A Functionalist Account of Social Identity

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1 Introduction

Categorization is a foundational aspect of cognition (Hofstadter & Sander, 2013); creating and applying categories is one of the most basic functions of a brain. The world has so many things in it, and we must deal with those things adaptively. What do we eat and drink? What do we avoid? What does the weather imply about my most urgent needs? What can I use to help in my endeavors? In other words, categories aid adaptive decision-making by allowing us to identify regularities in the world. This reduces our uncertainty and increases the legibility of our environment, helping us to choose appropriate actions based on our circumstances.

Social identity is a type of category used for social decision-making. Social identities help us to determine—based on learned and inferred regularities in the social world—who we should trust, help, fear, dominate, submit to, enlist, or romantically pursue. People vary along many dimensions, and as such there are many possible ways to group them into categories. Because the most useful categories are those that have meaningful consequences for thought and action, identity designations often involve characteristics like gender, sexual orientation, ethnicity, and politics, with relatively little attention given to grouping people by their soup preferences or by the size of their little toes.

The focus of this chapter is on the functional aspects of identity—how salient identity categories have consequences for making decisions. This is not to downplay the sense of belonging people gain by being part of a coherent group, nor the capacity for collective action a sense of camaraderie can engender. Identities form over time through a mixture of circumstance, learning, and strategic choice in a

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variety of contexts (Moya, 2023; Wagner, 2024). Acknowledging that, for the purpose of this chapter I am de-emphasizing the phenomenology of individual identity and the processes by which cultural groups construct the specifics of their shared identities and the worldviews and narratives that accompany them. Instead, the chapter focuses on how people use perceived identity categories for adaptive decision-making, and how they strategically implement signals of identity to manipulate the behavior of others.

Adopting a functionalist view of identity allows us to focus on the forces that shape their use and on the filters that select some variants over others. Natural selection, learning, and culture (especially social transmission, norms, and institutions) are all drivers of what Skinner (1981) called "selection by consequences." In the remainder of the chapter, I will first make it clear that signals of social identity often encode meaningful information for decision-making. I will then review perspectives on how selection by consequences has shaped the use of identity signals to more adaptively facilitate social learning, partner choice, and coordination. This will be followed by a consideration of how the functional nature of identity has been changing in a world that is increasingly characterized by diversity, political polarization, anonymity, and the Internet. I will end by emphasizing that because identity is constructed for functional purposes, identities are only essential insofar as forming categories and legible cultural artifacts are essential features of human activity.

2 Identity Encodes Meaningful Information

Social categories are useful because the presence or absence of certain traits, behaviors, perspectives, personalities, and affordances can often be meaningfully predicted from those categories. These predictions are not always accurate, of course. When associations are acquired second-hand or deliberately produced as disinformation, they can become quite harmful, taking the form of false and even dangerous stereotypes. From the perspective of cultural evolution, the use of social categories would not persist as an adaptive strategy if it didn't lead to adaptive decision-making a substantial proportion of the time. Nevertheless, as we proceed with the functional consideration of identity, it is important to remember that the cognitive processes involved in forming and using social categories can be co-opted and exploited to produce harm as well as benefit.

Some social categories are predictive due to certain intrinsic physical properties of the individual. Tall people can more easily reach high places, young people usually need more patience and care, women are more likely to be primary care-providers for children. Other social categories are useful due to the implications about how a group provides education and instills norms among its members.

The world is very complex, and a naïve individual encounters scenarios with a vast multitude of choices, many of which lead to peril and few of which yield great benefit. Our large brains evolved to reduce this uncertainty. We group objects, individuals, scenarios, and even actions into categories. This means that even if

we haven't encountered an exact copy of some scenario before, a well-prepared individual may have some inkling of the types of choices that work best in scenarios of the same sort. While all animals with brains do this to some extent, culture multiplies our power to manage uncertainty manyfold. We share information with others, we tell stories and construct narratives—all of which multiplies our ability to learn about useful categories and associate them with adaptive behavior.

Culture also reduces uncertainty by making the world more *legible*, to borrow a term from Scott (1998). Norms about politeness and fairness help facilitate exchange among strangers, as do culturally-learned schemas for behaving in places like schools, restaurants, and courts. Institutional elements like traffic lights, legal codes, and religious prescriptions help us know what is expected of us and give us an inkling of what will happen if we transgress. And because so many of these categories and expectations are culturally learned, cultural groups subsequently differ systematically in terms of norms, perspectives, and shared narratives (Chudek & Henrich, 2011). A cultural group—be it a nation, a subculture, or a friend clique—constructs a shared view of the things in the world, of explanations for the experiences had by its members, and how actions can shape those experiences (Brand et al., 2021). The group's worldview also defines how the group differs from other groups they observe or interact with, and these definitions are often accompanied by reasons for not adopting the behaviors or ideas of those groups. In this way, differences between groups are maintained, solidifying the predictive value of group identity as a social category.

Consider the case example of political identity in the United States, currently a highly polarized nation with stark differences between partisans. In the mid-twentieth century, the party one voted for (typically either the Republican or Democratic parties) was an inconsistent preference and a weak predictor of non-political traits. In the intervening decades, processes of assortment and influence have changed this, and political identity has become a beacon for differentiation (Bishop & Cushing, 2009; DellaPosta et al., 2015; Mason, 2018). These differences are now so strong that cross-partisans can have starkly different definitions for the same words. As an example, consider the Black Lives Matter movement. The movement arose in the wake of the 2012 murder of seventeenth-year-old Trayvon Martin in Florida, and quickly became associated with the online hashtag #BlackLivesMatter. This was quickly followed by a countermovement, #AllLivesMatter. Powell et al. (2023) found that perceptions of #BlackLivesMatter as racist or offensive were strongly correlated with right-wing political orientation, and found comparable associations between #AllLivesMatter and left-wing orientation, indicating that cross-partisan conversations around reducing racism are likely to be fraught with misunderstandings. Similarly, when asked to name "socialist" countries, the top three answers given by Republican voters in the U.S. were Venezuela, China, and Russia, while the top three answers given by Democratic voters were Denmark, Sweden, and Norway (Smith, 2020). These findings highlight that not only do different identity groups behave differently, they may have fundamentally different conceptual understandings of the world, impeding intergroup communication and the dissolution of barriers.

Any grouping of humans into a society—be it a band, tribe, city-state, or nation—is characterized by a shared identity that is held by all of its members and used to contrast their group with other groups (Moffett, 2024). Most social animals live in what Moffett (2013) has called *individual recognition societies*, in which individuals cooperate mostly with others they directly know and recognize. In contrast, humans are nearly unique among vertebrates in the extent to which they live in *anonymous societies*, in which individuals will cooperate with almost anyone who is convincingly marked as a member of their group. Identity signals are therefore critical to understanding human social organization, as are the ways in which humans use identity signals to carry out the basic functions of living in society. In the next sections, I will consider the functional implications for how markers or signals of identity can be usefully employed in decision-making. I will begin with the adaptive value of learning preferentially from ingroup individuals, followed by the use of identity signals for partner choice and behavior selection, with particular focus on diverse societies.

3 Identity Aids Social Learning

There is a large body of theoretical and empirical literature detailing the adaptive value of social learning—acquiring information, behavior, and technology from others (Boyd, 2018; Kendal et al., 2018). Social learning helps organisms acquire adaptive behaviors without incurring the costs or risks of investigative trial and error, and its strategic employment when individual learning is likely to be particularly error-prone can boost the overall fitness of a population (Aoki & Feldman, 2014; Boyd & Richerson, 1985, 1995; Ehn & Laland, 2012; McElreath et al., 2013; Turner et al., 2023). However, even when individuals can readily copy others with high fidelity, social learning fails to provide an advantage when the information one learns from others is not relevant to one's own experience. This can happen when environmental conditions change or when individuals migrate to new places—in both cases behaviors that were once adaptive may no longer be so. Research has shown that certain strategies or heuristics—whether innate or learned—can boost the efficacy of social learning in these conditions. For example, preferences for learning from successful individuals ("success bias" or "prestige bias") or for ignoring low-frequency behaviors ("conformist bias" or "consensus bias") can reduce error under many conditions (Aoki & Feldman, 2014; Baldini, 2013; McElreath et al., 2013).

In diverse populations, however, even strategic social learning can run into trouble. Someone who is deemed successful or prestigious in one group may be the subject of scorn or ridicule in another, and copying the majority may be problematic if the overall majority contains relatively few members of one's own group. These concerns are especially important if behaviors that work well for members of some groups don't work well for others. An obvious example is gender, as nearly every culture has institutionalized roles that are typical of males but not females and vice versa—this sort of codified division of labor can readily entrench inequality (O'Connor, 2019).

Similarly, disadvantaged minorities with lower socioeconomic class markers may not have the social capital or clout to successfully perform behaviors that members of dominant majority groups or socioeconomic elites can get away with (Bourdieu, 1986; Bunce, 2021; Carter, this volume; Wagner, this volume). For example, risk-taking behaviors—such as confidently questioning authority figures—may help a wealthy white man land a job or get out of a speeding ticket, while the same behaviors performed by a poor minority individual could lead to charges of insubordination, arrest, or worse (de Courson et al., 2025; Schuck et al., 2008). When disparities like this exist, people might be better off learning behaviors from individuals whose circumstances better match their own (Bowles & Gintis, 2004). The same is true of risk-related attitudes around financial investment. Wealthy individuals with strong safety nets can afford to be much more risk-tolerant than poor individuals without those safety nets, and so thus it can be adaptive (if inequitable) to learn from others within one's own socioeconomic class (Pérez Velilla et al., 2025).

Several researchers have posited the adaptive advantage of parochial or similarity-biased social learning: preferentially learning from others who share one's social identity markers and ignoring information from those who do not (Boyd & Richerson, 1987; Henrich, 2015; McElreath et al., 2003; Montrey & Shultz, 2022; Moya, 2023; Wood et al., 2013). Recent modeling work has formalized this idea and detailed its adaptive value (Pérez Velilla et al., 2025; Smaldino & Pérez Velilla, 2025). In particular, parochial social learning is adaptive in diverse populations if it directs attention to targets most likely to be performing behaviors that will be useful to the learner. The cost of ignoring information from outgroup individuals is outweighed by the signal boost parochialism can provide. This is true even if identity markers are not perfect indicators of aligned circumstances, as long as there is a sufficiently high correlation between identity marker and the probability that a target is performing behaviors that will be useful to the learner. This addresses somewhat the issue of context and the multidimensionality of identity. Individuals have many aspects to their social identities, each of which may be salient in different contexts (Brewer, 1991; Smaldino, 2019). The aspects of identity that should, under ideal circumstances, be most salient are those that best correlate with meaningful decisions and learning domains at the time of decision-making.

4 Identity Aids Cooperative Assortment

Cooperation is central to much of human success, and coordination in cooperative activities is key to producing the benefits of that cooperation (Bowles & Gintis, 2011; Calcott, 2008). However, cooperation can be exploited by free riders and bullies, and coordination can fail when partners have divergent norms, expectations, or goals. Individuals are therefore incentivized to cooperate only with those who are likely to provide cooperative aid to them in return, or else provide aid to those whom the focal individual has an interest in seeing thrive, including family, friends, or community (Apicella & Silk, 2019; Smaldino, 2023). Signals of group identity

are useful in establishing whether or not someone is a worthy recipient of one's cooperative efforts, or is likely to provide aid when one is in need.

However, low-cost identity signals that are easily embedded in language, behavior, or fashion are typically not sufficient to aid partner choice for altruistic cooperation, because they are easily exploited. Dawkins (1976) articulated the problem by considering a hypothetical gene for growing green beards, which would signal a propensity for altruistic behavior. You might think that altruists could avoid being exploited simply by cooperating only with partners who, like themselves, sported a green beard. The problem occurs when non-altruists also adopt green beards and thereby infiltrate and exploit communities of altruists. The same argument applies to signals that can be learned or innovated, rather than inherited genetically. If you cooperated with anyone who shares your love of fresh fruit, a devious thief could earn your trust by simply showing up with a banana. A more reliable mechanism is needed.

Signals that are costly can overcome the green-beard problem and ensure cooperation. This works for several reasons. If signaling successfully incurs a cost that is only worth paying if the signaler's interests are really aligned with the receiver's, stable signaling systems can evolve and persist (Maynard Smith, 1991). Identity signals can therefore work to ensure cooperation if those signals are difficult or time-consuming to acquire (Gintis et al., 2001; Smaldino, 2024). Examples are widespread among religious communities, and include church attendance, tithing, and painful rituals (Henrich, 2009; Iannaccone, 1992; Sosis, 2003). These communicate knowledge of group norms and, critically, a commitment to the community. Mere familiarity with the jargon and norms of a community may be sufficient to signal membership in some cases, if their appropriate use is sufficiently nuanced as to be easily fumbled by newcomers. Costly mechanisms to ensure group membership are often necessary to avoid free-riding or exploitation by those who would take advantage of the benefits of group membership without paying the costs.

Deception is not always a bad thing. For example, "passing"—in which a person of one race, gender, nationality, or sexual orientation adopts the guise of another—may be used by members of persecuted groups in order to achieve freedom or gain the privileges enjoyed by the dominant classes (Ginsberg, 1996), though the moral and psychological costs of passing remain open to debate (Silvermint, 2018). Moreover, information in complex social environments is often more complicated than truth vs. lies. Two people's interests may be partially aligned and partially divergent, which opens the door to strategic misrepresentation (Crawford & Sobel, 1982), such as claiming to be more similar than we really are. We can lie through omission, or by presenting ourselves in ways that are only partly true. Ambiguity is itself a strategic communication tool that provides gaps in our self-representation, which can be filled in by gullible or optimistic partners (Eisenberg, 1984). The risk of being deceived has been countered by cognitive and cultural adaptations for detecting liars and ensuring trust (Boyd & Richerson, 2009; Cosmides & Tooby, 1992; Dunbar, 1999). Nevertheless, just as the Red Queen in Alice Through the Looking Glass had to run continuously just to stay in the same place, the rewards for successful deception are such that strategies for detecting deception and strategies for deceiving while

avoiding detection continue to co-evolve (Dunivin & Smaldino, 2024; Van Valen, 1973).

Once the problem of avoiding free riders is largely solved, the remaining problems for successful cooperation are to select partners with whom one can effectively coordinate, and to select actions appropriate to the context and the identity of one's interaction partners (Smaldino, 2019). Identity signals can help solve these problems even without costly indicators of investment or commitment, as long as all individuals involved have a shared interest in finding appropriate partners and selecting appropriate actions. Barth (1969) proposed that ethnic markers (identity signals indicating one's ethnic affiliation) could be used for partner choice and action selection in this way, and further proposed that their use should be most overt and consistent near territorial boundaries where members of different ethnic groups were most likely to interact. This idea echoes those of the fourteenth-century Arab scholar Ibn Khaldun, who proposed that feelings of ingroup solidarity and social cohesion would be strongest along ethnic frontiers separating the territories of two or more communities (Ibn Khaldun, 1958; Turchin, 2003). The plausibility of this idea has been supported with both mathematical modeling (Boyd & Richerson, 1987; McElreath et al., 2003) and empirical research (Bell & Paegle, 2021; Bunce & McElreath, 2017; Wimmer, 2008).

Interaction partners are not always chosen with great deliberation, especially when interaction is necessary and choice is limited (for example, in the context of work or commerce). Even in these cases, identity signals can help us select appropriate actions that facilitate coordination and allow individuals to converge on their preferred outcomes when possible. In a recent simulation study led by Nathan Gabriel, we showed that reliable signaling systems could emerge when individuals with differing preferences had their interaction partners chosen at random, as long as they could send and receive signals before selecting an action and thereby condition their actions on those signals (Gabriel et al., 2025). Even when individuals disagreed about their preferred outcome, signaling allowed individuals with divergent preferences to reach a compromise. However, we also found that that when one group constituted the vast majority of the population, members of that group were often able to ignore signals, and members of minority groups were forced to conform to the majority-preferred behaviors when interacting with majority members, while signaling still allowed them to coordinate on their shared preferences when interacting with members of their ingroup. A similar result was also obtained by O'Connor (2017). Relatedly, Bunce (2021) has shown that when lower-status minorities maintain competence in the norms of the dominant group, they may have an easier time maintaining their own internal norms. Overall, there are likely to be severe asymmetries in the use and efficacy of identity signals based on the relative size and power of various groups in a population. Indeed, identity signaling gets quite a bit more complicated as societies grow larger and more diverse.

5 Identity in Diverse Societies

The functional component to how humans present themselves in public has long been appreciated by social scientists (Akerlof & Kranton, 2000; Barth, 1969; Berger & Heath, 2008; Donath, 1999; Goffman, 1978; Simmel, 1904; Wimmer, 2008), and in recent years the instrumental functions of identity have been increasingly discussed in a cultural evolutionary context using formalized theories of social exchange (Bisin et al., 2011; McElreath et al., 2003; Smaldino, 2022). Much more rarely, however, have theories of identity signaling considered how the nature of society (at least partly determined by its size, diversity, and organization) determines the set of problems that identity signaling is suited to solve.

Suppose one lives in an isolated, small-scale foraging band, with only intermittent contact with members other groups and without the technology for instantaneous long-range communication. The functional uses for identity are fairly limited in this case (Smaldino, 2019), as one effectively lives in an individual recognition society (though seasonal multi-band gatherings may at least temporarily produce an anonymous society). Within one's group, age and gender will be the major categories guiding social behavior, along with more idiosyncratic skills and context-specific roles. Individuals may carry markers of their status within their group, such as ritualized scars incurred as part of a coming-of-age ceremony, but these will likely be minimal since membership in salient categories will often be known directly—for example, you don't need a special signal to determine that someone is a woman or an elder if you know these characteristics from firsthand experience. Interactions with other groups may be guided mostly by stereotypes that are transmitted as part of the culture knowledge packet learned by members of your group. When opportunities for between-group interactions are common, as during seasonal multi-band gatherings, members of each group may conspicuously mark themselves to reduce ambiguity regarding norms, expectations, and allegiances (Barth, 1969; Bell & Paegle, 2021; Schneider, 1990).

This description of life in a small-scale society is an oversimplification, but it helps us to see how the functional purposes for identity signaling grow in number and complexity as societies become more diverse, cosmopolitan, and technological. Individuals now often live in urban centers with hundreds of thousands or millions of other people, and are connected via phone, internet, and social media to thousands or millions of other people around the world, unconstrained by geography. With the greater number and diversity of people with whom one shares one's world comes a greater need to categorize those people for effective partner choice and behavior selection, and to signal in ways that help others categorize us in ways that benefit us. Cultures are divided into subcultures, leading to a more continuous fissioning of groups needing to signal their identity. The multidimensionality of identity leads to a multidimensionality of signaling strategies, due to the fact that the implications of multiple group memberships are often non-additive. And the presence of diverse coexisting subpopulations creates pressures for subtle signals whose meanings may depend on the specific backgrounds of their audiences.

5.1 Subcultures

A subculture is a group of people—an identity group—that exists within a larger cultural society and is associated with values and norms that explicitly differentiate group members from the baseline values and norms of the dominant overarching culture, often in ways that place the subculture's members simultaneously subordinate to and in rebellion against the dominant culture (Hebdige, 1979). Members of subcultures often engage in signaling that allow themselves to be recognized by members and non-members alike. Yet subcultures do not typically arise fully formed. They must emerge from larger communities around shared values and goals. Sometimes, subcultures co-opt styles and signals from elsewhere due to the perception of sufficient similarity. For example, East German punks in the 1980s adopted the styles and nomenclature of British and American punks and were associated with similar antiestablishment views, yet differed significantly in their rebellion against the "too much future" imposed by the authoritarian DDR regime rather than the ennui of "no future" felt by their anglophone counterparts (Mohr, 2019). The long-term persistence of specific subcultural identities may rely on the perseveration of role models within each community and the strength of vertical transmission in which children born into the community retain their membership into adulthood (Bisin et al., 2011).

As subcultures grow, they may experience further fissioning into contrasting communities, as the punk movement in the United States radiated into communities that congregated around emo, hardcore, and thrash music, among others. The musical styles associated with these subcultures serve both as coordinative activities for building group solidarity and facilitating cooperative interactions (including selecting romantic partners and motivating collective action), as well as outward-facing signals of group membership. How do these styles come to be associated with each subculture? Several models have purported to show how assortment and influence can lead to group differentiation, yet these models tend to be quite fragile and can easily lead to monoculture if individual interactions tend to lead to increased similarity (Axelrod, 1997; Flache & Macy, 2011; Turner & Smaldino, 2018; Yan et al., 2023). In order to understand why behaviors and fashions become signals of subculture mechanism, we need to account for why people adopt behaviors and styles in the first place.

To address this, Greg Bryant and I developed a model of cultural trait evolution based around four distinct drivers of cultural traits (Bryant & Smaldino, 2025). First, some traits are simply better than others at solving some environmental or socioeconomic problem. Second, individuals may derive an advantage from coordinating with their interaction partners by adopting the same traits. Third, individuals may benefit by adopting traits that differentiate them from groups to which they do not belong (Berger & Heath, 2008). And fourth, individuals may preferentially interact with and learn from group members (Smaldino & Pérez Velilla, 2025). If individuals share the same overarching environment, they will face no a priori pressures to adopt different traits. In this case, without specific pressures to differentiate from outgroups, our analyses show that populations will converge to uniformity. With

even slight pressures to differentiate, however, groups will evolve divergent cultural traits as long as one specific trait value is not overwhelmingly superior, and as long as individuals are at least somewhat groupish in their social interactions. Bryant and I frame our discussion of cultural trait divergence around the example of musical distortion. Distortion has the important property in that it is typically unpleasant to the non-acculturated listener, meaning that continued tolerance and displays of enjoyment is more likely to be an honest signal of group membership.

5.2 Intersectionality

Individuals typically do not have a single social identity, but many. This is clear from the discussion of subcultures; members identify with their subculture within their larger society, but are also likely to identify with that larger society when brought into contrast with other societies. More generally, identity is typically highly multidimensional (Roccas & Brewer, 2002; Smaldino, 2019). One person may be simultaneously a woman, an American, a Jew, a scientist, and a New Yorker, while another person may simultaneously be a man, a Mexican-American, a Catholic, a Giants supporter, a Democrat, and a hip hop fanatic. Identity in this sense is often context sensitive. Individuals will signal those aspects of their identities that are most salient, most useful for adaptive social assortment, or least likely to get them into trouble. This view contrasts somewhat with "optimal distinctiveness theory" (Brewer, 1991) and related approaches to identity signaling, which focus on the opposing needs to assimilate and differentiate oneself while ignoring the function of identity signaling to solve specific social problems. Yet how an individual signals identity is more than the task of selecting the most salient choice from a set of discrete identities. Identities interact and intersect. For example, the important narratives among Black feminists is not captured by merely adding together the dominant narratives from Black liberation and mainstream feminism (Combahee River Collective, 1977; Crenshaw, 1991).

Nathan Gabriel, Adrian Bell, and I built one of the first formal models to study the cultural evolution of signaling strategies for coordination in a diverse population in which identity preferences intersect (Gabriel et al., 2025). We modeled a population composed of several types of individual, each of which had distinct but overlapping preferences for behaviors on which to coordinate. These behaviors could indicate modes of interaction, communication, or activity preferences. We considered how individuals could evolve signaling strategies to communicate their preferences and thereby facilitate more effective coordination. The model indicates that members of intersectional groups will rarely, if ever, be able to use their preferred behaviors when interacting with others who do not share those intersectional identities, but will instead converge on the norms of one of the larger groups whose identity overlaps with their own. The model also indicates that if the intersectional group is a very small proportion of the overall population, its members may be unable to coordinate effectively on their preferences even among themselves if the intersection is too poorly represented in the larger populations.

These conclusions also highlight the fact that while we often discuss group identities as if they were natural and persistent categories, it is more accurate to say that identities are constructed by pragmatic concerns for decision-making and coalition building. These concerns can, in turn, create frustrations for individuals who do not feel adequately represented by the dominant identity categories. Diverse societies characterized by loose norm enforcement (Gelfand et al., 2017) and low costs for movement or online assortment can provide outlets for intersectional identities that may be discouraged or marginalized in more traditional societies. But the functional lens on identity indicates that such assortment also involves tradeoffs, because there are likely to be more intersectional permutations than coordination can reasonably accommodate. Thus, choices regarding the benefits and costs associated with the intersection of various identity elements are likely to be shaped by cultural evolution in response to their practical consequences.

5.3 Fashion Cycles

In a diverse society, membership in different groups can confer different benefits or difficulties to the groups' members. This is especially true when some groups have power or privileges that others lack. In these cases, members of powerful groups may want to honestly signal their status, while members of subordinate groups may have incentives to obscure their status or even masquerade as an elite. In an early sociological theory of identity signaling, Simmel (1904) discussed this phenomenon as a way of explaining fashion. While clothing is obviously useful for providing warmth and protection from the elements, there are also aspects of sartorial expression—clothes, accessories, jewelry, etc.—that appear to serve no instrumental purposes, and may even be detrimental for performing many tasks. Simmel reasoned that these aspects would therefore only be maintained if they served a signaling function. Living in a highly stratified society, Simmel considered the diverging signaling needs of the upper and lower socioeconomic classes. Elites, he proposed, need to signal their wealth and status, along with their familiarity with high society, by adopting expensive fashion trends that separated them from the rabble. The lower classes, on the other hand, could benefit by adopting some of these status markers, and would therefore imitate the fashion trends of the elites. Although they may have been primarily fooling only other members of their own social class, Simmel proposed that the confusion would drive the elites to continually innovate new fashion trends, so as to more effectively distinguish themselves, thereby driving perennially changing fashion cycles.

The logic of Simmel's theory is sound, as has been demonstrated by mathematical modeling (Acerbi et al., 2012; Di Giovinazzo & Naimzada, 2015), though empirical work suggests that its explanatory power may be limited, at least in the modern world. Many fashion trends (as well as musical and linguistic trends), after all, trickle up from the lower classes to the elites. Moreover, social classes are hardly monolithic, and there are often complex group structure within each societal stratum. Style and

fashion aesthetics can also be driven by counter-dominance signaling among communities trying to distinguish themselves from the status quo, whose prestige can then be co-opted by the larger population (Klimek et al., 2019).

An important point here is that the functional use of identity signals may depend on information asymmetry, such that an ingroup has a more nuanced command of the signal's use and interpretation than a competing outgroup. This is especially important when that outgroup is incentivized to either infiltrate or sanction members of the ingroup, and the ability to produce or recognize such signals is an honest indicator of membership. When such signals are made publicly, the information asymmetry is inherently unstable, as members of the outgroup can gradually learn to recognize and even reproduce those signals. To adapt, old signals must eventually be abandoned and new signals must be adopted.

5.4 Covert Signaling

As noted, identity signals help us categorize other people—and help them categorize us—so that we more effectively choose who to approach, avoid, imitate, or attack (Barth, 1969; McElreath et al., 2003; Smaldino, 2019). However, this ability to assort also creates a new problem: that of burning bridges. It may be desirable, as a first pass, to divide people into those whom we approach and those whom we avoid. But in a diverse society, we cannot always divide people so easily. Sometimes we must work and live with people with whom we disagree or diverge severely on goals, norms, and expectations. Sometimes we must even conceal aspects of ourselves that, if revealed, might help us to find compatible partners but might also impede cooperation or even put us at risk of harm. In such cases, humans often rely on the ability of our communication to be ambiguous and indirect.

Covert signaling is the transmission of (identity) information in such a manner that it tends to be accurately perceived by its intended audience but tends to be obscured when observed by others (Dunivin & Smaldino, 2024; Smaldino et al., 2018; Smaldino & Turner, 2022). This contrasts with overt signaling, in which honest signals of identity are widely broadcast. Examples of covert signaling range from humor (Flamson & Bryant, 2013) to fashion (Berger & Ward, 2010) to dog whistles (Quaranto, 2022). If revealing aspects of one's otherwise hidden identity to members of an outgroup entails costs—such as those faced by members of certain ethnic minorities and religious groups, political dissidents, and LGBTQ+ individuals—covert identity signals may be incentivized (Dunivin & Smaldino, 2024; Smaldino & Turner, 2022).

Formal models of covert signaling (Smaldino et al., 2018; Smaldino & Turner, 2022) predict that covert signaling will be more common among communities for which (1) the cost of being recognized as a member of their community is larger and (2) the probability of interactions involving dissimilar or outgroup individuals is higher. The latter condition is more likely to be met when people live in more diverse populations and/or belong to a disadvantaged minority group.

Covert signaling is intrinsically difficult to study empirically, because the meaning of the signals depends on the background knowledge of the receiver. However, two recent studies provide additional support for the model predictions. First, van der Does et al. (2022) studied political messages on (pre-Musk) Twitter, and found that users with more heterogeneous follower networks used more covert signaling. In a follow-up behavioral experiment in which participants were incentivized to choose communication that an audience liked and avoid communication that the audience disliked, they found that participants selected more covert communication when their audience consisted of a larger proportion of cross-partisans. Second, Johnson et al. (2024) used phonetic analysis of recorded interviews to study ethnically-correlated speech patterns among students in two Utah high schools. They found that Pacific Islander students in Utah had more ethnicity-specific vocal intonations when they were attending more diverse schools, even while none of the students indicated conscious awareness of these differences.

Covert signaling relies on information asymmetry between groups. However, the use of covert signals in public settings provides opportunities for members of other groups to learn their meaning, eventually turning them into overt signals. What does this mean for the long-term dynamics of specific covert identity signals? Zack Dunivin and I studied this with a computational model in which ingroup agents learned to converge on signals that could be used to identify other members of their own group. However, their interactions were occasionally observed by outgroup agents, who could also learn the signals' meanings by reinforcement learning, and then use their knowledge to punish members of the ingroup who had publically revealed themselves (Dunivin & Smaldino, 2024). We found three dynamic regimes, depending on the relative likelihood of being observed by members of the outgroup and on the cost of being punished as a consequence of being discovered. If outgroup interactions were relatively rare and/or not particularly costly, covert signals merely became overt signals, remaining stable identity signals used by the ingroup. When outgroup interactions were more common and/or costly, we observed cyclical dynamics, in which the ingroup established a conventional covert signal and used it until it became sufficiently known among the outgroup, at which point the signal was abandoned and the group had to establish a new signal, ad infinitum. Finally, when outgroup interactions were very common and/or costly, public identity signaling among the ingroup became entirely suppressed.

This model indicates that groups with incentives to remain even partially obscured to outsiders may need to constantly invent new identity signals to avoid detection. Further, if identification by the outgroup is very likely and very costly, conventionalized identity signals may never emerge for public display. This reminiscent of situations faced by political dissidents under authoritarian regimes, or even by xenophobic extremists in a well-functioning cosmopolitan society. More mundanely, it could reflect any scenario in which the benefit of coordinating on a particular idiosyncratic identity is outweighed by the social costs of outing oneself as different.

6 Identity in a Changing World

The human mind's incredible plasticity and our capacity for sociality and innovation has helped us adapt to varying and changing environments throughout our history (Boyd, 2018; Henrich, 2015), from the Sahara to the arctic, from nomadic foraging to urban living, from farming to telecommuting. While the capacity for categorization and social inference may be coded in our genes (Cosmides & Tooby, 2013; Lau et al., 2018), strategies for creating and interpreting social identity signals are likely learned from others, as evidenced by the tremendous variation in the nature of signaling across cultures (Contreras Kallens et al., 2018; Moya & Boyd, 2015, 2016). In our deep past, when humans were primarily living in relatively isolated foraging communities and the global population was relatively small, a small set of social categories, shared within a community, likely sufficed. As humans developed agriculture and built large cities in more dense, diverse, and unequal civilizations, we needed to develop richer and more context-dependent social category structures (Bell, 2023; Smaldino, 2019). The previous section explored many of functional uses for identity signaling in these complex environments.

In the last few decades, a new cultural shift has created new affordances and selection pressures for identity signaling (Smaldino et al., 2025). To some extent, online spaces are simply new instances of the same old in-person spaces they arose out of. In any complex society, individuals are categorized into roles that help them determine how to behave and present themselves, and help others manage expectations for social interaction (Goffman, 1978). Online, new social roles such as "trolls" and "newbies" could be viewed as novel in the same way that "party kid" or "nerd" were novel in decades past, as suggested by Golder and Donath's (2004) early analysis of Usenet groups. However, there are also several key differences. The rise of digital technologies and online environments have produced new modes of interaction, detached from many of the features that have characterized nearly all social interaction in the past: geographical localization, temporal synchronization, and identity continuity. Instead, widespread adoption of the internet and smartphones have spawned social interactions that are geographically diffuse, temporally extended, and that, perhaps most importantly, involve fragmented and even anonymous exchanges.

The internet has made communication and assortment less local. In the past, norms were enforced within local cultural communities, which ensured the legibility of the community for its members and leaders (Scott, 1998). Deviations in such communities were punished passively by failing to successfully coordinate and actively through direct sanctioning of deviant behavior. The subsequent cultural coherence could be beneficial, facilitating norms that created public goods (Boyd & Richerson, 2002), but it could also be costly or repressive for individuals interested in deviating from the norm. Consider the burning of "heretics" and Galileo's coerced recanting of heliocentrism by the Pope, the forced baptism of Jewish children in nineteenth-century Europe, or the forced sterilization of homosexuals in mid-twentieth-century England. The internet has provided opportunities for unusual people to find communities in which their interests can be viewed as normative, from LGBTQ+ sexual

preferences to live-action role-playing. These new opportunities for assortment have clear benefits for people in these communities, but they also carry potential societal costs, as with the increased avenues for conspiracy-based paranoia from groups like QAnon.

A key feature of identity signaling in most of our historical and prehistorical past is that identities had to be linked to a physical personage that was not only geographically localized but also carried over from context to context. If someone proclaimed themselves a Christian in church, they were likely to be beholden to that commitment at the market or at home. Now, one can form relationships on various online platforms that have minimal influence on others. For example, people regularly construct personas on social media sites like Facebook, Instagram, or TikTok, or on online dating sites like Tinder, Bumble, or Hinge that may bear little relation to the personas they use with their friends, families, and coworkers (Bullingham & Vasconcelos, 2013; Donath, 1999). The lack of geographical localization and separation from local communities also means that online content is rife for the misinterpretation of identity signals. All communication occurs in context, with commitments and implicatures that rely on shared experiences to ensure interpretations consistent with the signalers' intentions. Devoid of context or familiarity, many behaviors seem odd, foreign, and even amoral. Such misinterpretations can then be used as beacons for rallying or even constructing other identity groups in opposition to these perceived moral slights (Ronson, 2016). Platforms that allow for the creation of anonymous pseudonyms—including Instagram and TikTok as well as Reddit, X, Bluesky, and YouTube—take this a step further by allowing individuals to create influential personae unconnected to their quotidian lives. These personae nevertheless rely on identity signals to communicate to potential audiences the commitments implicitly held by the creator, so as to determine the sort of content they are likely to find by returning to the creator's account or channel (DiResta, 2024).

Recall that traits that become useful for identity signaling will typically be those that provide a category-based advantage in adaptive decision-making. However, our proximate feelings of satisfaction when assorting with similar others online, and our outrage when seeing norm violators may be examples of cultural mismatch (Nunn, 2022), a relic of reaction norms optimized for an in-person world.

Indeed, it seems reasonable to speculate that the presence of online social media platforms and smartphones that make engagement with those platforms easy and accessible contributes to overall feelings of unease and fear that cause people to cling to their identity groups, exacerbating feelings of widespread polarization. Three key mechanisms work in tandem to produce this phenomenon. The first is the ease of assortment on arbitrary traits. The low caloric and cognitive costs of online engagement mean that the satisfaction of online identity formation can be more appealing and less effortful to achieve than the deeper connections to community, especially when the latter is rife with the conflicts inherent in long-term, multi-context relationships. The second is the reduced power to enforce local norms in online communities. Although local norm enforcement can lead to oppression and conservatism, the need for localized groups to thrive across many domains ensures that many norms will be group-beneficial (Boyd & Richerson, 2002; Lansing, 2012; Wilson, 2002).

Online interactions can be restricted to single contexts, and their separation from local community means that many of the norms that develop in these contexts can be deeply antisocial, discriminatory, and uncivil. Indeed, given the intense competition for attention online, extreme positions driven by demonizing outgroups often thrive most successfully online (DiResta, 2024). The third mechanism is the aforementioned ability to easily view, share, and discuss the communication and behavior of others without sufficient appreciation for the contexts in which they were produced. This lack of context allows online posters to capitalize on the confusion, fear, and disgust people often feel when presented with behavior that appears to violate their expectations for moral or normative behavior. Due to the vast quantities of online content produced daily throughout the world, its ubiquity provides fuel for motivated individuals to demonize almost any group. When such motivated individuals are elites with interests in manipulating a populace to allow them to more deeply entrench their wealth and power, society as a whole suffers. Our ability to avoid perennial cycles of polarization, exacerbated inequality, and the continuing entrenchment of neofeudalism (Varoufakis, 2023) depend in part on our ability to stymie these forces of polarization.

7 Conclusion: Essentialism and Identity

Identities are categories, and like all categories, we use them because they help us make sense of the world, make predictions, decide how to act, and communicate with others. Every human is unique, but we can also be clustered into types along a multitude of dimensions. The identities that we choose to emphasize, perceive, signal, and discuss are the ones that *matter*, whether because we believe they are important or because we know that others do. Understanding this allows us to emphasize the instrumental functions of identity in terms of decision-making, learning, and signaling, as well as how the nature of those functions are shaped by the structures of our social and physical environments (Smaldino et al., 2025). The instrumental nature of identity means that it is probably useless to consider any particular identities as *essential*. What *is* essential is that as long as humans live in sufficiently large or complex cultures such that categorizing people by type is useful for decision-making, identities will continue to emerge and evolve.

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