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The functional intelligences proposition

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ABSTRACT

Why are some governments more effective managers of resources – people, places and finances – and others less effective? This question is at the center of understanding political and economic development. Yet, established theory that explains how individual cognitive differences and sociological forces mutually explain government effectiveness is lacking. To bridge this knowledge gap we articulate the Functional Intelligences Proposition (FIP): The individual level attributes of general intelligence and social intelligence serve unique information processing functions and have a positive and independent effect on the ability of individuals, acting in concert, to govern resources. To begin to evaluate the FIP, we study the effects of general intelligence, social intelligence and social infrastructure (prosocial norms & trust) on how effectively US states govern. We find that measures of general intelligence (estimated by IQ) and social intelligence (social-cognitive theory of mind – ToM – estimated by agreeableness) have a positive and independent effect on the effectiveness of governance. The FIP provides an interdisciplinary explanation for the effectiveness of governance and, ultimately, development.

1. Introduction

Economic development depends on the effective governance of resources—whether people, places, or finances (e.g., Acemoglu, Johnson, & Robinson, 2005; Fukuyama, 2011). Thus, a question central to understanding differences in development is why some populations are better at governing resources than others (Anderies, Rodriguez, Janssen, & Cifdaloz, 2007; Bowles, Durlauf, & Hoff, 2006; Fukuyama, 2011; Ostrom, 2005). There are two important research traditions that explain how effectively social groups govern resources. The first is sociological. This tradition demonstrates the importance of social capital. Social capital refers to rules and norms in society that favor cooperation, trust and the structure of social networks. Numerous studies find that trust and established norms of prosocial behavior increase how effectively populations govern resources (e.g., Knack, 2002; Ostrom, 2005; Putnam, Leonardi, & Nanetti, 1993). The second tradition is psychological. This research tradition demonstrates the importance of cognitive capital. Cognitive capital refers to the intelligence assets held by individuals. Several studies in this tradition demonstrate that populations composed of individuals with higher general intelligence are more effective at governing (e.g., Carl, 2014; McDaniel, 2006; Rindermann, Kodila-Tedika, & Christainsen, 2015). In this paper, we begin to integrate these two disparate research traditions by proposing a theory that specifies how individual differences in cognitive capacities relate to social capacities to promote (or not) the effective governance of resources. Specifically, we propose the Functional Intelligences Proposition (FIP).

The FIP states that two cognitive capacities of individuals have effects on the ability of groups to effectively govern resources: general intelligence (*g*) and social intelligence (*SI*). *G* is the variance common to mental tests (e.g., IQ tests) that measure the ability of individuals to engage in complex reasoning and abstract thought (Jensen, 1998, 274–294). *SI* is measured along two dimensions. The first is emotional intelligence, which is the capacity of individuals to empathize with the emotions of others and identify their own emotions (Salovey & Mayer, 1990). The second is the theory of mind (ToM), which is the ability to model and reason about the intentions of others (Baron-Cohen et al., 1999; Dunbar, 2003; Marlowe, 1986). Here, when we use the term *SI*, we refer to the ToM dimension. *G* is critical to understand how a system works and make effective decisions that will best allocate resources. *SI* is critical to promote and maintain prosocial behavior, in spite of conflicts of interest that arise in social groups, and, thus, more effectively work toward shared goals. Given these dimensions of intelligence, we reason that a functional diversity of intelligence capacities results in more effective governance of resources than either an abundance of individuals with high *g* or *SI* alone. To begin to evaluate the FIP, we investigate the effects of *SI* and *g* on governance in the 50 states of the United States. Our findings indicate that *g* and *SI* are independent and both have a

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positive effect on governance, which is consistent with the FIP. Our study suggests that investments in diverse cognitive capacities should improve the governance of resources.

1.1. The functional intelligences proposition

We define governance as the ability of populations to allocate resources in ways that consistently serve the broad interests of a social group rather than the narrow, short-run interests of a few (Acemoglu et al., 2005). To study the mutual influence of social and cognitive capacities, we use a coupled infrastructure systems (CIS) framework to guide our study (Anderies, 2015). In the CIS framework, system outcomes are a result of interactions between natural infrastructure (e.g., a fish stock or forest), human made hard infrastructure (technology) (e.g., an irrigation or road system), human made social (soft) infrastructure (e.g., prosocial norms) and cognitive infrastructure (e.g., intelligence). The purpose of the FIP is to specify the effects of cognitive infrastructure on the ability of groups to govern resources. In this subsection, we first summarize the premises of the FIP and, in turn, three core predictions that follow from these premises. In the next subsection, we describe the potential relationships between social infrastructure and cognitive infrastructure that are important to consider to evaluate the core predictions of the FIP.

In sum, the FIP is as follows: A functional diversity of intelligence capacities results in more effective governance by social groups than either an abundance of individuals with high general intelligence, *g* or social intelligence, *SI* alone. High *g* individuals within a group should improve governance because such individuals are better at figuring out how a system works and identifying the net benefits of different ways to allocate resources (Anderies, Janssen, Lee, & Wasserman, 2013; Jones, 2008). This is a prerequisite to allocating resources in ways that benefit larger rather than narrower interests. But groups with high *g* individuals may not also have individuals with high *SI* because the two forms of intelligence are independent (Baron-Cohen et al., 1999, 2015; Marlowe, 1986; see below). High *g* but low *SI* should make the effective governance of resources more fragile because individuals with low *SI* are more sensitive to perceived slights or are prone to spite (Yamagishi, Kikuchi, & Kosugi, 1999). Hence, lower *SI* should yield more conflict, which provides incentives for individuals to serve narrow interests and leads to less effective governance. Conversely, high *SI* may confer robustness to complex social problems because individuals are better able to anticipate the intentions of others, which results in the emergence of a higher level of group intelligence that is more than the sum of the individual *g's* involved, known as "c", collective intelligence (Engel, Woolley, Jing, Chabris, & Malone, 2014; Woolley, Chabris, Pentland, Hashmi, & Malone, 2010). Higher *SI* individuals can beget groups with higher *c*, and such groups engage in more prosocial behavior, which diffuses perceived slights and holds coalitions together (Dunbar, 2011). However, such groups may lack individuals who also have the requisite *g* to perceive and imagine solutions to changing economic and ecological circumstances. Thus, groups with a high *SI*, but many individuals with a lower level of *g* may not effectively govern resources. This is because, although more prosocial in nature, such groups have a less nuanced understanding of the interdependencies between the social, economic and ecological systems in which they participate, leading to poor decisions about the allocation of resources (Anderies et al., 2013). Three core predictions follow from the FIP.

First, *groups composed of individuals with higher g are more effective at governing resources than groups with lower levels of g.* This prediction follows from the premise of the FIP that *g* is integral to abstract reasoning and identifying relationships between dynamic processes (Jensen, 1998). Understanding how a system works is a necessary condition for individuals to make good management decisions because they "see" the benefits of governing resources for the public good over the medium to long-term rather than short-term, selfish gain. Several studies provide empirical support for this mechanism.

For instance, Jones (2008) finds that cooperative outcomes in repeated prisoner's dilemma games are more prevalent at universities with higher SAT scores (a well-known proxy for *g*). A potential explanation for this pattern is that participants with higher *g* develop a better understanding of the prisoner's dilemma game and recognize that they gain more by cooperating instead of defecting (Jones, 2008). Similarly, at the country level, Rindermann et al. (2015) illustrate that a measure of *g* explains 50% of the variation in government effectiveness and, in turn, this is the strongest predictor of economic performance (GNP) (Carl, 2014). Hence country level data indicate that increases in the *g* of populations lead to increases in how effectively resources are governed. Rindermann et al. (2015) argue that this relationship stems from the ability of government officials to understand the policies that will best promote economic growth. Finally, common pool resource experiments illustrate a positive relationship between how well individuals understand a natural resource system and the collective governance of resources (Anderies et al., 2013; Ostrom, 2005). Anderies et al. (2013) observe that how well groups understand an irrigation system positively correlates with how quickly groups adapt to changes in stream flow to collectively manage the distribution of water (see also LePine, Colquitt, & Erez, 2000). Each of the studies above suggests that as the *g* of individuals in a system improves, individuals are more likely to understand the system and "see" the benefits of effective management for the public, though this does not guarantee that they will choose to manage for the public good.

Second, *societies with higher SI are more likely to engage in prosocial behavior and, thus, should be more effective at governing resources because individuals are more willing to work together toward common goals.* The dimension of *SI* relevant here is social-cognitive theory of mind (ToM). ToM allows individuals to model and reason about the mental states and social position of others, as well as themselves (Baron-Cohen et al., 1999; Dunbar, 2003; Graziano, 2013; Kelly, Webb, Meier, Arcaro, & Graziano, 2014; Marlowe, 1986). This model of the mental states of others and oneself, in turn, allows individuals to respond to changes in their social environment by more effectively holding coalitions together and maintaining group oriented feelings via norms (Dunbar, 2011; Engel et al., 2014; Kelly et al., 2014; Woolley et al., 2010). The premise that ToM is the glue that maintains cooperation by reducing the costs of living in groups comes from the first principles of the social brain hypothesis (SBH) and the study of collective intelligence.

The SBH is an explanation for the evolution of brain size in hominin species (as well as non-human primates) over the last 2–1.5 million years. The main proposition of the SBH is that increases in group size cause an increase in the costs of living in social groups; such as, resource depletion, more conflicts over how to distribute resources and less effective communication (Clark & Mangel, 1986; Dunbar, 1998; Johnson, 1983). According to the SBH, when social groups increase in size, greater ToM competency results in greater reproductive success for individuals because they are better at acting in concert to manage resources, which, all else equal, should mitigate the negative effects of larger group sizes on a forager's fitness (Dunbar, 2011, 1993, 1998, 2003; Dunbar, Korstjens, & Lehmann, 2009). If this idea has merit, groups with greater ToM capacity among contemporary societies should be better at working together.

There is evidence that individuals with greater ToM competency have larger friendship networks, which might reflect a capacity for more prosocial behavior (Stiller & Dunbar, 2007; Dunbar, 2003). However, these correlations are not evidence that groups with higher ToM are better at governing resources. Intelligence research in psychology also indicates that increases in ToM improve the ability of groups to achieve a mutually beneficial goal. For example, Woolley et al. (2010) find that the *g* of individuals does not predict group level performance on tasks that require cooperation; however, ToM does (Engel et al.,