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2 **Economic and evolutionary hypotheses for cross-population**
3 **variation in parochialism**

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21 Human populations differ reliably in the degree to which people favor family, friends and
22 community members over strangers and outsiders. In the last decade, researchers have begun to
23 propose several economic and evolutionary hypotheses for these cross-population differences in
24 parochialism. In this paper, we outline major current theories and review recent attempts to test
25 them. We also discuss the key methodological challenges in assessing these diverse economic
26 and evolutionary theories for cross-population differences in parochialism.

27

28 **Keywords:** Parochialism, in-group favoritism, cross-cultural, market integration, religion,
29 institutions, parasite stress, closeness

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31

33 In the last 200 years, the half million Iban living on Borneo's northwest region have undergone a
34 remarkable transformation. When first encountered by colonizers in the 90th century, Iban lived
35 in communal long-houses of 100 to 200 people and made a living from farming rice and hunting
36 (Freeman, 1970). According to their festivals and mythology, Iban worked toward a community
37 that was harmonious, rich in rice, flush with children, and endowed with an abundance of
38 spiritual energy (Jensen, 1974;Heppell et al., 2005). A key way of fostering such flourishing
39 communities was the taking of human heads—to cure a member of one's group or to rescue a
40 member's soul from limbo or from spiritual slavery in another region (Klokke, 2004). It is
41 important to note here that indiscriminate killing was not acceptable among the Iban. Tribal
42 groupings were defined in part as those people who did not take each other's heads. Killing a
43 fellow group member was considered a major transgression on the order of incest. It could upset
44 the universal order and could lead to sterility in terms of offspring and rice production and also
45 in the future taking of heads (Freeman, 1970;Jensen, 1974;Sutlive, 1992).

46 Fast forward to today. After the forceful imposition of colonial and state laws banning head-
47 hunting, the practice is effectively dead, and only a few elderly men still wield the hand tattoo
48 used to mark a successful headhunter (Freeman, 1970;Laukien, 2005). Iban engage in far-flung
49 wage labor opportunities alongside members of other ethnic groups with which they have prior
50 histories of war (Lumenta, 2003). They seek formal education, consume Malaysian mass media,
51 and many have converted to dominant world religions, including Christianity and Islam. Many
52 Iban now also identify as citizens of Malaysia in addition to being Iban (Lumenta, 2003;Postill,
53 2006). At times, violence reminiscent of earlier times flares up (BBC News, 2001), but after two
54 centuries, most Iban have a very different way of defining insiders and outsiders and very
55 different views about appropriate social behavior with other groups.

56 The Iban transformation illustrates three points. First, the ways that people behave toward others
57 can depend heavily on how those others are classified—as kin, friends, and community members
58 or outsiders, strangers and foreigners. Second, human populations can vary dramatically in: (1)
59 how they define closeness and distance of a social partner and (2) how these qualities of a
60 partner influence social behavior. Third, these population differences are not fixed or static.
61 Populations can change quite dramatically within several generations, in this case, from hunting
62 the heads of neighboring groups to participating relatively peacefully in a much larger nation-
63 state and world system.

64 How people socially and psychologically construct boundaries between insiders and outsiders or
65 plot gradients of social distance and how these models of boundaries and distance shape behavior
66 toward others are critical questions for a number of fields. Current models for the evolution of
67 human social behavior, and of large-scale cooperation specifically, rely on the construction of
68 groups that can contain the fruits of cooperation, exclude outsiders, and compete with other
69 groups (Boyd et al., 2003;Choi and Bowles, 2007). Paradoxically, the same tribal instincts that
70 may have fostered the human capacity for large-scale cooperation today pose problems for
71 building peaceful and just societies at ever larger scales (Bernhard et al., 2006;Richerson and
72 Henrich, 2012) They also underly many currently recognized problems in today's world,

73 including favoritism, racial and ethnic discrimination, armed ethnic conflict, and genocide
74 (LeVine and Campbell, 1972).

75 In the past decade, researchers have proposed a number of theories to account for these
76 population differences in parochialism and to explain historical changes like those observed
77 among Iban. However, these diverse approaches are relatively scattered across the social and
78 behavioral sciences, they encompass a wide range of motivations and behaviors under the broad
79 rubrics of in-group favoritism, ethnocentrism, xenophobia, and parochial altruism, and these
80 different theories rarely come into contact in the same paper or analysis. In this paper, we clarify
81 the diverse ways that scholars have operationalized parochialism, we outline and synthesize
82 current hypotheses for cross-population variation in parochialism, and we discuss key
83 methodological challenges in assessing these diverse economic and evolutionary hypotheses.

84 2. VARIETIES OF PAROCHIALISM

85 Humans do not have a general tendency to help, protect or harm others. Rather, these behaviors
86 are conditioned by many contextual factors (Bekkers and Wiepking, 2011), including the
87 perceived need of the recipient (Taormina and Messick, 1983;Engel, 2011), the legitimacy of the
88 request for help (Bickman and Kamzan, 1973), the degree to which someone deserves harm or
89 help (Skitka and Tetlock, 1992), genetic relatedness or kinship with a person (Rachlin and Jones,
90 2008;Alvard, 2009), and whether the individual or group are perceived to pose a threat
91 (Semyonov et al., 2004). The degree to which an actor feels socially close to another individual
92 also reliably guides social behavior, whether social closeness is determined by subjective
93 assessments of a spatial metaphor (e.g. closeness or insiderness) or by common membership in a
94 group (Leider et al., 2009;Goeree et al., 2010;Mathew and Boyd, 2011;Branas-Garza et al.,
95 2012). Here, we refer to the broad tendency to rely on cues of social closeness in guiding
96 behavior as *parochialism*, a concept which encompasses a number of related concepts including
97 xenophobia, ethnocentrism, and parochial altruism.

98 The social and behavioral sciences have a long tradition of studying the proximate mechanisms
99 by which social closeness and group membership influence behavior toward others and how
100 groups emerge in experimental settings (Sherif, 1961;Tajfel et al., 1971;Brewer, 1979;Glaeser et
101 al., 2000;Hewstone et al., 2002;Dovidio et al., 2005;Goette et al., 2006) All of these approaches
102 are united in studying how our decisions to help, protect or harm someone are shaped by
103 perceptions of social closeness. However, these approaches also differ in two key respects: (1)
104 in how social closeness is operationalized, and (2) in what behaviors, preferences and
105 motivations are considered. We review these differences here.

106 OPERATIONALIZING SOCIAL CLOSNESS

107 Social closeness has been operationalized as both an ordinal and categorical concept. As an
108 ordinal concept, researchers have assessed social closeness to a partner or a group in several
109 ways, by asking participants: (1) to rate partners on a Likert scale in terms of "emotional
110 closeness", "we-ness", or spatial overlap (Aron et al., 1992;Myers and Hodges, 2012), (2) to rank
111 partners in terms of relative closeness (Rachlin and Jones, 2008), and (3) to indicate to what
112 degree one sees oneself as a member of a group (Inglehart et al., 2006). A spatial metaphor is

113 used to describe and assess this concept in many, but not necessarily all languages (as in English,
114 Hruschka 2010).

115 Operationalized as a categorical concept, social closeness is based on participation in a
116 relationship (e.g. close friend, family) or on membership in a common group. This can be
117 operationalized categorically in terms of the existence of a recognized face-to-face relationship,
118 including different kinds of kinship, friendship and acquaintanceship (Hruschka, 2010). It can
119 also be operationalized categorically in terms of common membership in a larger group, such as
120 a religion, denomination, nationality, region, city, neighborhood, language, university, ethnicity,
121 or race (Hruschka and Henrich, in press).

122 BEHAVIORS, PREFERENCES AND MOTIVATIONS

123 Parochialism is manifest in a number of behaviors, preferences and motivations, which we
124 classify here as avoidance, trust, favoritism, permission to harm, and ingroup bias.

125 First, one can accept or avoid individuals of different groups in everyday interaction (henceforth,
126 *avoidance*). One of the first attempts to assess parochialism, the Bogardus social distance scale,
127 used this approach by asking how much a respondent would accept someone from another ethnic
128 or religious group as a close relative by marriage, as a close personal friend, as a neighbor on the
129 same street, as a co-worker, as a fellow citizen, and as a visitor to one's country (Bogardus,
130 1933;Inglehart et al., 2006). Second, social closeness correlates with how much people report
131 trusting others. This creates different "radii of trust", where people generally report trusting
132 family more than personally known others and neighbors, who in turn are trusted more than
133 individuals from other regions, ethnicities and countries (Allik and Realo, 2004;Whitt,
134 2010;Delhey et al., 2011). Third, social closeness can influence how we distribute resources or
135 protect others (*favoritism*), whether in allocating jobs (Van de Vliert, 2011) or money
136 (Fershtman and Gneezy, 2001;Bahry et al., 2005;Habyarimana et al., 2007;Whitt, 2010),
137 violating a rule to help others (Trompenaars and Hampden-Turner, 2000;Hruschka et al., in prep)
138 or acting to protect others (Bernhard et al., 2006). Fourth, social closeness can shape how
139 morally acceptable it is to harm others or how hostile one feels towards others (*permission to*
140 *harm*) (Sutlive, 1992;Cashdan, 2001;Mathew and Boyd, 2011). Fifth, people tend to rank
141 socially close friends, family and community members as better than others. This *ingroup bias*
142 can be expressed as pride in family or country or relative ratings of competence, intelligence, or
143 other positive qualities (Brown, 1986;Evans and Kelley, 2002). Researchers have measured
144 these different behaviors, motivations and preferences in several ways, as self-reported attitudes
145 (Evans and Kelley, 2002), behavior in hypothetical scenarios (Trompenaars and Hampden-
146 Turner, 2000;Whitt, 2010), behavior with real monetary stakes (Fershtman and Gneezy,
147 2001;Bahry et al., 2005), and real-world behavior (Gazal-Ayal and Sulitzeanu-Kenan, 2010).

148 In addition to these specific manifestations of parochialism, researchers have also deployed
149 several general measures derived from factor analyses intended to capture investment in one's
150 local group. Perhaps the best known measure is collectivism, or the tendency to care about the
151 consequences of one's behavior for in-group members and to be willing to sacrifice personal
152 interests for collective gains (Triandis et al., 1988;Hofstede, 2001). Schwartz's measure of
153 embeddedness also falls into this category and captures restraint of actions or inclinations that
154 might disrupt group solidarity or the traditional order (Schwartz, 2006).

155 Little research has focused on how these diverse measures of parochialism covary across
156 individuals and populations. In a sample of 186 small-scale societies, between-society variation
157 in hostile attitudes toward other ethnic groups was not correlated with the degree of belonging to
158 one's own ethnic group (Cashdan, 2001). However, a number of measures of avoidance,
159 favoritism, and ingroup bias are highly correlated across countries, and these also correlate with
160 other non-specific measures of collectivism and embeddedness (Hruschka and Henrich, in press).
161 Interestingly, the tendency to favor socially close others appears to extend across diverse social
162 scales, all the way from family to nation. For example, increased population levels of
163 parochialism at one level (e.g. the immediate family) are moderately to strongly associated with
164 parochialism at other levels (e.g. extended relatives, friends, compatriots) (Hruschka and
165 Henrich, in press). Measures of parochialism also appear to be associated with a more general
166 syndrome of social and psychological tendencies, including tighter adherence to norms (Gelfand,
167 2011), greater concerns about obedience and authority (Inglehart et al., 2006), greater religiosity
168 (Fincher and Thornhill, 2012), and more concerns about purity violations (Haidt and Graham,
169 2007).

170 Thus, many measures of in-group favoritism appear to correlate, although out-group hostility
171 may constitute an independent dimension (Cashdan, 2001). Parochialism at one social scale (e.g.
172 immediate family) appears to be associated with parochialism at other scales (e.g. extended
173 family, community and country). And parochialism appears to be part of symptom of other
174 tendencies toward conformity and obedience.

175 3. CROSS-POPULATION VARIATION IN PAROCHIALISM

176 In the last two decades, psychologists and economists have begun to identify key cognitive and
177 neurobiological mechanisms underlying parochialism, including perceptions of threat (Reik et
178 al., 2006) and the role of oxytocin and brain circuits in modulating behavior toward in- and out-
179 group members (De Dreu et al., 2010; Baumgartner et al., 2011; De Dreu, 2012). Researchers
180 have also identified specific kinds of activities which can increase social closeness to others,
181 including focused conversations (Aron et al., 1997), synchronized movement
182 (Vacharkulksemsuk and Fredrickson, 2012), and synchronized multisensory inputs (Paladino et
183 al., 2010). Moreover, it appears that the capacity and propensity to differentiate social groups
184 arises early in development (Kinzler et al., 2007). However, researchers have only recently
185 begun to explore why these psychological capacities for parochialism are recruited differently in
186 different human populations and across different cultural settings (Miller and Bersoff,
187 1998; Buchan et al., 2009; Gelfand, 2011; Van de Vliert, 2011; Fincher and Thornhill,
188 2012; Hruschka and Henrich, in press)

189 There are several ways that populations differ in parochialism. First, what counts as a kin tie, a
190 friendship, or an in-group and what counts as appropriate behaviors with different social partners
191 is informed by local cultural categories and norms. For example, most populations in the U.S. do
192 not have a cultural category of blood brother, and so there is no clear set of norms or
193 expectations applied to being in such a relationship (Hruschka, 2010). Second, the social
194 techniques available to organize and maintain in-groups of varying sizes and scales constrain the
195 kinds of in-groups to which people can belong. Mass media and formal schooling makes it much
196 more likely that people can identify with groups as large as those encompassed by modern
197 nation-states. World religions disseminate and enforce common languages, symbols and rituals

198 which can forge large populations into a single in-group (Atran and Henrich, 2010). These
199 social techniques permit the creation of new in-groups that may have never been possible before.
200 Third, the most salient in-group category can change quickly based on local practices and
201 contexts. Among Enga horticulturalists in Papua New Guinea, rituals aimed at dehumanizing
202 members of another group can swiftly recast allies as enemies (Wiessner, 2006), and among the
203 Nuer of Sudan, changing patterns of competition over resources can re-align in-groups and out-
204 groups (Evans-Pritchard, 1940). Finally, and most relevant to this article, given in-groups of
205 similar scales, individuals from different populations differ remarkably in several crucial ways,
206 including how much they trust and avoid outsiders and how much they favor friends, family and
207 community members (Fukuyama, 1995; Inglehart et al., 2006; Delhey et al., 2011; Hruschka and
208 Henrich, in press).

209 4. THEORIES OF CROSS-POPULATION VARIATION IN PAROCHIALISM

210 Several theories have been proposed to account for cross-population differences and historical
211 changes in parochialism. These theories vary along two major axes. First, they vary in the
212 specific mechanisms by which individuals and populations change in response to their
213 environment. Second, they vary in the specific ecological and social conditions which are
214 posited to shape parochialism. We first review proposed mechanisms and then outline the
215 different proposals for relevant environmental conditions, including market integration, religion,
216 and environmental uncertainty.

217 MECHANISMS

218 Parochial behaviors and motivations might change in response to the environment in several
219 ways. These include genetic adaptation, learning over development, immediate facultative
220 responses, and social learning (Schaller and Murray, 2010).

221
222 One recent example of a genetic mechanism is Chiao and Blizinsky's proposal that differences in
223 collectivism may result from allelic variation in the serotonin transporter functional
224 polymorphism (5-HTTLOR). Specifically, collectivist nations had higher frequencies of the
225 short allele which is associated with heightened anxiety, harm avoidance, fear conditioning, and
226 attentional bias to negative information (Chiao and Blizinsky, 2010). Furthermore, their
227 analyses suggested that these genetic differences may reflect adaptations to infectious disease
228 prevalence. However, a re-analysis of these data suggests that their findings can be accounted for
229 by a model of neutral genetic and cultural change with migration (Eisenberg and Hayes, 2011).

230
231 At much short time scales, individuals may respond relatively immediately to changing
232 environmental conditions. For example, a vast body of experimental work indicates that cuing
233 uncertainty in a number of domains, including mortality, disease, and social exchange, makes
234 people more likely to favor in-group members (Kollack, 1994; Navarrete et al., 2004; Heine et al.,
235 2006; Hohman, 2011). Conversely, priming individuals with terms related to safety and security
236 make them less likely to favor in-group members (Mikulincer and Shaver, 2001). Thus,
237 parochial motivations and behaviors can respond quite rapidly to environmental cues.

238 At longer time scales that are still shorter than a lifespan, parochial motivations and behaviors
239 may change in response to environmental cues during specific windows of development. For
240 example, Fincher and Thornhill propose that individual's may learn about disease risk from the
241 local environment through recurring immune system activation, which in turn affects social
242 behaviors and motivations (Fincher and Thornhill, 2012). Recent studies of exposure to war,
243 suggest that specific parochial motivations and behaviors are sensitive to violence between ages
244 of 7 and 20, but not before or after that window (Bauer et al., 2012). In addition to direct learning
245 through exposure to their environment, individuals may also learn from others about key aspects
246 of the environment, such as local disease risk, threat of mortality, and risk of inter-group conflict
247 (Fincher and Thornhill, 2012).

248
249 In addition to learning environmental cues which may shape parochialism, individuals may also
250 learn relevant social norms about who are members of one's in-group and how one should treat
251 insiders and outsiders under different conditions (Henrich et al., 2010). For example,
252 individuals frequently engaging in market interactions may learn and eventually internalize
253 norms about dealing fairly with relative strangers and anonymous others (Henrich et al., 2010).

254
255 Each of these mechanisms would lead to different expectations about the time scale of response,
256 from months, to decades, to centuries (Schaller and Murray, 2010). Apparent behavioral fit with
257 specific environments may also result from a combination of co-evolutionary feedback loops
258 involving these mechanisms. For example, infectious disease risk, which is proposed by some
259 theories to be a driver of parochialism, is not simply an exogenous element of the environment.
260 Rather it has changed in response to the emergence of public health institutions, which were in
261 turn the outcome of early large-scale collective attempts to improve other's health. Such feedback
262 between environments and behavior can lead to significant co-evolutionary trajectories.

263

264 MARKET INTEGRATION

265 The market integration hypothesis proposes that market norms emphasizing fair treatment of
266 anonymous others have culturally evolved to sustain mutually beneficial exchanges in contexts
267 demanding frequent interaction with strangers or ephemeral interactants. As, individuals
268 increasingly interact with markets, they adopt and internalize these norms, and markets spread
269 more successfully in places where such norms already in place (Henrich et al., 2010). Thus,
270 individuals with greater market exposure will be more likely to have adopted or internalized
271 these norms and thus will treat anonymous others more fairly. This hypothesis has been tested,
272 replicated, and extended in two separate projects covering 24 different societies from Siberia to
273 New Guinea. Overall, more market integrated societies tend to split pots of money more evenly
274 with anonymous others, independent of the threat of punishment, income, wealth, education,
275 community size, sex and age (Henrich et al., 2005;Henrich et al., 2010). Since such equitable
276 behavior arises even when punishment is not possible, and anonymity is assured, the authors
277 argue it is guided by internalized local norms. More recent studies among 57 communities in
278 Ethiopia which are tied to their land by customary rights suggests that the relationship between
279 market integration and prosocial behavior with anonymous others is not due to selective
280 migration (Rustagi et al., 2010;also see Voors et al., 2012 for findings from Burundi). And,

281 recent experimental work on "giving" by Westerners show that such responses are automatic
282 (Rand et al., 2012) and rely on the brain's reward circuitry (Fehr and Camerer, 2007;Harbaugh et
283 al., 2007), suggesting that they do reflect internalized patterns of behavior.

284 RELIGION

285 Many religious traditions emphasize the importance of helping strangers and treating others
286 fairly, and thus enculturation in specific religions may reduce parochialism—either within one's
287 religion or even across religions. One current theory holds that modern world religions, such as
288 Christianity and Islam, were able to spread precisely because they effectively enculturated norms
289 of prosocial behavior which galvanized large-scale cooperation among relatively anonymous
290 strangers (Atran and Henrich, 2010). According to this view, followers of modern world
291 religions, such as Christianity and Islam, will be more likely to have internalized these norms of
292 prosocial behavior and will thus treat anonymous others with greater fairness and generosity.
293 Findings from the cross-society studies described earlier are also consistent with this hypothesis
294 (Henrich et al., 2010), showing that adherents to modern world religions offer more in
295 bargaining experiments. Similar experiments among Western populations have shown that
296 unconsciously priming Christians, but not atheists, with “God” causes them to be more equitable
297 in bargaining games, cheat less, cooperate more and sometimes punish selfishness to a greater
298 extent (Randolph-Seng and Nielsen, 2007;Shariff and Norenzayan, 2007;Ahmed, 2009;McKay
299 et al., 2011;Laurin et al., 2012).

300 World religions may also exhibit variation in how strongly they affect parochialism.
301 Experiments meant to measure trust in anonymous transactions show that religious people are
302 trusted more, especially by other religious people. Consistent with this, work from psychology
303 suggests Christians trust each other more because they believe other Christian know God is
304 watching (Gervais et al., 2011). Ritual participation seems to have affects independent of belief
305 in God: participation in rituals increases in-group favoritism, in the form of cooperation (Sosis
306 and Ruffle, 2003;Ruffle and Sosis, 2006), and is associated with support for out-group
307 aggression (Ginges et al., 2009).

308 Protestantism may be of particular interest here. Weber, and more recently Fukuyama, have
309 argued that a key effect of Protestantism was to "shatter the fetters" of the extended family
310 (Weber, 1951;Fukuyama, 2011), and recent authors have pinned this on Protestant core values of
311 self-reliance and individualism which potentially led to less investment in family, friends and
312 local in-groups (Lipset and Lenz;Treisman, 2000). Consistent with this, cross-national analyses
313 show that majority Protestant countries consistently report less favoritism, in-group bias, and
314 out-group avoidance, after adjusting for economic security and government effectiveness, than
315 countries with other religions in the majority—including Orthodox Christianity, Catholicism, and
316 Islam (Hruschka and Henrich, in press).

317 GLOBALIZATION

318 The globalization hypothesis proposes that as people are increasingly exposed to individuals
319 outside their community through new forms of mass media, including newspapers, the internet,
320 social media, television and movies, and through new forms of social interaction, they are less

321 likely to think in terms of in-groups and out-groups and more likely to imagine humankind as a
322 "we" where there are no "outsiders" (Buchan et al., 2009). Thus, individuals with greater
323 interactions with global communication (e.g., televisions, print media and employment in
324 transnational firms) will be more inclined to engage in collective action with individuals outside
325 of their immediate in-group. This hypothesis overlaps with the market integration hypothesis,
326 but proposes that many kinds of interactions, including mere exposure to people from other
327 countries through mass media, can change responses to outsiders. Consistent with this
328 hypothesis, Buchan et al. (2009) found that contribution to global public goods increases with
329 increasing exposure to different forms of mass media.
330

331 EXISTENTIAL OR MATERIAL SECURITY HYPOTHESES

332 Here we group three related hypotheses that focus on the effects of various form of material or
333 existential security on individual decision making, development and cultural evolution. The first,
334 generalized insecurity, casts a broad net by proposing that insecurity will influence parochialism,
335 while the others suggest that individuals respond selectively to specific kinds of threats, such as
336 pathogens, inter-group conflict, and thermic stress.

337 GENERALIZED INSECURITY

338 Variants of the institutional quality hypothesis propose that informal and formal institutions
339 change the costs and benefits of parochialism, which in turn shape social norms and behavior by
340 a number of potential mechanisms. Public services, global markets, and social safety nets that
341 mitigate material threats and guarantee safe interaction with anonymous partners may render
342 investments in an expansive network of kith and kin less necessary as alternative forms of social
343 insurance. It may also foster greater interaction and trust with a larger set of individuals
344 (Inglehart and Welzel, 2005; Inglehart et al., 2006; Hruschka, 2010; Hruschka and Henrich, in
345 press). Ample experimental and observational evidence demonstrates the role of economic,
346 existential, and symbolic security on parochial attitudes and behaviors (Kollack, 1994; Navarrete
347 et al., 2004; Heine et al., 2006; Canetti-Nisim et al., 2008; Proulx and Heine, 2010; Hohman,
348 2011; Kaplan et al., 2012). Conversely, priming individuals with terms related to safety and
349 security make them less likely to favor in-group members (Mikulincer and Shaver, 2001). And a
350 body of work in political science and economics has examined how norms and institutions
351 reduce barriers to trust, encourage cross-group cooperation and discourage parochialism in
352 ethnically-divided societies (Knight, 1992; Jackman and Miller, 2004; Whitt, 2010). Several lines
353 of observational evidence are also consistent with this hypothesis that stronger institutions and
354 less exposure to generalized risk of famine, disease, and inter-group conflict (Cashdan,
355 2001; Inglehart et al., 2006; Whitt, 2010; Hruschka and Henrich, in press).
356

357 PATHOGEN STRESS

358 The above hypothesis proposed that parochialism responds to existential or material insecurity,
359 in general. However, there are other, more domain-specific, hypotheses that propose that specific
360 forms of insecurity may have parochial effects. Recently, several evolutionary researchers have

361 proposed that parochialism constitutes a form of behavioral immune system against the spread of
362 pathogens. According to this hypothesis, in regions with high risk of infection by dangerous
363 pathogens, individuals will preferentially interact with in-group members in a way that insulates
364 them from infection by out-group members (Schaller and Murray, 2010;Fincher and Thornhill,
365 2012). Though originally predicting avoidance of and hostile attitudes toward out-groups, the
366 theory has been extended to account for other aspects of parochialism as well, including ingroup
367 favoritism and bias (Fincher and Thornhill, 2012). This hypothesis differs crucially from other
368 hypotheses by positing that the adaptive mechanisms responsible for this effect are specific to
369 pathogen risk and were designed to impede the spread of pathogens or to provide social support
370 specifically in case of infection. Different mechanisms have been proposed, including sensitivity
371 to immune system activation, social learning of local disease risks and direct observation of
372 parasitic infections, all of which would lead to relatively fast facultative responses. Other
373 longer-term mechanisms include culturally evolutionary processes by which groups which have
374 social norms preventing and mitigating threats of infection (e.g. parochial social interaction) are
375 more likely to spread and persist in regions of high endemic pathogen threat (Schaller and
376 Murray, 2010).

377 Emerging experimental evidence suggests that people do indeed adjust some social motivations
378 and behaviors (i.e. conformism) to specific cues of pathogen threats over and above generalized
379 threats (Murray and Schaller, 2012). However, cross-national and cross-state studies have
380 shown mixed support for this hypothesis as an explanation for extant cross-population variation
381 in parochialism (Currie and Mace, 2012;Fincher and Thornhill, 2012;Cashdan and Steele,
382 2013;Hackman and Hruschka, 2013;Hruschka et al., in prep;Hruschka and Henrich, in press).

383 INTER-GROUP CONFLICT HYPOTHESIS

384 Another insecurity hypothesis focuses narrowly on how the threat of, or experience of,
385 intergroup conflict may strengthen in-group preferences, including egalitarianism. Using simple
386 choice task in two post-conflict societies, the Republic of Georgia and Sierra Leone, Bauer and
387 colleagues (Bauer et al., 2012) show that the experience of war creates an enduring increase in
388 individuals' in-group egalitarian motivations, while not influencing their motivations toward out-
389 group individuals. However, the effect of war only left an enduring mark on motivation if
390 individual experienced the war during a developmental window from roughly age 7 to 20. The
391 effect of war experience had no impact on those under about age 7, and only small effects on
392 those who experience the war past roughly age 20. These results are supported by other work
393 showing that senior Israeli citizens were more willing to punish norm-violators in a bargaining
394 game during the conflict with Hezbollah, compared to both pre- and post-war measures (Gneezy
395 and Fessler, 2011). Working in Burundi, Voors and colleagues show that victimization in war
396 increases people altruism toward their neighbors, as well as their temporal discounting and risk
397 preferences. This work also examines the effects of non-war related shocks to security, including
398 draught, flooding, and pestilence. This work shows that the experience of droughts also increased
399 altruism towards in-group members, an independent effect, but did not alter temporal discounting
400 or risk preferences. This suggests that war-related insecurity vs. drought-related insecurity may
401 produce somewhat different psychological effects (Voors et al., 2012), supporting the notion that
402 these are distinct domains. However, aside from this finding, all of these data are also consistent
403 with the generalized insecurity hypothesis.

404

THERMIC STRESS HYPOTHESIS

405 The climate-economics hypothesis proposes that much of human culture is an adaptive response
406 to thermic stress—either extreme cold or extreme heat—but that this can be buffered by
407 economic resources. In the case of in-group favoritism, Van der Vliert argues that populations
408 facing extreme temperature stress without the economic resources needed to adapt to that stress
409 respond psychologically in a number of ways, including greater preferences for authoritarian
410 leadership and for favoring members of one's in-group (Van der Vliert 2011, Van der Vliert and
411 Postis 2012).

412

5. METHODOLOGICAL ISSUES IN ASSESSING CROSS-POPULATION 413 HYPOTHESES

414 In the last decade, the observation of substantial between-population differences in parochialism
415 has inspired considerable theoretical work on the possible causes of these between-population
416 differences. This is exciting progress, and this review describes a number of promising theories
417 that may account for cross-population variation.

418 However, there are serious challenges in efforts to discriminate between these different
419 hypotheses and to identify the specific mechanisms by which parochialism rises and falls in
420 societies. Most studies have relied on observational cross-population designs, raising concerns
421 about causality, identification of specific mechanisms, the direction of effects, and the time-scale
422 of adaptation. Several strategies can help deal with these issues.

423

424 The first task is to begin culling hypotheses through strategic model comparison rather than
425 testing each hypothesis against a straw man null model. This involves identifying different
426 predictions across models and then finding appropriate cross-population data which can
427 discriminate between these predictions (Hackman and Hruschka, 2013;Hruschka and Henrich, in
428 press). Of course, this approach does not definitively show that the "winning" hypothesis is
429 correct. However, it helps winnow the playing field.

430

431 Another important check can come from combining psychological experiments with cross-
432 population studies in order to triangulate between potential psychological processes and the
433 macro-scale correlates of cross-population variation. The findings of experiments alone may not
434 scale up easily to account for cross-population differences, and cross-population correlations
435 without grounding in established psychological mechanisms can easily be explained away as
436 spurious associations. Integrating these two orders of data can ensure that hypotheses are
437 consistent at both the individual and population level. A number of theories, including the
438 market integration, religion, institutional quality, and pathogen stress hypotheses have begun to
439 accrue data at both of these levels.

440 To mitigate some concerns about causality, mechanism, and directionality, the social sciences
441 offer a number of tools that provide further checks on findings from cross-population
442 observational data. These include instrumental variable analyses and mediation analysis
443 (Acemoglu et al., 2001;Hruschka and Henrich, in press). Moreover, as access to longitudinal
444 data increases with longer running cross-national surveys, it will be possible to assess the
445 temporal precedence and coincidence of different changes within populations (Inglehart et al.,

446 2006;Hruschka and Henrich, in press). For example, between 1925 and 2005, U.S. samples have
447 shown steadily decreasing avoidance of other ethnic groups in a number of domains—as in-laws,
448 friends, neighbors, and fellow citizens (Bogardus, 1933;Parrillo and Donoghue, 2005). Long-
449 term longitudinal data like this may provide insights into what factors most readily account for
450 long-term changes in parochialism and how rapidly changes occur. Migration studies, originally
451 developed in epidemiology, but now applied in economics, also show some promise in
452 identifying the time-scale by which different aspects of parochialism change across generations
453 who are put into novel contexts (Guiso et al., 2006;Fisman and Miguel, 2007;Giuliano and
454 Alesina, 2010).

455 Despite all of these possible checks and triangulations, observational data is still plagued by
456 concerns about endogeneity and non-random assignment of cases. Thus, once hypothesis are
457 culled and honed through the above-mentioned techniques, a growing body of field experiments
458 in economics, public health, and development holds promise in assessing specific mechanisms
459 by which economic, social and environmental conditions inhibit or foster parochialism. With
460 this combination of model comparison, cross-level confirmation, statistical checks on temporal
461 precedence and causality, and ultimately field experiments of different hypotheses, this exciting
462 and crowded field of theories for parochialism will hopefully lead to a clearer understanding of
463 the specific mechanisms and time scales by which population differences in parochialism emerge
464 and sustain themselves.

465

466

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