

Accuracy of perceiving social attributes

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Abstract

A wealth of research shows that people can achieve accurate interpersonal judgments of others based on brief observations of their nonverbal cues. Here, we review evidence demonstrating that people can accurately judge others' kinship, sexual orientation, religious identity, political ideology, and professional success from subtle cues in their physical appearance and expressive behavior. Following this discussion, we detail some of the major factors that can influence the accuracy of these judgments. Finally, we end by reflecting on what this research has elucidated about basic processes in person perception and nonverbal behavior more generally.

From exchanging glances on the street to meeting for the first time at a party, people consistently infer others' social attributes. Such "snap judgments" are principally achieved by categorizing individuals into social groups, from which perceivers extrapolate additional evaluations using group-based stereotypes (Macrae & Bodenhausen, 2000). Although a rich literature documents the biases rife in social

judgments (e.g., Merton, 1948), these impressions can also be accurate, as evidenced by individuals' near-perfect categorizations of others' age, race, and sex (e.g., Macrae & Martin, 2007).

Most social attributes are not demarcated as clearly as these “Big 3” dimensions, however. Here, we review the literature investigating judgments of social attributes that are perceptually ambiguous. We begin by discussing kin recognition, showing that the ability to accurately judge others' social attributes occurs across species. We then describe how the cognitive and perceptual machinery underlying such judgments is adaptive and flexible – evidenced by work demonstrating an average of approximately 64.5% accuracy in judging sexual orientation, religious identity, and political ideology from brief observations of nonverbal cues (Tskhay & Rule, 2013). We then extend this to research investigating the predictive validity of inferences based on subtle cues. Next, we argue for a nuanced understanding of accuracy by detailing some factors that affect one's ability to make accurate judgments. Finally, we conclude by discussing what this work has revealed about basic processes in person perception and nonverbal behavior more generally.

Kinship

Like many other animals, humans preferentially invest resources into their close relatives (Smith, Kish, & Crawford, 1987). Indeed, nepotism is evolutionarily favorable, as any gene that leads an individual to promote the welfare of his or her relatives will also promote its own survival (Hamilton, 1964). Alongside this benefit, accurate kin recognition can also help to prevent inbreeding, a costly mistake in terms of

evolutionary fitness (Keller & Waller, 2002). Finally, accurate kin recognition can also advantage individuals to identify other people's kin to ascertain alliances (Cheney & Seyfarth, 2004). Given these benefits, one would expect kin recognition to be accurate and pervasive; indeed, this is so.

In one early study, researchers found that people could accurately judge family relationships from short (2 minute or less) naturalistic videos of one to four people based on verbal and nonverbal cues – such as correctly judging that a woman conversing on the telephone was speaking with her mother (Costanzo & Archer, 1989). Brédart and French (1999) showed that kinship judgments could be made with even less information, reporting that people could accurately match children and parents from photos of their faces. Indeed, static facial cues can communicate kinship between grandparents and grandchildren (Kaminski, Dridi, Graff, & Gentaz, 2009), and between siblings (DeBruine et al., 2009; Maloney & Dal Martello, 2006). More intriguing, humans can also reliably judge the kinship of other (nonhuman) primates from photos of the offspring and parent faces (Alvergne, Huchard et al., 2009).

People can detect kinship from olfactory cues as well. For example, Porter, Cernoch, and Balogh (1985) found that strangers could accurately match mothers and children from shirts worn while sleeping (controlling for personal hygiene products), but could not match spouses, suggesting that olfactory kinship cues arise from genetic similarity, rather than environmental similarity alone. Indeed, further studies showed that people regard non-cohabiting identical twins (who are genetically indistinguishable) as smelling more alike than non-cohabiting dizygotic twins (who are genetically distinguishable; Roberts et al., 2005), and that mothers cannot recognize their cohabiting stepchildren (who share no genes with them) from their odor (Weisfeld, Czilli, Phillips, Gall, & Lichtman, 2003).

Olfactory cues also predict kin recognition within families. Mothers, for instance, can correctly recognize their neonates from their odors even only 20 hours after delivery (Porter, Cernoch, & McLaughlin, 1983). Reciprocally, neonates prefer their own mothers' breast pad odors to those of other women (MacFarlane, 1975). Moreover, odors allow parents to distinguish between their individual children, and allow children and adults to distinguish their parents and siblings (Porter & Moore, 1981; Weisfeld et al., 2003). Extended family members (e.g., grandmothers and aunts) also accurately judge kinship from odors (Porter, Balogh, Cernoch, & Franchi, 1986).

Research has therefore pervasively demonstrated that people can judge their own and strangers' kin through minimal information, reinforcing previous findings that this ability is shared across species (Lieberman, Tooby, & Cosmides, 2007). Moreover, such attunement of people's visual and olfactory perceptions to specific individuals suggests that the social perceptual system can flexibly discern subtle cues relevant to the current social environment. Below, we review research investigating accurate judgments of sexual orientation, religious identity, and political ideology to illustrate this further.

Sexual orientation

Consistent with gay men's and lesbians' reports, a growing literature shows evidence that sexual orientation can be accurately perceived from subtle cues (colloquially referred to as "gaydar;" Nicholas, 2004). Berger, Hank, Rauzi, and Simkins (1987) first tested this by presenting judges with 2–3-minute videotaped interviews of gay, lesbian, and straight individuals. Although they found no evidence of accuracy, a more sensitive

reanalysis of the same data by Hallahan (1998) did. Ambady, Hallahan, and Conner (1999) then provided further evidence that people could accurately judge sexual orientation from dynamic nonverbal cues. They presented judges with 1-s or 10-s-silent video clips, or photographs of gay, lesbian, and straight individuals speaking, and found that judges could accurately categorize the speakers' sexual orientation across all conditions. Thus, both dynamic and static cues accurately communicated sexual orientation.

The robustness of these effects was extended by Rule, Ambady, Adams, and Macrae (2008), who showed that sexual orientation could be reliably judged from static cues in photos of gay and straight men's faces collected from online personal advertisements.¹ In this study, they demonstrated that a static face suffices to communicate sexual orientation, as do its individual features (with rates of approximately 65.7% accuracy for the entire face, 56% accuracy for the eyes alone, 57.5% accuracy for the mouth alone, and 62% accuracy for the hair alone). The human social perceptual system therefore seems calibrated to accurately perceive sexual orientation, even when only one facial cue is available (see Tskhay, Feriozzo, & Rule, 2013, for similar results with women's faces). Further investigation into the features underlying such judgments revealed that gay men tend to have wider and shorter faces, smaller and shorter noses, and bigger and more rounded jaws than straight men do

¹ One might expect that people will be especially motivated to accurately communicate their sexual orientation in online personal advertisements. However, people usually communicate traits that are counter-stereotypical in such ads (Bailey, Kim, Hills, & Linsenmeier, 1997). Indeed, judges' accuracy appears to be generally worse when based on photos taken from the Internet versus other sources (Tskhay & Rule, 2013) and sexual orientation, in particular, appears to be legible regardless of whether photos are self-posted by online daters (Rule & Ambady, 2008a), posted by friends (Rule et al., 2008), or photographed under standardized conditions in the lab (Stern, West, Jost, & Rule, 2013).

(Valentova, Kleisner, Havlíček, & Neustupa, 2014). Thus, facial morphology alone can provide valid cues to sexual orientation, complementing Ambady et al.'s (1999) earlier work using samples of expressive behavior.²

Vocal cues also allow for accurate judgments of sexual orientation (Munson & Babel, 2007). Indeed, people are about 4% more accurate in judging sexual orientation from speech samples than from visual cues, on average (Tskhay & Rule, 2013). Despite the folk belief that gay men speak like straight women (with relatively high, variable pitch) and that lesbians speak like straight men (with relatively low, monotonous pitch; Levon, 2007), several studies have failed to detect such differences (e.g., Rendall, Vasey, & McKenzie, 2008). Rather, Linville (1998) found that judges were accurate when they used the duration and frequency of speakers' "s" sound (i.e., the voiceless alveolar fricative) to judge men's sexual orientation, and other researchers have detected differences in particular vowel sounds (Rendall et al., 2008).

As suggested by work on vocal cues, the extent to which gender inversion (i.e., the possession of characteristics typical of the opposite sex) accurately communicates sexual orientation may be exaggerated. Still, gendered cues, such as from facial appearance (Freeman, Johnson, Ambady, & Rule, 2010) and body movement (Johnson, Gill, Reichman, & Tassinari, 2007) can allow for accurate inferences of sexual orientation (e.g., explaining roughly 37% of the variance between gay and straight faces in Freeman et al., 2010); indeed, even home videos of gender-nonconforming children can be used to predict their sexual orientation in adulthood (Rieger, Linsenmeier, Gygax, & Bailey, 2008). Thus, there seem to be at least some cases in which gendered cues are valid indicators of sexual orientation.

² Notably, expression can also influence facial morphology such that the two may be somewhat inextricable (see Malatesta, Fiore, & Messina, 1987).

Religious identity and political ideology

The Holocaust stimulated research on the accurate judgment of Jewish identity. During this time, people commonly believed that Jewish people could be identified through observation. Substantiating this, Allport and Kramer (1946) found that judges could categorize Jewish and non-Jewish individuals better than chance from yearbook photos, and Lund and Berg (1946) found that even preschoolers could discern Jewish identity from live observations providing both appearance and speech information, thus demonstrating that expressive cues communicate religious identity (though speech cues generally decreased accuracy). Further studies that statistically accounted for response biases also revealed above-chance accuracy somewhat consistently (e.g., Dorfman, Keeve, & Saslow, 1971), yet other studies did not (e.g., Elliott & Wittenberg, 1955). Two meta-analyses subsequently clarified this discord by demonstrating an overall significant, albeit small, level of accuracy for identifying Jewish individuals from nonverbal cues (approximately 55% accuracy for judgments made from the static face; Andrzejewski, Hall, & Salib, 2009; Rice & Mullen, 2003; but see Lund & Berg, 1946, for much higher accuracy from live presentations). In addition, people can differentiate Mormons and non-Mormons from photos of their faces with approximately 58% accuracy (Rule, Garrett, & Ambady, 2010a).

Aside from group-based differences in religious identity, individual variation in political ideology is also legible from facial cues. Samochowiec, Wänke, and Fiedler (2010) found that Swiss and German politicians' party memberships and political attitudes (i.e., right-wing versus left-wing) could be reliably judged from 15-s videos and photographs of their faces. This suggests that people are sensitive to facial cues

communicating not only party membership, but also the extent to which one supports liberal or conservative views. These effects also extend to American politicians (e.g., Olivola, Sussman, Tsetsos, Kang, & Todorov, 2012): conservatives tend to be perceived as powerful, whereas liberals tend to be perceived as warm, facilitating accurate judgments of political ideology through facial morphology alone (Rule & Ambady, 2010).

Thus, the social perceptual system can detect subtle cues communicating perceptually ambiguous information, such as one's kinship, sexual orientation, and beliefs (e.g., political ideology and even attitudes; see Chapter 7). We now review research indicating that people are sensitive to subtle cues that predict later success. It is worth pointing out that, although most of these studies demonstrate predictive validity rather than accuracy per se, we include them to show that perceivers can attune to how individuals' appearances are correlated with real-world outcomes.

Professional success

On September 26, 1960, John Kennedy and Richard Nixon participated in the first televised US presidential debate. Undoubtedly, an important event in American political history, this momentous day is also thought to have been an inadvertent demonstration of the striking influence that appearances can hold for real-world outcomes: those who had watched the debate on television believed that Kennedy had won, whereas those who had listened to the debate on the radio hailed Nixon the winner (Krauss, 1996). Today, a large body of research reflects what was suggested by reactions to the

Kennedy–Nixon debate nearly 60 years ago: appearances can predict people’s achievements.

Indeed, appearance seems to be an important factor in political outcomes. Todorov, Mandisodza, Goren, and Hall (2005) found that naïve ratings of American political candidates’ competence from photos of their faces predicted the winning candidate, even when viewed for only 100 milliseconds (e.g., predicting the outcomes of 68.5% of gubernatorial races in Ballew & Todorov, 2007). Although this relationship between inferences of candidates’ competence and their electoral success is meaningful, it is indirect and therefore does not measure accuracy. Moreover, the subjective nature of both the predictor variable (laboratory participants’ opinions) and outcome variable (voters’ opinions) may simply suggest that candidates’ faces are useful polls, rather than measures of political leaders’ actual traits or effectiveness in office.

Other studies have demonstrated that direct inferences of success can predict individuals’ actual performance, however. Rule and Ambady (2008b), for instance, found that first impressions of chief executive officers’ (CEOs’) leadership ability from their faces correlated with their company’s profitability – the standard for success in business. Although this association could arise because more profitable companies hire people who look like better leaders, Wong, Ormiston, and Haselhuhn (2011) found that CEOs’ facial morphology predicted their companies’ profits when controlling for the companies’ financial performance prior to their tenure as CEO. This suggests that CEOs’ appearances may validly indicate their leadership ability. Moreover, such inferences may be stable: Rule and Ambady (2011) found that evaluations of business leaders’ power from their faces predicted their companies’ profits across different photos taken decades apart – even before the individuals became business leaders.

In addition to static faces, other studies have found that dynamic, expressive nonverbal behavior also allows for accurate judgments of success. Benjamin and Shapiro (2009) showed that perceivers could predict election winners from 10-s silent videos of debates, and Tsay (2013) found that people could accurately judge the winners of music competitions from silent videos of their performances. Similarly, Tskhay, Xu, and Rule (2014) observed that naïve perceivers judged conductors' relative fame from brief silent videos of their live performances with approximately 62% accuracy. Given that conductors' success requires eliciting specific behaviors from their followers in a very intimate setting, these data show that the nonverbal behaviors of leaders of small groups relate to measures of their success like they do for the leaders of large groups who are very distant from their followers (e.g., CEOs and politicians), as described above.

Correlates and moderators

Alongside research that seeks to identify the cues leading to accurate judgments of social attributes, researchers have investigated some of the variables that moderate the relationships between individuals' perceptions and outcome criteria. Importantly, this work joins the efforts of other research to ascertain various correlates of nonverbal judgment accuracy (Hall, Andrzejewski, & Yopchick, 2009). Here, we review how research into the accurate judgments of kinship, sexual orientation, religious identity, and political ideology reveals several consistently influential correlates and moderators, thus offering a nuanced view of accuracy.

Context

Accuracy can vary in different contexts. For instance, people judge the sexual orientation of gay men, straight men, and straight women more accurately from speech samples in which they are conversing with a gay individual than they do from speech samples in which they are conversing with a straight individual (Carahaly, 2000). Thus, social context can affect the accurate perception of sexual orientation and the stereotypes present in a given social context may affect accuracy as well. For example, a meta-analysis showed that the years in which studies were published moderated the effect of prejudice on the accuracy of judging Jewish identity: prejudice related to greater accuracy in the past but diminished accuracy today (Andrzejewski et al., 2009). The authors speculated that higher prejudice against Jewish individuals previously resulted in greater accuracy because such prejudicial views were once normative (and thus an indicator of better social adjustment, which is associated with greater interpersonal sensitivity), whereas now the reverse is true. Similarly, people who are more familiar with sexual minorities (including gay and lesbian perceivers) tend to be more accurate judges of sexual orientation from nonverbal cues (e.g., Brambilla, Riva, & Rule, 2013), and people with higher self-reported levels of anti-gay prejudice tend to perform worse (Rule, Tskhay, Brambilla, Riva, Andrzejewski, & Krendl, 2015).

Culture and race

Accuracy has been documented across numerous ethnic, racial, and cultural lines for a variety of judgments in the nonverbal communication literature (e.g., Zebrowitz et al.,

1993; see also Chapter 16). Recent research suggests that this consistency also applies to the kinship judgments described above: both Senegalese and French judges displayed similar accuracy in judging strangers' kin from both countries (Alvergne, Oda et al., 2009). Accuracy also extends across group boundaries for the other social attributes we have discussed, with some also showing an in-group advantage. For example, gay men judge male sexual orientation more accurately from faces than straight men do (Rule, Ambady, Adams, & Macrae, 2007), and Mormons can distinguish between Mormons and non-Mormons better than non-Mormons can (Rule, Garrett, & Ambady, 2010b).

Rule, Ishii, Ambady, Rosen, and Hallet (2011) asked perceivers from cultures with low (Japan), medium (the US), and high (Spain) acceptance of homosexuality to judge the sexual orientation of targets from all three nations, finding that natives of each country were able to accurately judge targets' sexual orientation regardless of their culture of origin, with Americans being the most accurate, possibly because of their greater propensity for intuitive judgments (see the Perceptual and Cognitive Mechanisms Underlying Accuracy section). Consistent with the cultures' level of acceptance, however, American and Japanese participants were less likely to categorize targets as gay compared to Spanish participants, suggesting that culture can affect one's openness to consider another individual as gay. Similarly, Valentova, Rieger, Havlíček, Linsenmeier, and Bailey (2011) demonstrated accuracy in judging the sexual orientation of Czech targets, and also identified an in-group advantage: US judges were more accurate for US targets, and Czech judges for Czech targets. Moreover, although target and participant race do not generally affect the accuracy of judging sexual orientation (Rule, 2011), the combination of racial and gender inversion stereotypes can facilitate accurate judgments. For instance, because Asian individuals are perceived as being feminine (relative to Caucasian individuals), the sexual orientation of Asian

women is relatively easier to judge because any gender-atypical features, which are valid cues to homosexuality (Freeman et al., 2010), will be more salient and thus facilitate judgments of homosexuality (Johnson & Ghavami, 2011).

Sex

Women are often better judges of nonverbal cues than men (Hall, 1984; see Chapter 15). This may apply to sexual orientation judgments based on dynamic cues but not the static face (e.g., Ambady et al., 1999; Rule, 2011). Moreover, some research indicates that women's sexual orientation is judged more accurately than men's sexual orientation from static cues (Tabak & Zayas, 2012), whereas judgments of men's sexual orientation may be more legible than women's when inferred from dynamic cues (Ambady et al., 1999; Johnson et al., 2007).

Motivation

Motivation may also influence accuracy (see Chapter 19). In the case of recognizing kin, Kaminski, Ravary, Graff, and Gentaz (2010) found that individuals with older siblings performed better than first-born individuals in judging kinship among strangers. They speculated that this arose because first-born individuals could rely on the fact that their siblings were born to their parents after them to judge kinship (e.g., they were present for their siblings' births). Later-born individuals, however, presumably had greater implicit motivation to develop alternative ways of detecting kinship, such as by facial

cues, because they would not have been present to associate their siblings with their parents when their siblings were first born.

The ecological theory of social perception predicts that social perception functions to facilitate social action: when observing another person's nonverbal cues, people glean information that can guide the realization of their social goals (Zebrowitz & Montepare, 2006). Thus, perceivers should be able to quickly and accurately judge characteristics that are relevant to adaptive action (Gibson, 1979). Indeed, it would be adaptive for individuals to accurately judge sexual orientation to identify potential mates, especially when such motivations are heightened. Along these lines, Rule, Rosen, Slepian, and Ambady (2011) found that heterosexual women were significantly more accurate judges of men's (but not women's) sexual orientation the closer they were to peak ovulation, when they are most capable of conception. This accords with previous studies showing that women are more attentive to mating-related facial cues when ovulating (e.g., Penton-Voak et al., 1999). Moreover, when Rule, Rosen et al. (2011) experimentally manipulated women's motivation by priming them to think about romance, heterosexual women again showed better accuracy at judging men's but not women's sexual orientation, supporting the conclusion that women's motivational state encouraged the increase in accuracy.

Political ideology

Perceivers' political ideology also affects their accuracy in judging sexual orientation. Buttressed by the findings that conservatives tend to show a greater desire to reach certainty and typically rely more heavily on stereotypes in making judgments (e.g., Jost,

Glaser, Kruglanski, & Sulloway, 2003), Stern, West, Jost, and Rule (2013) found that conservatives more accurately judged sexual orientation as the validity of the gender inversion stereotype increased. Moreover, forcing liberals to rely on their initial snap judgments increased the influence of gender inversion stereotypes on their categorizations as well, rendering their judgments similar to conservatives' because they were also then more likely to rely on stereotypes. Thus, to the extent that stereotypes about gender inversion accurately distinguish gay and straight individuals, conservatives are more effective than liberals in judging others' sexual orientation.

Perceptual and cognitive mechanisms underlying

accuracy

Research on the accurate judgment of perceptually ambiguous social attributes has allowed the field to develop a more complete account of how people judge the majority of social dimensions, a question not fully addressed by studies that only examine obvious characteristics (e.g., sex). These efforts have revealed that the perceptual and cognitive processes underlying judgments of perceptually ambiguous social attributes parallel those supporting the accurate judgment of perceptually obvious social attributes. For example, just as people process perceptually obvious social attributes categorically (e.g., age), judgments of sexual orientation rely on a straight–non-straight dichotomy, such that bisexual individuals are judged as being different from heterosexual individuals, but are judged as belonging to the same category as gay and

lesbian individuals (Ding & Rule, 2012). In other words, people judge others' sexual orientation in terms of discrete categories, rather than conceptualizing sexual orientation along a continuum (cf. Kinsey, Pomeroy, Martin, & Gebhard, 1953/1998).

Second, just as members of perceptually obvious social groups are categorized automatically (Macrae & Bodenhausen, 2000), this seems to extend to perceptually ambiguous groups as well. For instance, research generally shows that nonverbal kinship communication is primarily implicit: strangers posing as couples are accurately distinguished from actual couples simply told to pose together for a photo, suggesting that part of kinship is communicated unintentionally (Barnes & Sternberg, 1989; Sternberg & Smith, 1985). Kinship recognition, whether based on face matching or olfaction, may also be implicit, as participants still perform above chance when they are unaware of their performance level and feel that they are merely guessing (e.g., Arantes & Berg, 2012; Lundström, Boyle, Zatorre, & Jones-Gotman, 2009).

Similarly, in addition to the controllable and intentional cues that communicate sexual orientation (e.g., eye gaze, clothing; Nicholas, 2004; Rudd, 1996), sexual orientation can be automatically perceived from subtle cues as well. Cosmetics notwithstanding, people typically do not deliberately style the appearance of their eyes and mouths (Ekman & Friesen, 1969), yet both features independently permit accurate judgments of sexual orientation when perceived in isolation, suggesting that individuals may unintentionally provide cues to their sexual orientation through these features (e.g., Rule et al., 2008). Moreover, people can accurately judge sexual orientation with as little as a 40-ms glimpse of a person's face (Rule, Ambady, & Hallett, 2009). Thus, only very small amounts of time are needed to distinguish sexual orientation. This efficiency suggests that sexual orientation may be processed automatically, and direct tests of automaticity have supported this: people identified words relating to gay and straight

stereotypes faster when preceded by photographs of gay and straight men's faces, respectively (Rule, Macrae, & Ambady, 2009), and deliberated judgments – which disrupt intuitive processes – impaired perceivers' judgments of sexual orientation (Rule, Ambady, & Hallett, 2009). Finally, sexual orientation can still be perceived from nonverbal cues when gay and lesbian targets deliberately attempt to conceal it (Sylva, Rieger, Linsenmeier, & Bailey, 2010).

These findings therefore suggest that kinship and sexual orientation are either part of the “master status” categories like age, race, and sex, or that the cognitive and perceptual machinery involved in these accurate judgments may be adaptive and flexible to perceiving a number of group distinctions. If the latter, one would expect that a variety of social attributes could be perceived accurately (i.e., better than chance). Considering the findings for religious identity, political ideology, and professional success reviewed above, this appears to be the case. What is more, some research also suggests that success and religious ideology are processed nonconsciously (e.g., Ballew & Todorov, 2007; Rule et al., 2010b). Thus, the cognitive machinery responsible for identifying perceptually ambiguous social attributes seems to be (i) fundamental to how social groups are perceived, (ii) flexible in its processing of group distinctions, and (iii) applicable beyond perceptually obvious categories.

Conclusion

In a meta-analysis of 47 articles investigating the accurate perception of ambiguous social groups, Tskhay and Rule (2013) found the aggregate effect size to be $r = .29$, indicating that people are correct in 64.5% of their judgments, on average (see

Rosenthal & Rubin, 1982). Although 64.5% is much lower than the near-perfect accuracy attained when judging perceptually obvious groups (e.g., 99.2% accuracy for race; Remedios, Chasteen, Rule, & Plaks, 2011), it still demonstrates the mind's remarkable ability to glean important social information, whether for judging kinship, sexual orientation, religious identity, political ideology, or professional success. Of course, given such imperfect accuracy, there are a range of factors that can affect people's ability to correctly judge others' social attributes, such as culture and sex. Nevertheless, such judgments appear to occur beneath conscious awareness, delicately making sense of the infinitely complicated social world in which we live.

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