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THE EVOLUTION OF THE SOCIAL SELF

Multidimensionality of Social Identity Solves the Coordination Problems of a Society

PAUL E. SMALDINO

WE EACH CONTAIN MULTITUDES

My mother grew up in a largely Jewish neighborhood in Brooklyn and resided in the New York metropolitan area until just a few years ago, when my parents retired to Colorado. Since the move, my mother talks much more often about being culturally Jewish and actively seeks out interactions with fellow Jews. She prepares traditional Jewish dishes such as kugel and matzo ball soup with increasing frequency, occasionally refers to an idiosyncrasy as "a Jewish thing," and has hung in her foyer a poster featuring an Asian boy holding a sandwich with the caption "You don't have to be Jewish to love Levy's real Jewish Rye." She cherishes a coffee mug that features the quotation: "I never think about being Jewish until I leave New York."

The coffee mug makes sense. The New York metropolitan area is home to the largest Jewish population outside of Israel. In Brooklyn, New York's most populous borough, 23 percent of its 2.6 million residents are culturally Jewish (Cohen, Ukeles, and Miller 2012). These numbers are especially impressive given that Jews comprise only about 2.1 percent of the total U.S. population. No matter where you go in the United States, when you leave New York, there are fewer Jews. This is important because American Jews have many cultural traits in common by virtue of being Jewish and American, irrespective of whether they are found in New York, Los Angeles, Denver, or Atlanta (Whitfield 1999). The difference is that in New York being Jewish is both so common and so pervasive in the larger culture of the city that *being* Jewish is not, in itself, a particularly useful signal of an individual's norms and perspectives, and so fades into the background of many Jews'

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identity palettes. It may be more informative to identify as a psychotherapist, or a Buddhist, or a Libertarian; these identities appear in smaller numbers, and so by announcing oneself as such, one can more effectively find others with similar values.

In suburban Colorado, on the other hand, Jews may want to be more proactive in seeking each other out by signaling their Jewishness. This is both because being Jewish is now an informative signal (in the information theoretic sense that it is surprising or unusual) and because the associated norms and perspectives diverge more noticeably from those of the general population. Most people are worthless if you're looking for a decent knish.

My intention in this chapter is neither to talk about my mother nor about Judaism.[1] Rather, I want to talk about a facet of human existence that has been largely underplayed in discussions of cultural evolution: social identity (though see Moffett 2013). This is puzzling because social identities often serve as cultural demarcations and, as I will argue, help humans to solve a crucial coordination problem that would otherwise impede the large-scale cooperation that, some say, defines our species (Bowles and Gintis 2011).

The discussion above highlights several important features of social identity. First, social identity is important. Humans place an immense value on clearly identifying to others *who they are* and *to which groups they belong*. Second, social identity is context dependent. Who I am, and how I express that to you, depends on where I am, who you are, and who else is around. A corollary of this is that social identity is multidimensional. Each of us contains multitudes. We are all many things, and we are different things in different contexts, with different people, in different times and places. These shifting identities help us to act and respond appropriately, both to identify ourselves to the right individuals and to differentiate ourselves from the crowd.

These facts have obvious implications for organizational psychology and the social sciences. Less obvious, perhaps, are their implications for human cultural evolution. In this chapter, I want to talk about how the complex nature of human social identity helps solve a key problem in the evolution of human societies: cooperative group formation. Following that, I will discuss how the role of social identity in facilitating cooperation has changed as human societies themselves have changed.

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COOPERATION, COORDINATION, AND GROUP-LEVEL TRAITS

When compared with other social mammals, human cooperation is astounding. Much has been made of the extreme propensity human beings possess for altruism and other forms of cooperation with their fellow humans. As an evocative example, Sarah Hrdy (2009) has pointed out that the ability of three hundred or more strangers to sit calmly in an airplane for a transoceanic flight—replete with crying babies, snoring neighbors, and ever-shrinking seat sizes—is a marvel in the animal kingdom. Three hundred chimpanzees similarly locked in a metal cabin for eight hours would rip each other to pieces.

This predilection for prosociality is not adequately explained by the mechanisms traditionally employed to explain cooperation in nonhuman species—namely, inclusive fitness and reciprocity. For example, humans in contemporary industrialized societies often cooperate with unrelated strangers in one-shot interactions. Explaining this type of large-scale cooperation probably requires consideration of how cultural transmission (and forms of cultural inertia such as niche inheritance and technological lock-in) interacts with a developmental psychology predisposed to social learning, conformity, and empathy to create a species that has come to dominate the global ecosystem through its ability to cooperate with relative strangers instead of attack them (Laland, Odling-Smee, and Feldman 2000; Arthur 2007; Chudek and Henrich 2011; Tomasello et al. 2012; Smaldino 2014; Wimsatt 2014; Richerson et al. 2016).

Most theory on the evolution of cooperation has treated it as an individual's propensity for prosocially helping another, even if that entails a cost on the part of the helper. In other words, cooperation is an individual-level trait. This characterization is unsurprising. In general, theories of both biological and cultural evolution have generally focused on the evolution of individual-level traits—physical properties and behaviors that are heritable through genetic or cultural transmission. Such traits are generally presumed to be the property of a particular organism, and it is through selective survival and reproduction that evolution hones the trait-environment fit of a species. Yet traits need not only describe properties of individual organisms. As a classic example, the cellular slime mold *Dictyostelium discoideum* forms a slug-like proto-organism when resources are scarce, enabling a group of otherwise free-living amoebae to move to higher ground and for a select few to disperse

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to more nutrient-rich territory (Savill and Hogeweg 1997). The structure and behavior of this slug is crucial to the life cycle of *D. discoideum,* yet it is not accurate to describe these features as a trait of any individual amoeba. Instead, they are emergent group-level traits.

Groups of humans also exhibit many emergent group-level traits (Smaldino 2014). These groups may often be ephemeral, with a group coming together for an activity and disbanding. A major difference between emergent group-level traits in humans and in other organisms is that, in the case of humans, the process of group formation for any specific trait is only minimally controlled by genetics (even in other species, principles of self-organization and environmental feedback likely play a large role).[2] Compared with other species in which there is widespread division of labor—the ants and termites, for example—humans are more morphologically uniform and yet much more behaviorally diverse. This is easy to see if one considers the enormous variety in the nature and behavior of groups of humans working together in organized, coordinated, and often differentiated roles. A cappella choirs, sailing crews, hunting parties, soccer teams, drum circles, policy institutions, farming collectives, winter harvest festivals, urban infrastructure, software development teams, film crews, pickup basketball, military service, commerce. There are myriad ways in which people can work together (for an excellent review of teamwork in humans and other species, see Anderson and Franks [2003]).

Human cooperation often involves groups of individuals working together in a coordinated fashion toward common or mutually beneficial goals. How humans coordinate to *form* cooperative groups, which often involve the emergence of group-level traits, is a major problem for the development of theories of cultural evolution (Smaldino 2014). In order to proceed, it will help to discuss the general problems associated with cooperation.

The Cooperation Problem

The problem of cooperation is often stated in the language of evolutionary game theory: How can individuals with cooperative strategies invade and continuously outperform free riders? In other words, cooperating is risky. If you help your partner but she doesn't help you, you are a sucker as well as an evolutionary dead end. So how can cooperation evolve so that cooperators aren't suckers?

Decades of research have been put into this question. The overly simplistic but largely correct answer is that most of it has to do with positive assort-

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ment. As long as there is some mechanism that allows cooperative individuals to interact preferentially with each other, they can outperform free riders who can't reap the benefits of synergy, while avoiding being played for a sucker. There are a bunch of mechanisms that allow this to happen. Interacting preferentially with kin is a good one. Cooperation can evolve and stabilize through inclusive fitness when closely related individuals interact with one another, through either proximity or some sort of recognition mechanism. Critically, these mechanisms work even if the individuals are *not* closely related, as long as they each share cooperative traits that they can pass on either genetically or culturally (Hamilton 1964; McElreath and Boyd 2007; Gintis 2014). One way this kind of assortment can occur is through limited dispersal—when offspring live their lives near the location in which they were born (Koella 2000; Mitteldorf and Wilson 2000; Kümmerli et al. 2009; Smaldino and Schank 2012). Another way to stabilize cooperation is to make it costly to do otherwise. Partner selection and explicit punishment are among the ways to get this done, and in humans explicit institutions have arisen to do just this (Richerson and Henrich 2012; Ostrom 2014).

Yet another mechanism is to signal with group markers or tags, which can aid assortment by signaling whether an individual is in your group and so is likely to cooperate again either with you or someone you know (Axelrod, Hammond, and Grafen 2004; Hammond and Axelrod 2006; Cohen and Haun 2013). This last mechanism speaks to our earlier discussion of social identity, which I will argue functions as a sort of multidimensional, context-dependent marker for assortment. But, if cooperators can effectively signal to each other with simple tags, why might such a complex mechanism as context-dependent, multidimensional social identities be necessary for assortment? The reason is that finding other cooperators is only part of the problem associated with effective cooperation.

The Hermione Dilemma

The central problem of cooperation is usually framed in terms of how cooperators can invade and outperform free riders. This cooperation problem is largely solved, even if some but-fors and nitty-gritties remain to be worked out. In the case of humans, people are often cooperative. We are the cooperative species, after all (Bowles and Gintis 2011). Problem solved. However, we are still left with the *other* problem of cooperation: how to best generate a benefit between two or more cooperators (Calcott 2008; Smaldino 2014). Often, the question for an individual is not how to find *someone* who will

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cooperate but how to find the *best* person to cooperate with (Nöe and Hammerstein 1994; Tooby and Cosmides 1996; Barclay and Willer 2007).

For illustrative purposes, consider the characters in J. K. Rowling's popular *Harry Potter* fantasies.[3] Clever and resourceful Hermione wants to fight the Dark Lord Voldemort, and luckily she has a bevy of helpful would-be heroes just waiting to assist her! On her left is the one and only Harry Potter: holder of the most telling of scars, Harry is brave, talented, and buoyed by throngs of admirers and supporters. On her right is bumbling Neville Longbottom: kindhearted but clumsy, socially isolated, and possibly a bit dim. Which of these two should she choose to join her in her quest to rid the wizarding world of evil? The problem here is categorically *not* how to pick the cooperator instead of the free rider. Instead, the difficulty is to choose the *best* cooperator, given the task at hand and Hermione's extant personality and skill set. Hermione is doing more than choosing a cooperator. She is choosing a collaborator: someone with whom she will have at least partially aligned goals and with whom she will coordinate to generate synergistic benefits. To make her choice, Hermione is aided by the overt and tacit signals sent by Harry and Neville, advertising their vices and virtues.

How to choose whom to cooperate with is a general problem that humans face all the time. From among the pool of potential partners who might be willing to cooperate, an individual must find a partner or team with whom interests are aligned, norms of behavior and communication are shared, and skills and experience are either common or complementary, depending on the task. To form successful collaborative partnerships or teams, individuals have to find the right people and make themselves desirable to them.

THE ROLE OF SOCIAL IDENTITY IN COLLABORATIVE GROUP FORMATION

Among cooperative individuals, there are myriad ways in which they might cooperate. This is often discussed as a problem of coordination. Assuming two or more individuals have the psychological machinery for shared attention and joint behaviors (Tomasello et al. 2005; Gallotti and Frith 2013; Heyes 2013), it is beneficial for them to maximize the degree to which they can harmoniously coordinate their efforts to generate the most productive synergistic outcome. If they share goals, vocabulary, and behavioral norms, coordination may go deeper and more smoothly, generating a larger benefit compared with individuals who cooperate out of obligation or necessity but

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must struggle to find common ground (McElreath, Boyd, and Richerson 2003; Calcott 2008). Thus, individuals must find a way to assort not only according to their cooperative tendencies but according to their norms and values. It is proposed here that social identity facilitates this kind of assortment.

For the purpose of this discussion, I follow the social psychologist Kay Deaux (1993) in allowing for a fairly broad definition of social identity: social identities are those roles or membership categories that a person claims as representative. These can include groups such as "Asian Americans" or roles such as "mother." This definition is by and large aligned with the sociological concept of the reference group and is also consistent with how identity is discussed in sociocultural anthropology. In his well-known chapter on ethnic groups and boundaries, Barth (1969) writes:

> It makes no difference how dissimilar members may be in their overt behavior—if they say they are A, in contrast to another cognate category B, they are willing to be treated and let their own behavior be interpreted and judged as A's and not B's; in other words, they declare their allegiance to the shared culture of A's. (15).

A key point here is that identity is not just something that is felt internally, as is the view from psychoanalytic theories concerned with the "struggle for identity" (e.g., Erikson 1968) as well as social psychological theories concerned with self-conceptualization (e.g., Brewer 1991; Hogg 2000). Self-concept is an interesting and surely important factor in explaining human behavior, but it is neither highly relevant to the present discussion of cooperative assortment nor easily measured in any sort of experimental paradigm. Instead, I am concerned with social identity as something that is actively and outwardly expressed.

Social Identity as a Signal

The expression of a social identity might take the form of an overt declaration ("I love socialism!"), covert signals such as encrypted jokes referencing shared experiences (Flamson and Bryant 2013), or markers such as clothing or vocabulary. Because of the high dimensionality of social identity, however, an individual cannot and should not express every facet of his or her identity. Rather, a subset gets expressed depending on context. But which subset? This question has been investigated by social psychologists who fall

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broadly into two camps. Both camps focus on the need to distinguish oneself from others but differ on the reasons for doing so and from whom one should differentiate oneself.

Theories related to distinctiveness or uniqueness focus on carving out a niche for oneself and thereby differentiating oneself from similar others (Snyder and Fromkin 1980; Brewer 1991; Vignoles 2011). In particular, *optimal distinctiveness theory* (Brewer 1991) posits that individuals adapt their self-concept to balance opposing needs for assimilation and differentiation. This adaptation is presumed to be based on the relative distinctiveness of the various components of their overall social identity in the current social landscape. For example, if I am a Socialist Muslim, I might identify more strongly as a Socialist when Socialists are rare and Muslims common, and as a Muslim in the opposite case. Though unable to test for internal self-concept, experiments have shown that Western college students do alter their expression of social identity based on the relative distinctiveness of those components in at least some settings (Pickett, Silver, and Brewer 2002).

Optimal distinctiveness theorists sometimes adopt an adaptationist rationale for their posited innate psychological desire for belonging to groups of relatively moderate size. For example, Leonardelli, Pickett, and Brewer (2010) suggest that such preferences allowed hominins to optimize the size of their cooperative groups, reaping the benefits of scale while avoiding the free rider problems found in large collectives. Without considering if the genetic evolution of such preferences is even feasible (see Gould 1991), we can first ask whether such individual preferences would, in fact, give rise to "optimally" sized groups that maximize the benefits to their constituents. Mathematical modeling suggests that this is unlikely. Smaldino et al. (2012) modeled a simple scenario in which all agents had group identities, had identical preferences for a moderate relative group size, and switched groups when another group had a preferable size. They showed that this scenario led to assortment into overly large groups in which no one's preferences were satisfied, except in the case where rigid network structures were imposed. In other words, preferences for relative distinctiveness did not result in group sizes that reflected those preferences. Moreover, group size is likely to be determined by the specifics of the task at hand and the resources available to group members, rather than by the aggregate preferences of its members. If there are benefits to group membership, then the interests of those who want to join a group may be opposed to the interests of those already in the group, who would be better off keeping them out (Smith 1985; Giraldeau and Caraco

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2000; Smaldino and Lubell 2011, 2014). In this case, group size will equilibrate to the point where the benefit lost to group members by adding a member is equal to the cost of barring a new member from entering (Smith 1985; Giraldeau and Caraco 2000). In addition, the optimal size for cooperative groups will likely be task dependent. As a result, a passive mechanism for determining group size—such as a general preference for joining groups of a particular size—will be insufficient to facilitate optimal assortment in most cases. It is therefore quite unlikely that strategies of social identity expression have evolved to optimize group size for cooperative endeavors. Instead, it seems more likely that the expression of social identity is geared toward assortment into groups in which the constellation of social identities satisfies the *group-level* needs for coordination and division of labor.

This line of reasoning does not invalidate the experimental findings of the optimal distinctiveness theorists, nor does it suggest that individuals do not strive to differentiate themselves from similar others. The most obvious benefit to differentiating oneself from the crowd is that it allows one to more easily find collaborators. But once this has been achieved, another mechanism is required to facilitate further assortment into groups.

Another camp of social identity theorists, the *identity signaling theorists* (Berger and Heath 2008), suggests that the expression of social identity functions largely to differentiate oneself from those who are *different,* in order to ensure that others understand who they are and do not mistake them for those with opposed norms or values. In other words, people understand when there is a chance they may be mistaken for a member of another group and take active precautions against this. For example, Stanford students in a typically "jocky" dorm were sold a one-dollar "Livestrong" bracelet, as was another dorm across campus as a control (to test the effect of boredom). A week later, bracelets were also sold to members of a neighboring "dorky" academic dorm, and these students tended to interact heavily with members of the first dorm in classes, dining halls, and so on. After another week, 32 percent of the jocks but only 6 percent of the control dorm members had stopped wearing the bracelets (Berger and Heath 2008, Study 2). If the expression of social identity is to make sure others know who you are, then one should abandon a signal when it is not reliable.

Both camps of social identity expression get something right. Social identity helps an individual to stick out from the crowd *and* find similar others, the latter being achieved both through the disassociation from dissimilar others discussed by the identity signaling theorists as well as through direct

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assortment for similarity, or homophily (McPherson, Smith-Lovin, and Cook 2001). In other words, *the expression of social identity functions as a signal to facilitate assortment for successful coordination.*

SOCIETAL STRUCTURE AND THE MULTIDIMENSIONALITY OF SOCIAL IDENTITY

In his 1961 novel *Mother Night,* Kurt Vonnegut tells his readers, "We are what we pretend to be, so we must be careful about what we pretend to be." Therein lies an important lesson about the difference between self-concept and self-expression, and a reminder that we are judged by our actions, not our thoughts. However, as a psychological theory, Vonnegut's analysis is lacking. We may be what we pretend to be, but we pretend to be *lots of things.*

Each of us has multiple identities. In-group biases are well documented in intergroup interactions, but we should recall that we all belong to multiple in-groups. We identify and are identified by family, friends, work, gender, politics, race, the sports teams we support, and the music we listen to (and the corresponding t-shirts we wear). Which of these identities is most salient is dependent on the context. Our lives are multifaceted, and different aspects of our social identity are expressed and utilized in different social and behavioral contexts (Long 1958; Deaux 1993; Putnam 2000; Roccas and Brewer 2002; Ashmore, Deaux, and McLaughlin-Volpe 2004). There are, of course, individual differences in the ways in which the multidimensionality of social identity is conceptualized and expressed (Roccas and Brewer 2002), but this aspect of that multidimensionality is not what concerns me here. Let us simply assume that humans express social identities in a manner that accounts for their multidimensional and context-dependent natures. The point I want to make is that, because humans have to cooperate in many different contexts, *the multidimensionality of social identity is important for successful coordination.*

Different Societies Imply Different Roles for Social Identity

This is the point at which we finally encounter the topic of cultural evolution, because the structure of society will determine the contexts for cooperation and therefore impinge on the multidimensional nature of social identities.

Different societal structures create different strategic opportunities and necessities for interaction. The sociologist Miller McPherson notes, for ex-

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ample, that as societies transition from small-scale foraging structures to large-scale agricultural structures, "the activation of entirely new dimensions such as education, occupational prestige, and other distinctions come into play" (McPherson 2004, 266). Of course, certain identities are specific to certain cultures, corresponding to particular idiosyncrasies of history, religion, or climate. These differences will affect the specific ways in which social identities are expressed. However, there may be certain regularities found in the expression of social identity across cultures. These regularities include the diversity of social identities in a population, as well as the manners in which social identities are expressed to facilitate coordination.

I will simplistically talk about human societies as varying on a continuum of "complexity." I want to be careful to note that I mean to make no judgments or appraisals related to the worth or quality of a society in referring to one as more or less complex. In particular, the complexity, depth, or intelligence of the *individuals* in those societies is completely orthogonal to this discussion. Rather, let the complexity of a society be a gestalt measure encompassing the size of its population and the diversity of the specialized social and economic roles held by its members. By this measure, a foraging society of a few thousand would be relatively simple, and a modern international community would be maximally complex. Other, more precise measures are obviously desirable, but this is somewhere to start.

Social Identity Expression in "Simple" Societies

For most of human history, people lived in relatively small groups. Studies of modern hunter–gatherers show that although extended societies can number in the thousands, most of an individual's time is spent with small foraging groups numbering between thirty to one hundred adults (Hamilton et al. 2007; cf. Caporael 2014). Most discussion of identity as a facilitator of cooperation and coordination in both contemporary and prehistorical foraging societies has focused on the role of overt ethnic markers or tags (such as language, accent, or clothing) for distinguishing between cultural groups (Barth 1969; Cohen and Haun 2013; Hammond and Axelrod 2006; McElreath et al. 2003; Moffett 2013). In such societies, only outsiders had to be identified by a tag, as in-group members could be known directly, through either personal experience or reputation (Apicella et al. 2012; Hamilton et al. 2007).

In a small, perfectly egalitarian society—which may, some have claimed, describe the conditions under which typical ancestral Pleistocene humans

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lived (Boehm 1999; though see Smith et al. 2010)—the diversity of roles should be quite low. Individuals would be identified by the persistence of role diversification based largely on sex, age, or skill. The expression of social identity in such a society should therefore be minimal. Although individuals vary in their skills, experiences, and outlooks, these differences tend to be known by everyone in the community in very small-scale societies.

This is not to say that, in small-scale societies, assortment based on shared norms and values is necessarily a trivial problem. Individual differences abound even in small groups, and individuals in all societies develop friendships with their preferred interaction partners, solving the problem of assortment by identifying specific individuals to cooperate with (Hruschka 2010). Fostering deep friendships takes time, and finding potential friends is still a challenge. Flamson and Bryant (2013) have raised the interesting proposition that within small communities, jokes and other forms of humor serve as encrypted signals that allow similarly minded individuals to preferentially assort without alienating dissimilar in-group members, with whom they must still occasionally cooperate. Such a strategy solves the problem of coordination without a need for overt identity expression.

Social Identity Expression in "Complex" Societies

With the introduction of hierarchy and social classes, social identity within the community can become concerned with largely prescribed roles and with facilitating the proper behavior between two or more actors in consideration of their positions. For example, in the Indian caste system, individuals from different castes may cooperate in the domain of farming, but not intermarry (Waring 2012). Here, social identity can facilitate smoother assortment for coordination, as individuals can be placed into categories of potential or forbidden partners based on their belonging to a particular class, saving the individuals the trouble of getting to know every other individual in depth to make such an assessment.

After the rise of agriculture, societies became larger, more complex, and more entangled with other societies via trade networks (Johnson and Earle 2000; Moffett 2013; Richerson and Boyd 1999; Gowdy and Krall 2016). In a population that is both large and has a high degree of diversity in social roles, individuals must often interact cooperatively with relative strangers in a large variety of contexts. In complex societies, therefore, mechanisms for establishing trust, compatible skills, and common norms and values become increasingly important to the formation of cooperative groups.

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Complex societies pose two new problems for human cooperation. First, as human societies grew larger, members of cooperative groups would increasingly have to interact with individuals whom they had not previously encountered or otherwise knew little about, making finding partners for cooperation and coordination increasingly difficult. Second, as the diversity of roles within a society became greater, individuals would increasingly have to modify the expression of their social identities to relate to others in a larger variety of contexts. To solve these problems, individuals in complex societies must make rapid, accurate decisions regarding both whether to cooperate with a potential partner and how to do so.[4] Individuals looking to join a group as well or let new members into their groups facilitate this process through the expression and evaluation of social identities.

To be clear, I am not suggesting that individuals' social identities need be more or less rich in different societies. Individuals have complex and well-developed identities in all known societies. Rather, I argue that in more complex societies, the landscape of possible identities is more heterogeneous, and the multidimensionality of social identity is employed more directly as a coordination device. Thus, the advent of social identities in modern complex societies, such as national or regional identities; religious affiliations; or various fan communities for sport teams, film, or music, may be indicative of a cultural evolved solution set to the problem of assortment for cooperation and coordination in an expanding world.

A hint at how this kind of psychological transformation could occur through cultural evolutionary processes is suggested by the results of a recent study by Isabel Scott and her colleagues (2014). They looked at male and female perceptions of facial characteristics in potential sexual partners across twelve populations that included complex, urbanized societies as well as smaller-scale pastoral and foraging societies. They found that highly dimorphic preferences—square jawlines in men and softer, rounder faces in women—were more prevalent in urban, large-scale societies. Individuals in smaller-scale societies, in contrast, did not rely on such signals. They also found that the degree to which more masculinized faces were perceived as more aggressive was strongly correlated with the percent of the population that was urbanized—that is, living in a large, complex social environment. An interesting aspect of this finding is that masculinity *is* a reasonably strong predictor of aggression, in part because it correlates with circulating testosterone levels (Pound, Penton-Voak, and Surridge 2009). It seems quite possible that the stereotype of square-jawed men as more aggressive never

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developed in smaller-scale societies because there was no need for it—when aggressive men can be known individually and by reputation, such a stereotype would equate to discarding a strong signal for a weaker one. In large-scale societies, however, where rapid evaluation of strangers is paramount, such stereotypes may become useful heuristics.

Hogwarts Revisited

Let us return briefly to the problems of partner selection facing Hermione. In the earlier example, she was able to use firsthand knowledge of Harry and Neville in order to contrast them as potential cooperation partners. All three students are members of Gryffindor House and have regular contact, including extensive interactions on their very first day of school. This example reinforces the point that in complex societies, social organization takes many forms, and social identity is hardly required for *all* partner selection problems. However, consider a scenario in which Hermione, being of above-average intelligence and skill, is allowed to skip a grade. She finds herself in mixed classes with unfamiliar, older students from both Gryffindor and Ravenclaw. For partnered activities, she might use membership in Gryffindor as a first-pass signal to reduce the set of potential partners to those she knows share her values of bravery. This would be an especially good strategy if the activity required bravery, such as taming a wild hippogriff. On the other hand, suppose the activity was something requiring exceptional cleverness, such as devising an empirical test for how magical ability is transmitted from parents to offspring. In this case, Hermione might favor her identity as a clever person over her identity as a Gryffindor, and choose to partner with a Ravenclaw. The complex societal structure of this world facilitates many identities and many permutations for assortment.

COGNITIVE TRADE-OFFS BETWEEN DEPTH AND BREADTH OF SOCIAL IDENTITY

The ways individuals in the West conceptualize and express social identity are often written about as if they represent universal features of human nature. Indeed, proposed adaptationist explanations for these social identity strategies (e.g., Leonardelli, Pickett, and Brewer 2010) assume that our Pleistocene ancestors thought about other people in a manner similar to how we now think about ourselves and others. Such assumptions are dubious. Instead, the psychological nature of social identity is highly constrained by the

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structure of one's cultural milieu. Thus, as the structures of cultural societies have changed, so too have the ways in which humans have conceived of and expressed social identity. Indeed, the relative recency of the transition to agriculture and the emergence of complex societies suggest that many strategies related to the expression of social identity likely arose through cultural rather than genetic evolution. It would hardly be surprising if a rethinking of the psychology of social identity with an eye toward cultural evolution is necessary, given the extent to which psychological research has been skewed by a focus on minds belonging to individuals raised in Western, industrialized societies (Henrich, Heine, and Norenzayan 2010).

A few anthropologists have noted to me in private that individuals in "simpler" societies appear to have, if anything, a richer conception of identity. By this, I believe these anthropologists mean that, for people in these societies, the differences between the individuals they know are more pronounced, and the number of labels they can put on any individual is higher. If true, it strikes me as possible that there exists a cognitive trade-off in the depth and breadth of social identities an individual might use to identify himself or herself and others. As the diversity of contexts for identifying people increases, the depth at which any one person can be identified would decrease. This is surely one of the more speculative elements in this chapter, but it may nevertheless have legs.

To see how this might work, we can remind ourselves that the phenomenological aspects of the human mind emerge from the activity of the meat brains residing in our skulls, and that these brains are made of neurons. We can therefore draw insights by analogy to artificial neural networks. Consider a network with a fixed number of nodes, tasked with pattern discovery. In developing this example, I assumed the relatively simple architecture of feature discovery through competitive learning developed by Rumelhart and Zipser (1985), but any number of other architectures would suffice. The purpose of this type of network is to classify a large set of stimuli into discrete categories, such that the number of categories is not predetermined but has an upper limit of M. Here, the network is tasked with categorizing an individual's interaction partners based on a suite of expressible traits (their identities). If an individual's interaction partners are all drawn from the same group, then the network should discover systematic differences that exist between clusters of individuals within that group. On the other hand, if the set of interaction partners is drawn from across many groups, such that individuals within each group have correlated traits, then the network is likely

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to cluster individuals by group and, by extension, treat all individuals from each group as identical.

This is obviously an oversimplification of a complex aspect of human cognition, but it helps to explain how there might be a trade-off between depth and breadth in how we categorize those we interact with. Depth is sacrificed for breadth when one must coordinate with individuals with whom one shares less cultural and developmental overlap. Such a trade-off might be investigated empirically both through computer simulation with artificial neural networks as well as through direct cross-cultural comparison of how individuals in differently structured societies categorize themselves and others. More generally, this discussion points to the fact that social identity serves a social purpose, and that purpose is dependent on the strategic needs, opportunities, and affordances of the individuals in a given society.

Using Social Identity to Talk about Others

An alternative perspective on the trade-offs between simple and complex societies stems from the role of social identity as a way of communicating, not only between potential partners, but also with third parties. This idea is complementary rather than oppositional to the idea on cognitive trade-offs just presented. In small societies in which everyone knows one another, discussions about individuals who are not present can be had using direct references to those individuals, and the need to discuss personality or behavioral properties of strangers may be minimal. Complex societies, on the other hand, necessitate the existence of norms for describing people one knows in one social context (e.g., work colleagues) to people one knows in another social context (e.g., college friends). Indeed, people require common ground in order to describe anything, including other people, to their conversation partners (Clark and Brennan 1991). Social identities can serve as scaffolds for learning about new people, providing schemata for their potential behaviors and personalities. Moreover, the wider the variety of people we encounter, the more categories we will need to discuss them all. Requiring more categories, in turn, might lead to a shallower description of any specific person, as descriptions rely more on broad categories and less on detailed behavioral analysis.

In any society, individuals face problems of assortment, both to find cooperators while avoiding free riders or bullies, and to maximize the benefits of coordination with like-minded partners. I have proposed that (1) social iden-

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tity helps to facilitate assortment for successful coordination, (2) the structure of social identity, and the extent to which it is used for assortment, is tied to the structure of the society individuals find themselves in, and (3) the multidimensionality of social identity evolved culturally to facilitate cooperation with different individuals serving different needs in different contexts.

Solving the problems of cooperation necessary for the synergistic underpinnings of human culture requires assortment and coordination (Tomasello et al. 2012). As societies grew larger and more complex, social identity enabled people to solve the problem of assortment as other solutions—such as kin recognition, reciprocity, or monitoring—increasingly failed. Using social identity as a tool for assortment would have piggybacked on preexisting psychological structures related to identifying one's place within a group, which evolved in the context of simpler societies. The *cultural* evolution of highly multidimensional social identity profiles in response to the changing demands of complex societies might, in turn, explain a potential trade-off between depth and breadth in social identity.

After groups assort, there exist well-known feedback processes in which group members grow closer together, are more strongly identified, and are increasingly better at coordinated activities (Sherif 1988; Theiner and O'Connor 2010; Gallotti and Frith 2013). More generally, social identities may be shaped through the course of group membership, such that group membership acts as a scaffold toward role development. Abrams (2014) has proposed that as social organization persists and individuals take on different social roles, the intrinsic organizational structure may encourage "cohesive cognitive subnetworks," which in turn will cause individuals who take on similar roles in different groups to become increasingly similar. In other words, the environmental effect of participating in a group-level endeavor may lead to a number of cognitive and behavioral similarities among individuals occupying similar social roles, above and beyond those necessary for performing those roles.

The details of any particular culture will constrain the options of its members in many ways (Smaldino and Richerson 2012), including options related to social identity. For example, Michele Gelfand and her colleagues (2011) characterized thirty-three national cultures on a spectrum between "tight" and "loose." Tight cultures are defined by strong norms and a low tolerance of deviant behavior, with the reverse true of loose cultures. In tight cultures, social identity fluidity should be lower than in looser cultures,

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independent of the society's "complexity." In general, the psychology of social identity and the evolution of human cultural complexity are complex and complicated topics, and it is unlikely that any single hypothesis or line of reasoning will be able to explain either of them, as Sterelny (2012) argues more generally for explanations of human social complexity. My goal in this chapter is simply to provide a new perspective on the overlooked connection between these two areas of research.

Cultures are shaped not only by how individuals use social identities to assort with others, but also by the specific norms and goals associated with those identities. I have largely ignored this distinction, and in particular I have ignored those social identities that have shaped human cultural evolution perhaps more than any others: religious identities. These are often accompanied by heavily enforced institutions that promote social cohesion and group-adaptive behaviors, and have likely been critical in the emergence of large-scale, hierarchical societies (Wilson 2002; Norenzayan 2013; see also Watts et al. 2015). This omission is certainly not a reflection of a lack of importance but is instead a tactic to focus on the multidimensionality of social identity and its role in facilitating coordination.

The thesis put forth here is necessarily somewhat imprecise, dealing with the interaction of many complex topics that are not always so well defined, perhaps none more so than "social identity." I view this chapter as a first attempt to organize some thoughts on the relationship between social identity, cooperative coordination, and the evolution of human social complexity. In the future, formal mathematical and computational models will be useful to constrain the problems discussed here more precisely. Such models will hone these arguments and guide empirical research to look for particular patterns in the data, much as models of social learning and cumulative culture inspired subsequent laboratory research on the relationship between group size and the maintenance of complex technologies (Derex et al. 2013; Muthukrishna et al. 2013; Kempe and Mesoudi 2014).

Cultural traits are inherently social traits. Thus, in order to think about how cultural ideas, technologies, and institutions spread and evolve, we need to think about the emergence and evolution of traits that are properly described at the level of groups (Smaldino 2014). A part of this picture is the recognition that humans identify themselves in terms of others. Understanding the role of social identity in cultural evolution will help us move beyond the meme, beyond the focus on individual traits and simplified models from

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population genetics or epidemiology, and toward models of cultural evolution that capture the essential "we"-ness of human beings.

NOTES

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1. Though I could hardly be more Jewish by opening with a discussion of my mother.

2. For example, a tapered body shape and random movement in a confined space is sufficient to produce the huddling behavior observed in rat pups *(Rattus norvegicus),* which is thought to be critical in thermoregulation and energy conservation (May et al. 2006).

3. I hope the die-hard Potter fans will forgive me for this noncanonical interpretation.

4. These problems would be easier to overcome in smaller, less diverse groups. However, the advantages of size and efficiency likely outweighed their costs as some complex societies emerged and began to compete with other cultural groups. For discussions of this transition, see Turchin and Gavrilets (2009) and Richerson et al. (2016).

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