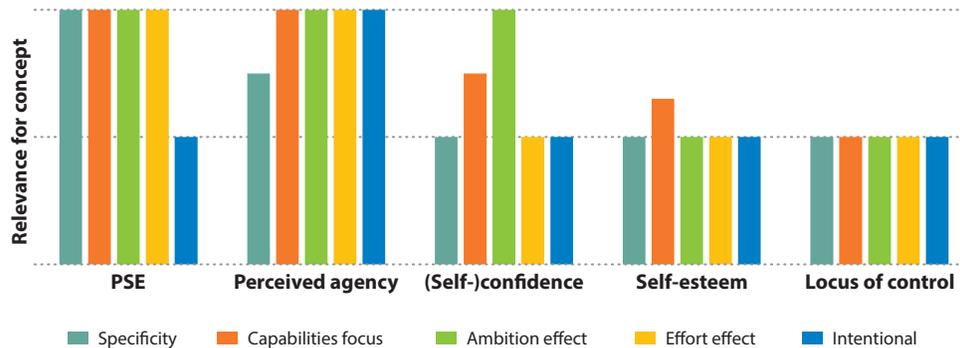
The concept of perceived self-efficacy (PSE). Individuals perceive their self-efficacy from their true initial agency, their current context (including their experiences, their peers' experiences, their emotions, and other learning signals), and their culture (that largely reflects the experiences of previous generations). PSE then affects what individuals expect, how they evaluate their context, what goals they set for themselves, and how they behave.

current context, as well as their outcome expectations, goals, and behavior. In this heuristic, PSE is itself a function of initial agency, the current context, and a cultural bias.

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, LoC, 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 imply a role for theory to offer distinctions and inform interpretations. Though one cannot ignore the inherent correlation between these concepts, we offer one way to compare and contrast them along six dimensions in **Figure 2**.

PSE and perceived agency are often used interchangeably. However, perceived agency is slightly less specific and implies the intent to act (Drostén 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). Additionally, 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



**Figure 2**

Stylized distinction between perceived self-efficacy (PSE) and related concepts. PSE is most similar to perceived agency but is slightly more domain specific and does not automatically imply any intentions. Self-confidence is less domain specific than PSE, does not imply an intention to act, is not necessarily related to the perceived capabilities of the individual, and does often not increase effort. PSE can be a source of self-esteem, but an individual can also feel highly competent in many domains and still not feel worthy of being liked by others (or vice versa). Locus of control is often correlated with PSE, but in contrast to PSE, it is often understood as a general worldview (not domain specific), and a perceived lack of control can also come from perceived discrimination, for example.

(Bandura 2012). Some authors use the phrase “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.

LoC captures whether individuals generally feel in control of their life, which can have many reasons. However, LoC can also 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 one’s family, one’s social peers, and school. The mechanisms are one’s own past experiences, the observed experiences of social peers, emotions, and persuasion. Schools are especially interesting from a policy perspective. 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<sup>1,2</sup> (Steele & Aronson 1995). 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 the example of 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,  $c_{it}$ , one's own experiences,  $\pi_{it}$ , the experiences of similar individuals,  $\pi_{-it}$ , emotions,  $\xi_{it}$ , and persuasion from others,  $\kappa_{-it}$ . Except for some external shocks (e.g., a policy intervention), the individual and their 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  $P$ . 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 & Tirole 2002, 2003, 2016) and the learning of noncognitive 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 noncognitive skills, the most efficient point to improve individuals' PSE is during childhood, both in schools (Cunha et al. 2010, Krishnan & Krutikova 2013) and in families (Dercon & Sánchez 2013). An interesting additional source of influence is electronic media (Bernard et al. 2015, La Ferrara 2016).

### 3. THEORETICAL MODELS OF PERCEIVED SELF-EFFICACY

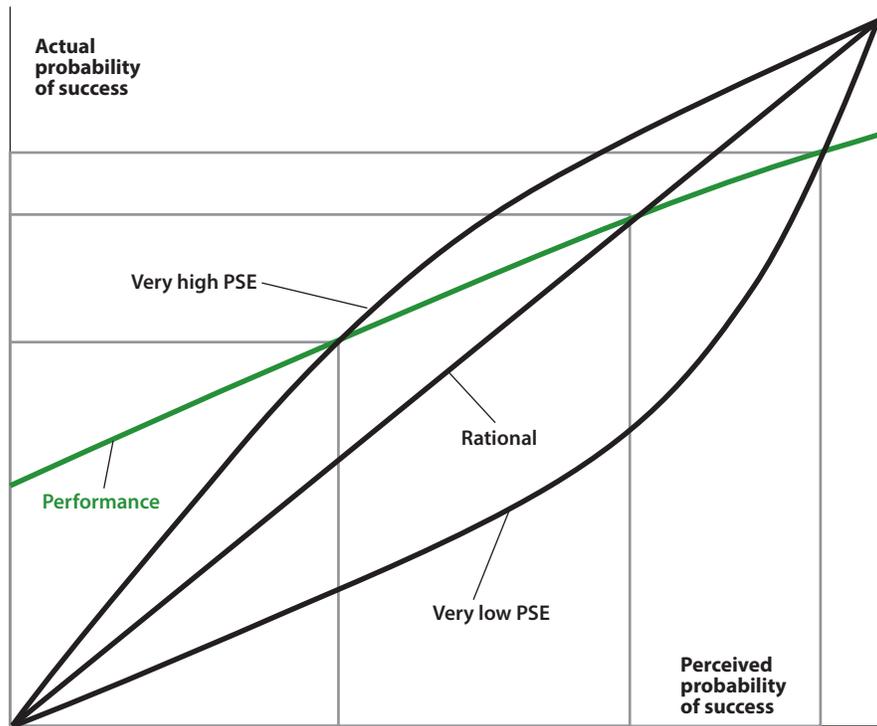
Building on these conceptual definitions and the discussion of PSE, we survey the relevant literature that has contributed to our understanding of the topic via theoretical models. These models demonstrate how PSE differences lead to distinct performance, knowledge, and achievement.

#### 3.1. Effects

A widely cited model by Compte & 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

<sup>1</sup>Importantly, there are other internal constraints that can work similar to low PSE (e.g., Hoff & Pandey 2005). The authors 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. Bulte et al. (2014) found similar results. These authors 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.

<sup>2</sup>When it comes to gender, very little can be generalized about its relationship with PSE. Cultural and institutional differences lead to lower PSE among girls in Ethiopia and India and higher PSE among girls in Vietnam (compared to boys), as found by Dercon & Singh (2013).



**Figure 3**

The relationship between perceived self-efficacy (PSE) and performance. The figure relates perception and reality. Because a more positive perception increases performance, it translates into a more positive actual outcome. The performance line (*green*) crosses the perception lines (*black*) once each, which maps perceptions to outcomes. The performance line of individuals with low PSE crosses the performance line first, leading to the lowest outcome. Depending on the context, it can be the case that every increase in PSE increases outcomes, such as in the model of Compte & Postlewaite (2004). Figure adapted from Compte & Postlewaite (2004).

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**.

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., a 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 & 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 socioeconomic 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 less 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 is 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 their income until the investment is due. Bénabou & Tirole (2002, 2004) show how PSE mitigates self-control problems. According to Bénabou & Tirole (2003, p. 139), 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 & 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 & 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 & Wydick (2017) is based on hope theory from psychology (Snyder 1994) and includes perceived agency, but it 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 individuals' perceived productivity, which has a similar effect to 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 the opportunity to learn about their true capabilities. In contrast, individuals with accurate or too much PSE both try, and their posterior thus converges to reality.

The model of Lybbert & Wydick (2017) is closely related to the literature on aspiration failures as exemplified by Dalton et al. (2016) and Genicot & 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 individuals' 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 & 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 socioeconomic 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 of the causes of PSE than there are of its effects, which is why we led with the latter. The existing models are especially concerned with the historical evolution and social transmission of PSE. The basic idea in these models 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 of 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 & Fowler (2011), in whose evolutionary model individuals compete for resources, and depending on the environment, overconfidence can be optimal. As discussed above, overconfidence usually leads to accurate PSE over time. A model starting from the opposite end is the agent-based model of Wuepper & 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 & Drosten (2016) demonstrates how PSE can grow, Haushofer & de Quidt (2017) develop a model on how it can shrink. In this model, exogenous negative shocks lower individuals' PSE (again modeled 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 leads to reduced labor supply, possibly ending in a poverty trap. Haushofer & de Quidt (2017) do not consider how the random shock affects what the next generation believes and how it 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). Networks are another social source of PSE. Bénabou & Tirole (2000) demonstrate how one's social network has an incentive to increase one's PSE to increase performance. A similar result is obtained by Lemoine (2016).

Thus, individuals' social networks affect their PSE passively and implicitly by demonstrating success, failure, and inaction; they do so actively and explicitly by persuading individuals to acquire, nurture, or lack capabilities.

Building on the work of Compte & Postlewaite (2004) and Akerlof & Kranton (2000), Hoff & Stiglitz (2010) show how our social identity affects our performance and creates 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 & Stiglitz 2016 for a discussion).

### 3.3. Discussion

We have thus far reviewed several theoretical contributions to our understanding of the causes and effects of PSE. The models show how PSE makes us perform better, and how it increases our aspirations, effort, accumulation of human capital, and willpower. One important effect of PSE has received too little attention thus far: PSE increases resilience. Individuals with strong PSE commonly increase their effort after failure or when they anticipate difficulties (Bandura 1997, 2012). That is, they demonstrate more grit. This is critical because many ambitious goals require persistent effort to be achieved, and the first attempts commonly fail (White 1982). The review by Pritchett & Kapoor (2009), especially the stories covered in Chapter 4, shows 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. Similar to the models showing how individuals learn about new technology from interacting with their peers (Bandiera & Rasul 2006, Conley & Udry 2010), we would like to see models about how individuals develop PSE through social interactions. Such a model could resemble the models of Doepke & Zilibotti (2008) on how parents decide how to raise their children and may also include stereotypes and identity, which have been empirically proven to be interesting (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-experimental, and observational 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 & Locke 2003 for discussion). It also covers a range of contexts, suggesting a certain general relevance of the concept.

### 4.1. Effects

Krishnan & Krutikova (2013) investigate whether it is possible to improve the PSE of the poor and whether this improves their educational and labor market achievements. They analyze a nongovernmental organization in India that offers a multifaceted 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 comprises peers of the same sex and age from the same neighborhood, whereas the second one comes from the same school and the same neighborhood. Using both comparison groups, the authors controlled for the unobservable school and neighborhood effects. Results show 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. (2016) 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 initially had 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 belief that we too can 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 were obtained to investigate additional peer effects. In a first posttreatment 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 in 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 so much. The research community awaits new results soon.

A related approach is taken in the Oaxaca Hope Project in Mexico, for which first results are reported by Lybbert & Wydick (2016). The project is conducted with female community bank members, divided into a treatment group and a control group. A baseline survey was conducted, including several psychological concepts. Furthermore, the women filled out a  $3 \times 3$  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. Second, 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 long term, and similar to the research of Bernard et al. (2014), the most interesting results are yet to come.

Bryan et al. (2014) investigate why more individuals do not migrate during the lean preharvest season in Bangladesh, when poverty and hunger are widespread and urban employment should be attractive. They randomly assigned an \$8.50 incentive to some households to emigrate during that time, which induced 22% of the households to send a seasonal migrant. This increased consumption in the origin area 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 that low PSE is a major barrier to finding a job outside one's village.

In Ghana, Wuepper & 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 an 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 across all of the cocoa-growing areas. The performance of these cooperatives was not only affected by the farmers but also by infrastructure, agroecology, and geography, which created exogenous variation in the performance of these cocoa cooperatives. Wuepper & 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 & Drosten (2016) exploit a second natural experiment that also uses an instrumental variables framework. The experiment involves a historical dependency on different kinds of crops. 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 regions with high returns on investment develop high PSE, and descendants of farmers from regions with low returns on investment develop low PSE. Wuepper & Drosten (2016) use the historical dependency on different crops as an 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 business relationships, are more resilient to adversity, and are generally more economically 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 were 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 is often the case, low PSE was widespread 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 & 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 & 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 socioeconomic status that leads to their low aspirations, which in turn explains the poor educational outcomes and contributes to persistent inequality. Chiapa et al. (2012) also find that poor Mexican parents and their children underinvest in education because of their low educational aspirations. However, through an antipoverty 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 & Carter (2014) investigate the effect of negative emotions on attitudes and economic outcomes and show how violence negatively affects one's perceptions of upward mobility and thus reduces actual upward mobility. They conduct their analysis in Colombia and collect a vector of pretreatment 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. (2017) study international child sponsorship that provides children with financial and moral support for school. They find that this positive support increases PSE among children in Indonesia and Kenya. They make use of a clear-cut age-eligibility rule that nicely allows the comparison of sponsored and nonsponsored 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. (2017).

In the very different context of climate change adaptation, adaptive capacity shapes the actions people take. Although this capacity was initially thought to be mainly a function of financial means (see e.g., Smit & Pilifosova 2001), 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 & 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 among smallholder farmers in China (Burnham & Ma 2017, 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, which 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 aforementioned studies, causal identification is often challenging. Wuepper et al. (2017) use interaction terms between PSE and drought and an instrumental variables approach to address this challenge. They operationalize PSE using a factor variable from four proxies and use peer effects as an instrument. They also use a factor variable to control for the actual farming skills of the individuals. They find that after farmers experience 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. Interestingly, when they dichotomize PSE, individuals with low PSE become less likely to adopt the innovation, whereas those with high PSE become more likely to do so. The authors also found that actual farming skills and PSE are additive in determining the adaptive capacity of the farmers.

A remarkable multicountry 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-skills coaching and found significant improvements in all 10 outcomes that they measured, such as food security, household income, and health, in all six target countries. Two major points from the literature are that low PSE and large external constraints together create poverty traps, and addressing both simultaneously is an efficient way to help people.

## 4.2. Causes

As already briefly mentioned above, Wuepper & Drosten (2016) propose that heterogeneity in historical agroecologies has produced distinct paths of cultural evolution. In regions where 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 & Özak (2016) 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 is distinct institutions. Just as our natural environment shapes our beliefs, so does our social environment, which is predicated 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 & 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 ongoing research effort is the Young Lives study (<http://www.younglives.org.uk>). The study follows the lives of 12,000 children in Ethiopia, India, Peru, and Vietnam. Among other variables, the study tracks the evolution of PSE over 15 years of the children's lifetime. So far, results show 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 & Krishnan (2009), Dercon & Sánchez (2013), and Dercon & 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.

The finding that poverty reduces PSE suggests a possible poverty trap. However, as already mentioned above, Krishnan & Krutikova (2013) show that PSE can be effectively improved with targeted programs in schools, and several studies describe other effective interventions (Ghosal et al. 2016, Glewwe et al. 2017). 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 is social interactions. Both Lybbert & Wydick (2016) and Bernard et al. (2014) use custom-made video documentaries about the stories of successful peers to increase the PSE of poor individuals. A natural experiment using a similar mechanism is reported by Jensen & Oster (2009). When women in India got access to cable TV and thus were better informed, their acceptance of domestic violence and bias toward male children dropped

together with pregnancy rates, whereas their autonomy grew. Several scholars have suggested that media-based interventions might be effective to achieve psychological and cultural change (Bandura 2001, Bernard et al. 2015, La Ferrara 2016).

### 4.3. Discussion

A major characteristic of recent economic research is the focus on the clean identification of hypothesized effects. This poses a significant incentive to choose research questions that do not involve too many feedbacks (optimally, none or a maximum of 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, and there are also multiple causal channels and feedback effects. Standard concerns about omitted variables (e.g., how to rule out that PSE does not just reflect unobserved objective potential?) and reverse causality (PSE and performance improve each other) apply in important ways to this literature. The trend toward 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 well suited for an experiment (Lybbert & Wydick 2016). However, the question of how much current investment decisions and business performance can be explained by historical events that shifted PSE is one that is far less feasible for an experiment (Wuepper & Sauer 2016). Furthermore, attention must be paid to the exact mechanism that is identified with a given experimental treatment.

As Lybbert & Wydick (2016) 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 to what aspect of PSE has been changed. Degree and strength are arguably equally important. 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 or cannot achieve. If an adult with naturally low PSE has increased PSE, for example, from an experimental treatment or other persuasion or through observing successful social peers, the person's high degree of PSE may 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 to avoid failure. Because 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. PSE that accumulates slowly and naturally over years of experiences is almost surely more resilient to setbacks, whereas experimentally induced PSE may have much shallower roots and may therefore be vulnerable to such setbacks. 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. 2016, Krishnan & Krutikova 2013, Lybbert & Wydick 2016). In the successful program described by Banerjee et al. (2015), individuals were supported in multiple ways (e.g., psychologically, medically, financially) so that they were encouraged along an alternative development path of reinforcing positive experiences.

Because PSE is often an outcome of either individual or collective history, we cannot solely rely on our own experiments, and we 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 historical outcomes of higher PSE do not cause the observed positive economic effects; instead, current PSE directly produces these

effects. As an example, Wuepper & Sauer (2016) go to great lengths to establish that the historical performance of cooperatives caused current PSE differences among potential and actual contract farmers. Moreover, neither historical differences in PSE nor other persistent differences bias the estimates. Similarly, Wuepper & Drosten (2016) show that historically distinct farming systems only affect current investment and incomes through PSE, and the farmer inherited distinct degrees of either physical or human capital.

From a methodological viewpoint, it is advantageous that both experimental and non-experimental data are 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 other research designs, such as regression discontinuity designs (RDD) and differences-in-differences (Angrist & Pischke 2008). As a recent example from sports, Rosenqvist & Skans (2015) use an RDD to show the effect of PSE on performance at golf tournaments. They show that almost equally skilled players are separated into successes and failures halfway 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 them. For the encouraging effect of PSE on risk taking, see Krueger & Dickson (1994). This also connects PSE 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, which in turn results in higher PSE (because undernutrition and low PSE can be self-reinforcing).

A further exploration of the interlinkage between PSE and poverty seems generally promising. On the one hand, there is the literature on how poverty negatively affects individuals’ ability to make sound decisions (Haushofer & Fehr 2014, Mani et al. 2013, Mullainathan & Shafir 2013); poverty also lowers PSE (Dercon & Krishnan 2009, Dercon & Sánchez 2013). On the other hand, PSE can improve psychological resilience and thus improve decision-making (Bandura 1995, 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 they could make sufficient mastery experiences (Bandura 1997).

Another topic for future research is how extension services should consider 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 of who should become a demonstration farmer. To develop PSE, demonstration is crucial. However, if the chosen farmer is known to be among the best, many others will not take his experiences as representative. If, on the other hand, the chosen farmer is among the worst, he is likely to fail and possibly lower the PSE of the observers. Suggestive evidence is reported by Macours & Vakis (2014), who show that in Mexico, the local leaders were feasible role models, as they had a good chance to succeed in an antipoverty program but were still perceived as sufficiently representative.

It would also be interesting and possibly policy relevant to analyze PSE differences on a larger scale. Olsson & Hibbs (2005) establish that historical biogeography has a strong but not fully understood effect on economic development. Similarly, Michalopoulos et al. (2016) find that in Africa, ancestral lifestyles have a strong but not fully understood effect on individual’s education and income. Recall that Wuepper & Drosten (2016) find that historical biogeography affects the

long-term evolution of PSE. However, investigating the role of PSE differences in explaining large scale patterns requires extensive data on PSE that does not yet exist.

## 5. CONCLUSION

There is now ample theoretical and empirical evidence that PSE is an important source of heterogeneity in performance, economic outcomes, and welfare. The standard economic framework assumes that individuals correctly perceive what they can and cannot achieve. The literature we review questions this assumption and provides compelling reasons to engage PSE as a research topic worthy of economists' attention. Understanding individual and group differences in PSE along with the determinants and dynamics of these critical perceptions may be particularly important for development economists given how potently they seem to shape the economic behavior and outcomes of the poor.

Work in psychology and other disciplines provides a rich conceptual and empirical foundation for this research. Economics can both build on and complement this existing literature with rigorous theoretical and empirical modeling. Recently published theoretical models show how PSE affects which goals individuals pick, how much effort they invest, how resiliently they respond to adversity, and how and what they learn in this process. 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 who rarely figure in published psychology research, namely the poor in developing countries. With a strong tradition of fieldwork, development economists are well positioned to extend this work to the settings and circumstances of the poor. Economists' now entrenched insistence on clean identification of causal effects provides another dimension of complementarity with other disciplines that prioritize other research methods and aspects. This sensitivity to causal identification or internal validity is increasingly paired with concerns about external validity, which may enable further complementarities with the existing PSE literature.

Dynamic interactions between PSE and poverty can be especially critical and, from a research perspective, be both challenging and intriguing. These feedback pathways imply that PSE can contribute to economic inequality: Slight initial differences in success can put some individuals on a trajectory of mutually reinforcing PSE, effort, expertise, and material success, whereas others experience PSE cycles in the opposite direction and become increasingly despondent and even hopeless. In this context, an important area for future research is the exploration of the dynamic effects of interventions and social interactions. Consider, for example, how PSE magnifies or mutes the economic effects of education, agricultural extension, or vocational training. For many such interventions, internal constraints stemming from low PSE (among other things) are just as real as the external constraints targeted by the intervention. Whereas higher PSE can enhance an individual's effort, abilities, and outcomes, external constraints can continue to bind and may be impervious to changes in PSE. Internal constraints may be as real as external constraints, but this does not make the latter any less real. As an example, high PSE can induce farmers to do everything they can to mitigate the adverse effects of a drought, but some adaptive measures, inputs or investments may simply not be in the farmer's choice set. On the margin, however, even a slight expansion of choices and improvement in outcomes attributable to higher PSE can compound favorably over time and result in much greater adaptive capacity in the face of environmental or climate change (Adger et al. 2013, Grothmann & Patt 2005) and in allocative ability in response to structural and economic change (Schultz 1975, 1980). Exploring the role

of PSE in the adaptive capacity and allocative ability of the rural and urban poor is an important area for future research. Especially promising in this regard are the dynamic interactions between PSE and the accumulation of human, social, and financial capital over time.

There is much more to be learned about these long-term dynamics and effects of PSE. Much of the emerging work on the topic in development economics involves changes over relatively short time horizons (e.g., Bernard et al. 2014, Wydick & Lybbert 2016). Although many findings are encouraging, long-term outcomes have yet to be tracked and analyzed. We anticipate several contributions in this regard in coming years. For example, the Young Lives study in Ethiopia, India, Peru, and Vietnam has the potential to reveal longer-term dynamics in and interactions between PSE and economic outcomes.

Finally, economists may contribute to the foundational work on PSE from other disciplines by leveraging more direct connections to the policy arena. Development initiatives and interventions commonly reflect economic findings, particularly those emerging from rigorous empirical research. With these channels of dialogue and influence already well established in some areas, it is conceivable that the evolving and expanding work on PSE in development economics will soon begin to shape the substance of development policy and interventions.

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