

Contributions of Nonverbal Cues to the Accurate Judgment of Personality Traits

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Abstract

In this chapter, we summarize research on nonverbal expressions of behavior (nonverbal cues) and how they contribute to the accuracy of personality judgments. First, we present a conceptual overview of relevant nonverbal cues in the domains of facial expressions, body language, paralanguage, and appearance as well as approaches to assess these cues on different levels of aggregation. We then summarize research on the validity of nonverbal cues (what kind of nonverbal cues are good indicators of personality?) as well as the utilization of nonverbal cues (what kind of nonverbal cues lead to personality impressions?), resulting in a catalogue of those cues that drive judgment accuracy for different traits. Finally, we discuss personal and situational characteristics that moderate the expression and utilization of nonverbal cues and give an outlook for future research.

Keywords: Judgment Accuracy, Personality Judgments, Nonverbal behavior, Behavioral Cues, Lens Model Analyses

Whenever we interact with others, we make judgments about their personalities (e.g., this person is trustworthy, this person is friendly). These judgments are typically formed within seconds (e.g., Willis & Todorov, 2006), tend to be quite stable across time (e.g., Kenny, Horner, Kashy, & Chu, 1992), and are often surprisingly accurate (e.g., Ambady & Skowronski, 2008; Funder, 2012). Most of the time, initial judgments are even formed before any (relevant) verbal information is exchanged. They are thus exclusively based on nonverbal cues (i.e., the way people look, move, or gesture) and they can have far-reaching consequences (e.g., Ambady, Bernieri, & Richeson, 2000; Harris & Garris, 2008). For example, in an employment interview, the applicant's upright posture, firm handshake, and appearance might lead to a positive evaluation (e.g., the applicant seems trustworthy and competent) and eventually to a job offer. In a get-to-know context, the broad smile of an interaction partner and the colorful clothing could lead to the conclusion that this person is friendly, thus resulting in a friendship or a romantic relationship.

In this chapter, we will present an overview of nonverbal cues and how they are related to the accuracy of personality judgments. That is, we will first summarize relevant nonverbal cue domains (i.e., facial expressions, body language, paralanguage, appearance) and discuss why they might be important for the judgment of personality and how they can be assessed. Afterwards, using the lens model as a conceptual framework, we will summarize their role in explaining the degree of accuracy in personality trait judgments. We will then present research on the validity (what kind of nonverbal cues are good indicators of 'true' personality?) and utilization (what kind of nonverbal cues are good indicators of personality impressions?) of nonverbal cues. Based on this, we will discuss potential moderators that might influence the relation between nonverbal cues and trait accuracy (i.e., good trait, good information, good judge, good target) and outline implications for future research.

Conceptualization of Nonverbal Cues

There has been a long history of studying nonverbal (behavioral) cues, going as far back as Darwin (1897) who examined the expression of emotions through facial cues and gestures. Numerous studies in this spirit focused on nonverbal cues and their relation to judgments of emotions and personality (e.g., Ekman & Friesen, 1969; Scherer, Scherer, Hall, & Rosenthal, 1977; Taft, 1955; for overviews of nonverbal communication and behavioral research see: Burgoon, Guerrero, & Floyd, 2010; Hall, Horgan, & Murphy, 2018; Harrigan, Rosenthal, & Scherer, 2005; Manusov, 2004). Nonverbal cues are typically divided into three domains of dynamic cues (i.e., cues that can easily be changed): face (i.e., facial expressions), body (i.e., body language; sometimes further divided into gestures and postures), and tone (i.e., paralanguage; Blanck, Rosenthal, Snodgrass, DePaulo, & Zuckerman, 1981; Elfenbein & Eisenkraft, 2010; Hall & Andrzejewski, 2008; Hall, Schmidt Mast, & West, 2016; Nowicki & Duke, 1994). In addition to these dynamic cues, there also exists a long research tradition of investigating static appearance based cues (e.g., body shape, choice of clothing, head size; DeGroot & Gooty, 2009; Gifford, Ng, & Wilkinson, 1985; Naumann, Vazire, Rentfrow, & Gosling, 2009; Scherer et al., 1977), which also play an important role in nonverbal expression. Cues based on environmental aspects such as rooms (Gosling, Ko, Mannarelli, & Morris, 2002), music (Rentfrow & Gosling, 2006), or verbal descriptions (e.g., Borkenau, Mosch, Tandler, & Wolf, 2016; Kufner, Back, Nestler, & Egloff, 2010), as well as social media cues (e.g., Back, Schmukle, & Egloff, 2008; Back, Stopfer et al., 2010) will be discussed in Ch. 14 by Wall and Campbell in this handbook. Thus, for this chapter, we focus on facial expressions, body language, paralanguage, and appearance as four generally distinct domains of nonverbal behavior (please refer to Table 1 for an overview with examples).

Table 1

Overview of nonverbal cue domains

Domain	Definition	Examples
Facial expressions	Movements executed with the facial muscles	Smiling Eye contact Frowning Winking
Body language	Arrangement and gestures executed with the body and its limbs	Trunk reclines Energetic stance Body movement Head shake
Paralanguage	Nonverbal elements and features of speech	Pitch Speech rate Amplitude Voice breaks
Appearance	Static visual cues	Body shape Height Stylish clothes Make up

Facial expressions

Facial expressions refer to any kind of movements with the facial muscles. This most prominently includes expressions via the mouth and lips (e.g., smiling, yawning, showing teeth) as well as expressions via the eyes and eyebrows (e.g., eye contact, glazing, squinting, winking, scowling). Research on such facial expressions has predominantly focused on the recognition of emotions (e.g., Ekman & Friesen, 1969, 1971; Ekman, Sorenson, & Friesen, 1969; Izard, 1971), which are displayed through an interplay of different facial muscle movements. For example, the emotion of anger can be characterized by pulled-down eyebrows, pulled-up eyelids, and tightened lips (for an overview see: Ekman & Rosenberg, 1997). While the kind of emotion signals are often assumed to be universal across cultures

(Ekman, 1994, 2016; Izard, 1994), there is large variability between individuals of how strongly emotions are expressed (e.g., Hildebrandt, Olderbak, & Wilhelm, 2015).

Individual differences in facial expressions, whether they are used for the recognition of emotions or not, can be used as cues for the judgment of underlying personality traits. One possible explanation lies in the relation between facial cues, affect, and traits. The *State and Trait Accuracy Model* (STAM; Hall, Gunnery, Letzring, Carney, & Colvin, 2017), for example, posits that people first judge affective states (e.g., a person with pulled-down eyebrows might be perceived as angry, a person with a wide smile might be perceived as happy). These affective state impressions might then be used to form trait judgments (e.g., an angry person could be seen as disagreeable, a happy person could be seen as extraverted). This is based on the idea that momentary characteristics are often regarded as enduring attributes (i.e., the process of temporal extension; Knutson, 1996; Secord, 1958; Zebrowitz & Montepare, 2008). This link between facial expressions, emotions, and personality judgments has been shown in a variety of studies (for an overview, see: Zebrowitz & Montepare, 2008) and serves as a starting point for the understanding of accurate trait judgments based on facial expressions.

Body language

Body language involves any kind of arrangement or gestures performed with the body and its limbs (i.e., every movement or arrangement of a person except the facial muscles). This includes gestures performed with the arms and hands (e.g., folded arms, waving, itching, peace sign), movement with the legs (e.g., running, walking) or head (e.g., head shake, head pointed towards the ground), as well as arrangements concerning the whole body (e.g., upright posture, energetic stance, crouched position). Some of these movements and gestures have concrete meanings within specific cultural groups (often called emblems, e.g., in many cultures a head shake stands for 'no' and a thumbs up stands for 'I agree', cf. Hall et al., 2018). Research on body-related cues has often focused on the display, recognition, and

relationship with dominance, power, and status (e.g., Carney, Hall, & LeBeau, 2005; Hall, Coats, & LeBeau, 2005; Henley, 1977). For example, upright postures, upright head tilts, and wide gestures are generally seen as signs of dominance.

Again, differences in the expression of such behaviors can be used as cues for the judgment of underlying traits. In addition to previously mentioned explanations (i.e., temporal extension, STAM) of how differences in expression can be related to (more or less accurate) personality judgments, body language cues especially can function via the accurate perception of underlying goals and motives. An individual who shows cues such as a huddled posture or head pointed towards the ground might, for example, be seen as someone with a (conflict) avoidance motive that wants to maintain a stable relationship with possible interaction partners. This person might then be (correctly) identified as being submissive or introverted (cf. Hall et al., 2005 for multiple explanations of how social pressures, goals, motives, emotions, and contextual variables impact nonverbal cues in the context of dominance).

Paralanguage

Paralanguage (i.e., paraverbal cues) describes nonverbal elements and general features of speech such as speech rate (number of words within a specific timeframe), voice breaks (number of pauses), fundamental frequency (mean voice pitch), pitch variability (variation of the voice pitch), amplitude (mean loudness/intensity of the voice), or amplitude variability (variation in the loudness of the voice). These vocal cues often parallel the spoken word, but can also provide additional (e.g., emotional state) or contradictory (e.g., sarcasm, deception) information (Hall et al., 2018). There is a large amount of research focusing on the perception of different paralanguage cues which shows that people generally rely heavily on voice and speech features when forming impressions about others (e.g., DeGroot & Gooty, 2009; Kramer, 1963). One example is the relationship between cognitive ability and paralanguage: Perceptions made via acoustic cues (within a standardized content, e.g., reading the weather forecast) have been shown to relate to differences in individuals' cognitive ability measured

via standardized intelligence tests (Borkenau & Liebler, 1993, 1995; Borkenau, Mauer, Riemann, Spinath, & Angleitner, 2004).

This can most likely be explained by the fact that ability measured in cognitive tests (e.g., rapid information processing, good working memory) is also important for the comprehension and fluent repetition of words and sentences (i.e., reading, see for example: Borkenau & Liebler, 1995). These possible differences in speech rate, pauses, and emphasis might then be used by observers as cues for competence. Of course, paralinguistic cues can also carry information about emotions and affective states (e.g., speaking slowly and quietly might be a sign for a sad mood, cf. Bänziger, Hosoya, & Scherer, 2015), as well as reveal individual motives of how one wants to appear to others that are based on stereotypes (e.g., Anna believes herself to be dominant, thus she general speaks in a loud voice when talking to others).

Appearance

Nonverbal cues relating to appearance include any static visual cues. These are physical characteristics that are usually less alterable such as height, weight, body shape, length of nose, width of chin, shape of ears, eye color, or hair color as well as more alterable features like choice of clothing, grooming, hairstyle, or makeup. All appearance-based cues have in common, however, that they are generally static within one situation and, in contrast to facial expressions and body language, cannot be easily changed within the specific judgment context. Theories and research about the relationship between static visual cues and personality dates back to *physiognomical* ideas of ancient Greek philosophers more than 2000 years ago (cf. Hassin & Trope, 2000; Zebrowitz, 1997), who believed that there are ‘mystic’ links between a person’s character and outer appearance. While these simplified ideas have been heavily criticized, newer research has focused on more specific relationships between appearance characteristics and personality, and there are hints that appearance can provide us

with at least rudimentary guidelines when judging personality (i.e., a kernel of truth; e.g., Berry, 1990; Naumann et al., 2009; Zebrowitz, 2017; Zebrowitz & Montepare, 2008).

Associations between personality and appearance can be traced back to a variety of mechanisms involving environmental and biological factors. For example, appearance and personality might be related due to common biological causes (e.g., testosterone influences facial hair growth as well as a more aggressive personality) as well as common environmental causes (e.g., the choice for a specific grooming style is specific for individuals that share the same values). Furthermore, physical differences could serve as some form of self-fulfilling prophecy (e.g., tall individuals are expected to behave more dominantly, they thus act accordingly) or they could reveal differences in past behaviors (e.g., individuals that laugh a lot might develop laugh lines and are thus judged to be happy or extraverts; see Zebrowitz & Collins, 1997 for an overview of these four explanations).

Assessment of Nonverbal Cues

To empirically investigate the contribution of nonverbal cues to trait accuracy one needs three different data sources: This includes some measure of “real” personality provided by the targets (typically assessed via self-reported personality questionnaires and sometimes supplemented by informant-reported personality), judgments on the same personality traits by unacquainted perceivers (typically based on short interactions, videos, or photos), as well as a listing and quantification of nonverbal cues available to perceivers. At best, these cues should be sampled with respect to their natural range and covariation and rated by independent observers.

Generally, the assessment of such cues can happen at different levels of abstraction which include the macro level (global ratings specific to one behavioral domain; e.g., shows dominant behavior), meso level (circumscribed behavioral expressions; e.g., self-confident facial expressions) and micro level (specific behavioral acts; e.g., leaning forward). The specific cues that are to be rated are typically based on coding schemes developed for the

assessment of (nonverbal) cues (for overviews see: Bakemann, 2000; Brauner, Boos, & Kolbe, 2018; Heyman, Lorber, Eddy, & West, 2014; Manusov, 2004). These schemes vary in their number of cues and comprehensiveness. The Münster Behavior Coding System (Grünberg, Mattern, Geukes, Kufner, & Back, 2018), for example, differentiates between the mentioned macro, meso, and micro levels and classifies cues within the broader sections of dominance, warmth, expressiveness, arrogance, aggressiveness, nervousness, and intellectual competence, resulting in over 280 possible cues. When used for specific research questions the number of assessed cues is often considerably lower. An example are the classic studies by Borkenau and Liebler (1992a, 1992b, 1995) in which observers rated about 50 behavioral and appearance-based cues.

Cues further differ in how they can be assessed: there are cues that can be objectively determined (e.g., target wears glasses, height of target, body proportions), cues that can be counted (e.g., number of aggressive gestures, number of smiles), and cues that are rated on Likert type-scales (e.g., extent of leaning forward, extent of eye contact). Due to the sheer number of cues investigated, live rating is not an option in most cases. Thus, usually multiple observers need to watch videos or evaluate photos of targets to assess all desired nonverbal cues.

Role of Nonverbal Cues for Accuracy

How are nonverbal cues related to trait accuracy when judging personality traits? Based on the assumptions of the lens model (Brunswik, 1952, 1956 see Ch. 4 by Osterholz, Breil, Nestler, & Back in this handbook for a detailed explanation; see Figure 1 for an example), perceivers use available cues in the environment to form judgments of personality traits that are not directly observable. This framework enables an analytic and differentiated analysis of involved processes.

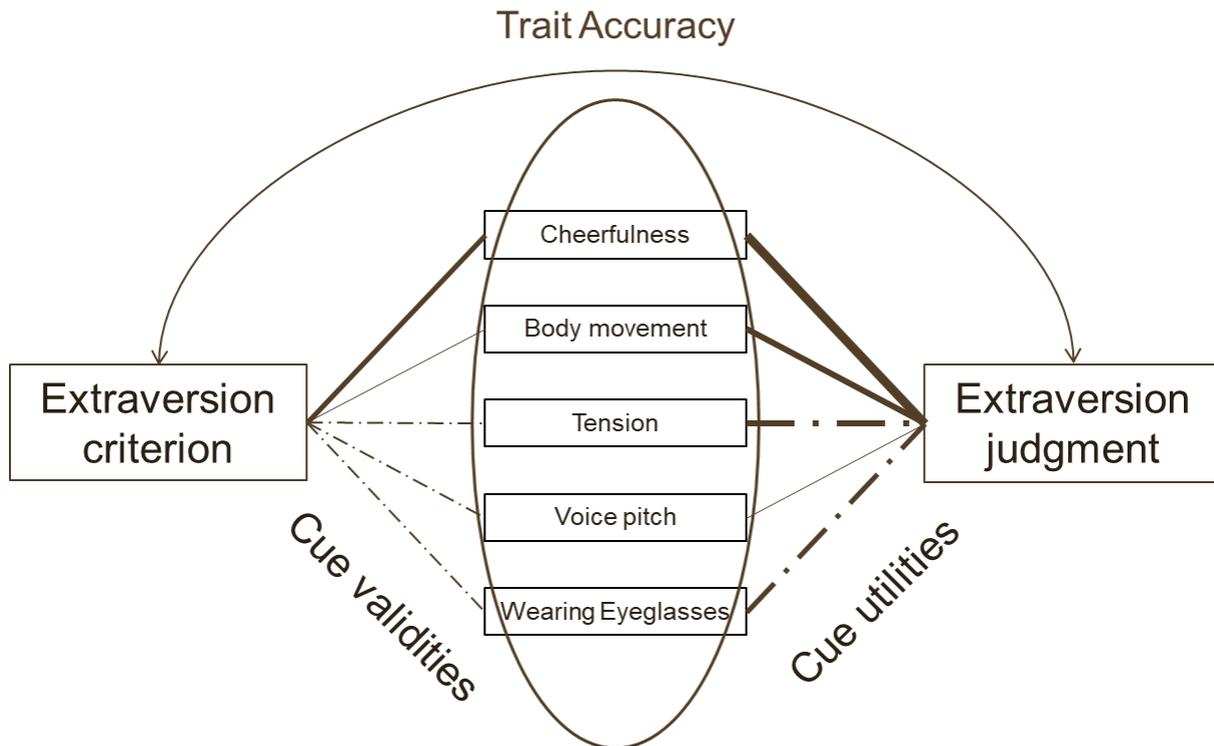


Figure 1. Exemplary lens model for the judgment of personality traits. The thickness of the lines indicates the strength of the relation. Solid lines indicate positive associations, dotted lines indicate negative associations.

For example, perceivers might observe the cheerfulness, the amount of body movement, and the lack of tension of a target and use this information to infer his/her (possibly high) extraversion. The extent to which an observer uses a specific cue for judgments is called cue utilization (see right side in Figure 1). For each cue, it describes the relationship between individual differences in target cue values and individual differences in how targets are judged. Cue utilizations are influenced by (intuitive) knowledge and individual experiences, as well as the utilization of stereotypes (e.g., Jussim, Cain, Crawford, Harber, & Cohen, 2009) and exemplar information (e.g., Smith & Zárate, 1992).

Cue validity on the other side, describes, for each cue, the relationship between individual differences in targets (nonverbal) cue values and individual differences in targets actual personality trait values (typically assessed via self-report and/or informant-report questionnaires; see left side in Figure 1). Individuals who wear glasses, for example, might be

(on average) less extraverted, while individuals who smile a lot (i.e., have a cheerful expression) might be more extraverted. Multiple (not mutually exclusive) explanations on why differences in the expression of nonverbal cues could be related to differences in actual personality traits have been discussed above and are displayed in Table 2. Nonverbal cues especially might be very suited for the judgment of personality as they are more difficult to suppress relative to verbal behavior and are thus more revealing of internal states (DePaulo, 1992).

Table 2

Explanations on why nonverbal cues are related to “real” personality

Reason	Explanation	Potential Examples
Temporal extension of emotion and affect	Individuals who are high in specific traits are more likely to show specific emotions and affective states.	Extraverts are more likely to be happy, thus they smile more often.
	These emotions and affective states are expressed through nonverbal cues.	People high in neuroticism are more likely to be afraid, thus their body is shaking more often.
Motives/Goals	Individuals who are high in specific traits are more likely to have specific motives and goals when interacting with others. These motives, goals, and interests are expressed through nonverbal cues.	Introverts are more likely to have a conflict avoidance motive, thus they show submissive (gestures, facial expressions) behavior.
		Individuals high in openness are more likely to have goals related to the creative expression of oneself and are thus more likely to wear extravagant clothes.
Common biological cause	Individuals who are high in specific traits are more likely to show specific nonverbal cues based on genetic and biological links.	Aggressive persons are more likely to have strong beard growth (due to testosterone which influences facial hair growth and aggressiveness).
		Intelligent individuals are more likely to be generally good looking (e.g., possible due to “good genes”).

Common environmental cause	Individuals who are high in specific traits are more likely to show specific nonverbal cues based on correlated learning.	Individuals low in openness have generally learned conservative values and, thus, wear more formal (conservative) clothes. Individuals high in conscientiousness have learned to think first, then act and thus, have a slower speech rate.
Self-fulfilling prophecy	Individuals who are high in specific traits are more likely to show specific nonverbal cues based on self-fulfilling prophecy which causes them to behave in a manner consistent with expectations.	Taller individuals are more likely to be dominant because they act upon the expectation to be dominant. Attractive individuals are more likely to be extraverted because they get more attention and act accordingly.
Past behavior	Individuals who are high in specific traits are more likely to show specific nonverbal cues based on past behavior that led to the development of these cues.	Individuals low in conscientiousness are more likely to be overweight because they behaved less conscientiously in the past. Individuals high in extraversion are more likely to have laugh lines because they behaved extraverted in the past.

Note. For more information on these different explanations please refer to Hall et al., 2005; Hall et al., 2017; Zebrowitz & Collins, 1997; Zebrowitz & Montepare, 2008. Please note that the provided examples just serve as a representation of different mechanisms and not all links have been empirically investigated. Furthermore, the mechanisms are not mutually exclusive (e.g., a common environmental cause might influence motives and goals).

In summary, accuracy through nonverbal cues can be achieved when there are valid cues available in the environment, that are observable, and used in line with their degree of validity. If there are no valid cues in the environment for a given trait, this means that this trait is impossible to judge accurately within this specific context. If there are valid cues, but they are not used accordingly by perceivers, this would indicate that perceivers have missing knowledge. The utilization of cues in the absence of validity could suggest some sort of bias or false stereotype.

Empirical Results for Validity and Utilization of Nonverbal Cues

Study selection and procedure

In this part, we will summarize empirical results regarding the validity and utilization of nonverbal cues for personality traits. We decided to include results of studies investigating the relationship between nonverbal cues on the one side and personality and/or personality judgments on the other side. We hereby only included studies with 1) real targets (age ≥ 16), with 2) a natural range and covariation of cues (i.e., no experimental manipulation), with 3) non-evaluative traits (e.g., no liking or popularity), and with 4) cues that classify to one of the four categories (i.e., facial expression, body language, paralanguage, appearance; e.g., no environmental cues, no highly aggregated cues).

We identified relevant studies through multiple criteria: In a first step we scanned known studies (and cross-references within these studies) that focused on the lens model, on cue-based judgments, and on behavioral prediction. In total, 32 studies met our criteria. In a second step, we used EBSCO, including the databases PsycARTICLES, PsycINFO, PSYINDEX, PsycBOOKS, and MEDLINE, for an online literature search. The search was restricted to peer-reviewed journals. Keywords were *lens model [AND] nonverbal* (all fields, 17 results), *nonverbal cues [AND] personality* (key words only, 30 results), *personality judgment* (key words only, 271 results), *personality perception [AND] cues* (all fields, 57 results), and *big five [AND] nonverbal* (all fields, 58 results). Here we found 10 additional

studies. In a last step, we scanned the first dozen pages of Google Scholar using the same criteria and identified 22 additional articles. In total, 64 articles were included (see osf.io/9p64g, Table S1) for an overview of included studies with relevant characteristics. Please note that some articles included multiple studies, while other studies were covered by multiple articles, resulting in 65 independent studies. Of these 65 studies, 33 studies included both cue validities as well as cue utilizations. Fifteen studies included only validities, while 17 studies exclusively focused on utilizations.

On the OSF page of this chapter (osf.io/9p64g), we have uploaded the full table with all studies and all individual correlations. Please note, however, that this list does not aim to be fully comprehensive and should be regarded as a preliminary documentation of the existing work. On the same page, we have included a sheet in which additional relevant studies we might have missed can be added, and we invite all readers to contribute to a more exhaustive documentation on personality (judgments) and nonverbal cues.

For the presentation of results in this chapter, we have focused on the relationship (correlation) between the Big Five (supplemented by intelligence) and 39 cues (6 to 14 per domain), which were selected based on their number of occurrences across studies. We hereby summarized traits and cues to broader categories (e.g., dominance and shyness were allocated to extraversion; warmth and arrogance were allocated to agreeableness; smiles and happy expression were allocated to cheerful facial expression; stylish hair and fashionable dress were allocated to stylishness). This allocation process was done by the authors of this study and based on theoretical (e.g., childlike, feminine, and soft faces are all related to babyfacedness) and practical (e.g., to have multiple studies for every trait / cue combination) considerations (also see Hirschmüller, Schmukle, Krause, Back, & Egloff, 2018 for a similar allocation of cues). For an overview concerning the current allocation of traits and cues, please refer to the online supplement (osf.io/9p64g, Table S2).¹

As some studies did not provide zero-order correlations, we used the provided partial correlations for those studies (e.g., correlations controlled for sex and age). When there were multiple correlations for a specific trait and cue combination within a sample (e.g., multiple traits within a sample allocated to extraversion, multiple cues within a study allocated to stylishness, separate results for men and women, self- and informant-reported traits), we aggregated these correlations within studies. In a next step, we meta-analyzed the resulting correlations across studies, using the R package *meta* (Schwarzer, 2019; R version 3.4.3, see osf.io/9p64g for data and code). Reported estimations are based on a random effects model with inverse variance weighting and DerSimonian-Laird estimation for the between-study variance. Please refer to Tables 3 to 8 for results.

Table 3

Cue Validity and Cue Utilization Meta-Analyses: Neuroticism

Cue Validity			Neuroticism	Cue Utilization		
<i>k</i> (<i>n</i>)	95% CI	<i>r</i>	Cues	<i>r</i>	95% CI	<i>k</i> (<i>n</i>)
<u>Facial expression</u>						
9(862)	[-.18, -.03]	-.11	Cheerful facial expression	-.24	[-.46, .02]	9(878)
4(414)	[-.16, .04]	-.06	Dominant facial expression	-.58	[-.74, -.36]	2(200)
1(62)		-.15	General expressiveness	n/a	n/a	n/a
3(299)	[-.16, .11]	-.03	Unconcerned (vs. serious)	.10	[-.42, .56]	3(299)
7(524)	[-.19, .07]	-.07	Eye contact	-.14	[-.24, -.04]	4(388)
2(116)	[-.55, .85]	.31	Eyebrow movements	-.01	[-.19, .18]	2(116)
<u>Body language</u>						
5(498)	[-.20, .08]	-.06	Body movement	.09	[-.18, .35]	6(466)
3(365)	[-.24, .12]	-.06	Forward lean / proximity	n/a	n/a	n/a
5(420)	[-.12, .07]	-.03	Gestures	-.12	[-.25, .02]	2(200)
3(189)	[-.27, .08]	-.10	Head movements	.13	[-.21, .44]	2(140)
4(336)	[-.16, .14]	-.01	Self-assured / open vs. slouching	-.40	[-.64, -.09]	3(224)
3(313)	[-.06, .17]	.06	Closed arms	.13	[-.01, .27]	3(313)
3(208)	[-.14, .13]	-.01	Self-touch	.17	[-.29, .57]	2(164)
4(325)	[.02, .23]	.13	Tension / nervousness (vs. relaxed)	.29	[.00, .53]	4(325)
2(200)	[-.09, .19]	.05	Stride length	-.13	[-.28, .02]	2(200)
<u>Paralanguage</u>						
2(200)	[-.09, .19]	.05	Ease of understanding	-.33	[-.51, -.14]	2(200)
2(123)	[-.43, -.02]	-.24	Expressive / varying voice	-.47	[-.70, -.14]	3(180)
7(698)	[-.20, -.01]	-.10	Fluent speaking (vs. nervous)	-.32	[-.40, -.24]	5(510)
3(299)	[-.23, .00]	-.12	Pleasantness of voice	-.50	[-.60, -.39]	4(323)
3(299)	[-.19, .04]	-.07	Powerful / confident voice (vs. soft)	-.28	[-.41, -.13]	4(323)
2(248)	[-.29, .02]	-.14	Loudness	-.17	[-.45, .13]	3(180)
3(299)	[-.25, .23]	-.01	Pitch	.08	[-.07, .22]	6(822)
1(54)		.20	Speech rate	-.20	[-.46, .10]	2(499)
5(446)	[-.32, .07]	-.13	Speech vs. non-speech	-.11	[-.19, -.03]	3(623)
n/a	n/a	n/a	Interruptions	n/a	n/a	n/a
<u>Appearance</u>						
9(865)	[-.22, -.06]	-.14	Attractiveness	-.33	[-.45, -.19]	10(843)
6(476)	[-.12, .10]	-.01	Babyfacedness vs. maturity	-.01	[-.26, .24]	4(276)
3(189)	[-.11, .18]	.04	Distinctiveness	.00	[-.14, .15]	3(189)
9(764)	[-.17, -.02]	-.10	Neatness	-.15	[-.24, -.05]	10(757)
8(752)	[-.11, .03]	-.04	Stylishness	-.15	[-.28, -.02]	8(690)
3(212)	[-.24, .24]	.00	Formality	-.08	[-.21, .06]	3(212)
3(149)	[-.22, .30]	.04	Eyeglasses	.24	[.01, .45]	2(76)
3(176)	[-.10, .20]	.06	Volume of Mouth / full lips	-.05	[-.39, .31]	3(176)
2(200)	[-.09, .19]	.05	Hair length (long)	.11	[-.03, .24]	2(200)
3(176)	[.10, .38]	.25	Dark hair color	.01	[-.14, .16]	3(176)
2(199)	[-.24, .04]	-.10	Height	-.18	[-.32, -.05]	2(199)
3(273)	[-.24, .00]	-.12	Muscular	-.33	[-.49, -.14]	2(200)
3(299)	[-.05, .18]	.07	Weight	-.04	[-.29, .21]	3(299)
2(200)	[.05, .32]	.19	Dark clothes	.08	[-.07, .21]	2(200)

Note. *k* = number of included samples, *n* = overall sample size. The effect size and confidence interval (CI) estimations are based on a random effects model (empty CI cells included only one study). Cues in bold showed at least small ($r \geq .10$) effects for both utilization and validity (same direction; across at least two studies).

Table 4

Cue Validity and Cue Utilization Meta-Analyses: Extraversion

Cue Validity			Extraversion	Cue Utilization		
<i>k</i> (<i>n</i>)	95% CI	<i>r</i>	Cues	<i>r</i>	95% CI	<i>k</i> (<i>n</i>)
<u>Facial expression</u>						
17(1789)	[.09, .21]	.15	Cheerful facial expression	.54	[.32, .70]	17(1565)
6(669)	[-.08, .27]	.10	Dominant facial expression	.52	[.38, .64]	3(382)
3(311)	[.03, .25]	.14	General expressiveness	.40	[.11, .63]	4(371)
3(382)	[-.35, .26]	-.05	Unconcerned (vs. serious)	-.29	[-.75, .37]	3(382)
12(1222)	[-.02, .09]	.03	Eye contact	.21	[.11, .31]	11(1202)
4(394)	[-.17, .10]	-.04	Eyebrow movements	.07	[-.24, .37]	4(394)
<u>Body language</u>						
8(733)	[-.02, .20]	.09	Body movement	.33	[.16, .48]	10(837)
7(893)	[.04, .24]	.14	Forward lean / proximity	.10	[.03, .18]	5(670)
12(1226)	[.11, .24]	.18	Gestures	.35	[.22, .46]	11(1048)
8(808)	[-.14, .13]	.00	Head movements	.26	[.17, .35]	8(802)
5(520)	[-.01, .31]	.15	Self-assured / open vs. slouching	.25	[-.30, .67]	4(395)
6(623)	[-.18, .05]	-.06	Closed arms	-.12	[-.23, -.01]	6(623)
7(697)	[-.03, .12]	.04	Self-touch	.07	[-.08, .22]	7(711)
7(713)	[-.24, -.08]	-.16	Tension / nervousness (vs. relaxed)	-.42	[-.58, -.23]	8(773)
3(382)	[-.07, .13]	.03	Stride length	.05	[-.05, .15]	4(425)
<u>Paralanguage</u>						
4(449)	[-.04, .22]	.09	Ease of understanding	.30	[.11, .47]	4(449)
7(849)	[.08, .33]	.21	Expressive / varying voice	.36	[.20, .50]	7(514)
5(564)	[-.03, .22]	.10	Fluent speaking (vs. nervous)	.22	[.14, .31]	5(472)
4(455)	[.08, .26]	.17	Pleasantness of voice	.30	[.16, .42]	4(406)
6(894)	[.13, .30]	.22	Powerful / confident voice (vs. soft)	.36	[.25, .46]	5(473)
3(387)	[-.03, .43]	.21	Loudness	.35	[.09, .57]	6(581)
5(821)	[-.15, .08]	-.04	Pitch	.05	[-.08, .17]	7(972)
3(493)	[-.25, .52]	.16	Speech rate	.21	[-.10, .49]	4(609)
9(932)	[.15, .32]	.23	Speech vs. non-speech	.31	[.15, .45]	7(1191)
2(197)	[-.01, .27]	.13	Interruptions	.05	[-.09, .19]	2(197)
<u>Appearance</u>						
13(1603)	[.14, .27]	.20	Attractiveness	.47	[.37, .56]	15(1362)
8(731)	[-.04, .21]	.08	Babyfacedness vs. maturity	.06	[-.07, .19]	6(627)
3(189)	[-.29, .05]	-.12	Distinctiveness	-.09	[-.23, .06]	3(189)
11(1064)	[.15, .27]	.21	Neatness	.25	[.18, .32]	11(1009)
10(964)	[.14, .31]	.22	Stylishness	.32	[.21, .41]	9(829)
4(367)	[-.09, .11]	.01	Formality	-.08	[-.22, .05]	4(463)
3(149)	[-.32, .07]	-.13	Eyeglasses	-.35	[-.54, -.13]	2(76)
4(358)	[.01, .22]	.12	Volume of Mouth / full lips	.16	[.05, .27]	4(358)
2(282)	[-.14, .33]	.10	Hair length (long)	.10	[-.02, .22]	2(282)
4(358)	[-.18, .06]	-.06	Dark hair color	-.09	[-.19, .01]	4(358)
3(382)	[-.19, .19]	.00	Height	.02	[-.08, .12]	3(382)
4(455)	[-.06, .12]	.03	Muscular	.19	[.02, .35]	3(382)
4(455)	[-.01, .18]	.08	Weight	.07	[-.03, .17]	3(382)
4(455)	[-.28, .04]	-.12	Dark clothes	-.11	[-.27, .06]	3(382)

Note. *k* = number of included samples, *n* = overall sample size. The effect size and confidence interval (CI) estimations are based on a random effects model (empty CI cells included only one study). Cues in bold showed at least small ($r \geq .10$) effects for both utilization and validity (same direction; across at least two studies).

Table 5

Cue Validity and Cue Utilization Meta-Analyses: Openness

Cue Validity			Openness	Cue Utilization		
<i>k</i> (<i>n</i>)	95% CI	<i>r</i>	Cues	<i>r</i>	95% CI	<i>k</i> (<i>n</i>)
<u>Facial expression</u>						
6(711)	[-.06, .09]	.02	Cheerful facial expression	.38	[.29, .46]	9(1026)
5(596)	[-.04, .12]	.04	Dominant facial expression	.36	[.27, .45]	3(382)
1(182)		-.01	General expressiveness	.22		1(182)
3(382)	[-.09, .11]	.01	Unconcerned (vs. serious)	-.28	[-.57, .08]	3(382)
5(645)	[-.20, .06]	-.07	Eye contact	.13	[.00, .26]	6(832)
2(116)	[-.26, .10]	-.08	Eyebrow movements	.09	[-.05, .22]	3(326)
<u>Body language</u>						
4(394)	[-.13, .07]	-.03	Body movement	.02	[-.08, .11]	5(434)
1(182)		.02	Forward lean / proximity	.15	[.05, .24]	2(392)
3(394)	[-.07, .13]	.03	Gestures	.08	[-.01, .17]	3(492)
3(382)	[-.12, .09]	-.01	Head movements	.07	[-.06, .19]	5(632)
3(237)	[-.03, .23]	.10	Self-assured / open vs. slouching	.25	[-.07, .52]	3(335)
4(495)	[-.13, .06]	-.03	Closed arms	-.10	[-.18, -.01]	4(495)
2(282)	[-.16, .21]	.02	Self-touch	.02	[-.10, .13]	2(282)
5(507)	[-.13, .05]	-.04	Tension / nervousness (vs. relaxed)	-.16	[-.26, .05]	5(507)
3(382)	[-.13, .13]	.00	Stride length	-.01	[-.27, .24]	3(382)
<u>Paralanguage</u>						
3(382)	[-.09, .14]	.02	Ease of understanding	.31	[.11, .49]	3(382)
n/a	n/a	n/a	Expressive / varying voice	n/a	n/a	n/a
4(520)	[-.13, .08]	-.02	Fluent speaking (vs. nervous)	.21	[.12, .29]	4(533)
3(382)	[.00, .20]	.10	Pleasantness of voice	.44	[.28, .58]	3(382)
3(382)	[-.24, .10]	-.07	Powerful / confident voice (vs. soft)	.10	[-.03, .23]	3(382)
1(182)		-.18	Loudness	-.23		1(182)
3(382)	[-.18, .07]	-.06	Pitch	.08	[-.10, .25]	4(824)
n/a	n/a	n/a	Speech rate	.05		1(442)
3(432)	[-.32, -.02]	-.17	Speech vs. non-speech	.06	[-.01, .14]	3(775)
1(182)		-.04	Interruptions	-.16		1(182)
<u>Appearance</u>						
8(788)	[-.14, .09]	-.03	Attractiveness	.56	[.21, .78]	9(828)
6(571)	[-.02, .14]	.06	Babyfacedness vs. maturity	.17	[.01, .31]	5(458)
3(189)	[-.30, .25]	-.03	Distinctiveness	.05	[-.34, .42]	3(189)
8(687)	[-.22, .09]	-.07	Neatness	.32	[.12, .49]	10(840)
7(675)	[-.13, .14]	.00	Stylishness	.18	[.06, .29]	7(675)
4(394)	[-.32, .08]	-.12	Formality	.08	[-.20, .35]	4(394)
2(76)	[-.18, .28]	.05	Eyeglasses	.00	[-.23, .23]	2(76)
4(358)	[.00, .33]	.17	Volume of Mouth / full lips	.21	[.01, .39]	4(358)
2(282)	[-.02, .22]	.10	Hair length (long)	.16	[.05, .28]	2(282)
5(458)	[-.05, .14]	.04	Dark hair color	.09	[-.01, .18]	5(458)
3(382)	[-.09, .11]	.01	Height	.12	[.02, .22]	3(382)
3(382)	[-.15, .05]	-.05	Muscular	.02	[-.29, .32]	3(382)
3(382)	[-.18, .02]	-.09	Weight	-.22	[-.38, -.04]	3(382)
3(382)	[-.01, .19]	.09	Dark clothes	.05	[-.05, .15]	3(382)

Note. *k* = number of included samples, *n* = overall sample size. The effect size and confidence interval (CI) estimations are based on a random effects model (empty CI cells included only one study). Cues in bold showed at least small ($r \geq .10$) effects for both utilization and validity (same direction; across at least two studies).

Table 6

Cue Validity and Cue Utilization Meta-Analyses: Agreeableness

Cue Validity			Agreeableness	Cue Utilization		
<i>k</i> (<i>n</i>)	95% CI	<i>r</i>	Cues	<i>r</i>	95% CI	<i>k</i> (<i>n</i>)
<u>Facial expression</u>						
13(1225)	[.02, .19]	.10	Cheerful facial expression	.53	[.39, .64]	17(1561)
4(385)	[-.27, -.06]	-.17	Dominant facial expression	.22	[.07, .37]	2(200)
1(62)		.09	General expressiveness	n/a	n/a	n/a
2(200)	[-.19, .09]	-.05	Unconcerned (vs. serious)	-.26	[-.39, -.12]	2(200)
7(577)	[-.08, .08]	.00	Eye contact	.24	[.10, .36]	8(814)
3(136)	[-.08, .26]	.09	Eyebrow movements	-.04	[-.14, .07]	4(346)
<u>Body language</u>						
4(272)	[-.23, .07]	-.08	Body movement	-.13	[-.32, .06]	7(394)
n/a	n/a	n/a	Forward lean / proximity	-.05	[-.31, .22]	3(330)
4(334)	[-.27, .17]	-.05	Gestures	-.03	[-.28, .22]	4(430)
5(323)	[-.16, .28]	.06	Head movements	.18	[.00, .35]	7(552)
4(310)	[-.20, .33]	.07	Self-assured / open vs. slouching	.14	[-.34, .56]	4(395)
3(273)	[-.05, .19]	.07	Closed arms	-.14	[-.35, .09]	3(273)
2(162)	[-.22, .19]	-.02	Self-touch	-.10	[-.37, .19]	2(160)
4(325)	[-.26, .23]	-.02	Tension / nervousness (vs. relaxed)	-.30	[-.50, -.06]	4(325)
2(200)	[-.41, -.01]	-.22	Stride length	-.18	[-.31, -.04]	2(200)
<u>Paralanguage</u>						
1(100)		.28	Ease of understanding	.35		1(100)
n/a	n/a	n/a	Expressive / varying voice	.01	[-.45, .46]	2(81)
3(262)	[-.07, .35]	.15	Fluent speaking (vs. nervous)	.10	[-.27, .44]	2(200)
2(200)	[-.05, .23]	.09	Pleasantness of voice	.43	[.32, .54]	3(224)
2(200)	[-.22, .18]	-.02	Powerful / confident voice (vs. soft)	.02	[-.11, .16]	3(224)
n/a	n/a	n/a	Loudness	.18	[-.12, .45]	2(81)
2(200)	[.04, .31]	.18	Pitch	.05	[-.19, .29]	4(699)
1(54)		.11	Speech rate	-.02	[-.28, .26]	2(499)
1(112)		-.11	Speech vs. non-speech	-.10	[-.35, .16]	2(499)
1(138)		-.22	Interruptions	-.30		1(151)
<u>Appearance</u>						
10(983)	[.02, .18]	.10	Attractiveness	.32	[.19, .44]	11(897)
6(476)	[-.08, .16]	.04	Babyfacedness vs. maturity	.33	[.17, .46]	6(467)
3(189)	[-.23, .06]	-.09	Distinctiveness	.02	[-.12, .17]	3(189)
10(882)	[.03, .24]	.13	Neatness	.18	[.05, .30]	9(658)
8(726)	[-.11, .11]	.00	Stylishness	-.01	[-.11, .09]	6(493)
3(212)	[-.02, .25]	.12	Formality	-.01	[-.15, .13]	3(212)
4(249)	[-.15, .10]	-.02	Eyeglasses	.00	[-.15, .15]	3(176)
3(176)	[-.04, .26]	.11	Volume of Mouth / full lips	.05	[-.13, .22]	3(176)
1(100)		.16	Hair length (long)	.11		1(100)
3(176)	[-.12, .19]	.03	Dark hair color	-.02	[-.17, .13]	3(176)
2(200)	[-.35, -.01]	-.18	Height	-.04	[-.25, .17]	2(200)
2(173)	[-.27, .03]	-.12	Muscular	-.20		1(100)
2(200)	[-.18, .10]	-.04	Weight	.08	[-.06, .22]	2(200)
2(173)	[-.23, .65]	.27	Dark clothes	-.19		1(100)

Note. *k* = number of included samples, *n* = overall sample size. The effect size and confidence interval (CI) estimations are based on a random effects model (empty CI cells included only one study). Cues in bold showed at least small ($r \geq .10$) effects for both utilization and validity (same direction; across at least two studies).

Table 7

Cue Validity and Cue Utilization Meta-Analyses: Conscientiousness

Cue Validity			Conscientiousness	Cue Utilization		
<i>k</i> (<i>n</i>)	95% CI	<i>r</i>	Cues	<i>r</i>	95% CI	<i>k</i> (<i>n</i>)
<u>Facial expression</u>						
5(529)	[-.04, .22]	.09	Cheerful facial expression	.28	[.10, .44]	7(630)
4(414)	[-.14, .05]	-.05	Dominant facial expression	.13	[-.05, .31]	2(200)
n/a	n/a	n/a	General expressiveness	n/a	n/a	n/a
2(200)	[-.10, .18]	.04	Unconcerned (vs. serious)	-.04	[-.24, .17]	2(200)
3(363)	[-.05, .17]	.06	Eye contact	.20	[.04, .34]	4(400)
2(116)	[-.70, .47]	-.17	Eyebrow movements	.15	[-.04, .32]	2(116)
<u>Body language</u>						
3(212)	[-.27, .32]	.03	Body movement	-.18	[-.36, .00]	5(316)
n/a	n/a	n/a	Forward lean / proximity	.14		1(60)
3(300)	[-.14, .20]	.03	Gestures	-.01	[-.22, .20]	3(260)
2(200)	[-.30, .29]	-.01	Head movements	-.23	[-.39, -.05]	3(240)
3(237)	[.04, .29]	.16	Self-assured / open vs. slouching	.31	[.14, .46]	2(125)
2(213)	[-.28, -.01]	-.15	Closed arms	-.03	[-.16, .11]	2(213)
2(200)	[-.34, -.07]	-.21	Self-touch	-.22	[-.35, -.09]	2(200)
4(325)	[-.19, .20]	.01	Tension / nervousness (vs. relaxed)	.21	[-.11, .50]	4(325)
1(100)		-.16	Stride length	-.39		1(100)
<u>Paralanguage</u>						
2(200)	[-.11, .17]	.03	Ease of understanding	.33	[-.05, .63]	2(200)
n/a	n/a	n/a	Expressive / varying voice	.31	[.10, .50]	2(81)
3(338)	[-.10, .21]	.06	Fluent speaking (vs. nervous)	.27	[.08, .43]	3(351)
2(200)	[-.18, .10]	-.04	Pleasantness of voice	.21	[.02, .39]	3(224)
2(200)	[-.04, .24]	.10	Powerful / confident voice (vs. soft)	.01	[-.13, .15]	3(224)
n/a	n/a	n/a	Loudness	.08	[-.15, .29]	2(81)
1(100)		.04	Pitch	.14	[-.18, .43]	4(623)
1(138)		.02	Speech rate	.05	[-.25, .34]	3(650)
1(112)		.22	Speech vs. non-speech	.25	[.16, .33]	2(499)
n/a	n/a	n/a	Interruptions	n/a	n/a	n/a
<u>Appearance</u>						
7(606)	[-.01, .23]	.11	Attractiveness	.21	[.06, .35]	10(875)
5(389)	[-.10, .21]	.06	Babyfacedness vs. maturity	.06	[-.29, .40]	5(445)
3(189)	[-.33, -.05]	-.19	Distinctiveness	-.12	[-.26, .03]	3(189)
7(505)	[.15, .31]	.23	Neatness	.50	[.37, .61]	10(827)
6(493)	[-.01, .17]	.08	Stylishness	.07	[-.11, .25]	6(493)
3(212)	[-.09, .37]	.15	Formality	.54	[.32, .71]	5(445)
3(176)	[-.19, .24]	.03	Eyeglasses	.25	[.10, .38]	3(176)
3(176)	[-.13, .21]	.04	Volume of Mouth / full lips	.04	[-.19, .26]	3(176)
2(200)	[-.30, -.03]	-.17	Hair length (long)	-.14	[-.27, .00]	2(200)
3(176)	[-.12, .18]	.03	Dark hair color	.12	[-.10, .32]	3(176)
2(200)	[-.28, -.01]	-.15	Height	-.06	[-.29, .17]	2(200)
1(100)		.00	Muscular	-.17		1(100)
2(200)	[-.33, .33]	.00	Weight	.06	[-.08, .20]	2(200)
1(100)		-.13	Dark clothes	-.21		1(100)

Note. *k* = number of included samples, *n* = overall sample size. The effect size and confidence interval (CI) estimations are based on a random effects model (empty CI cells included only one study). Cues in bold showed at least small ($r \geq .10$) effects for both utilization and validity (same direction; across at least two studies).

Table 8

Cue Validity and Cue Utilization Meta-Analyses: Intelligence

Cue Validity			Intelligence	Cue Utilization		
<i>k</i> (<i>n</i>)	95% CI	<i>r</i>	Cues	<i>r</i>	95% CI	<i>k</i> (<i>n</i>)
<u>Facial expression</u>						
4(267)	[-.22, .02]	-.10	Cheerful facial expression	.16	[.04, .27]	4(281)
1(100)		.34	Dominant facial expression	.35		1(100)
n/a	n/a	n/a	General expressiveness	.12	[-.10, .33]	2(122)
2(142)	[-.24, .09]	-.08	Unconcerned (vs. serious)	-.13	[-.61, .41]	2(142)
4(267)	[-.07, .22]	.08	Eye contact	.32	[.19, .43]	3(221)
n/a	n/a	n/a	Eyebrow movements	n/a	n/a	n/a
<u>Body language</u>						
2(142)	[-.18, .15]	-.01	Body movement	.03	[-.11, .17]	3(202)
3(258)	[-.01, .24]	.12	Forward lean / proximity	.16		1(42)
4(267)	[-.09, .15]	.03	Gestures	.28	[.11, .43]	4(283)
2(88)	[-.22, .21]	-.01	Head movements	.16		1(42)
2(121)	[-.18, .25]	.04	Self-assured / open vs. slouching	.28	[-.09, .58]	2(121)
2(142)	[-.16, .18]	.01	Closed arms	-.12	[-.32, .10]	2(142)
2(88)	[-.10, .32]	.12	Self-touch	.06	[-.14, .25]	2(104)
3(221)	[-.39, .20]	-.10	Tension / nervousness (vs. relaxed)	-.15	[-.28, -.02]	3(221)
1(100)		.17	Stride length	.20		1(100)
<u>Paralanguage</u>						
4(251)	[.01, .44]	.24	Ease of understanding	.30	[.12, .46]	4(251)
1(42)		-.02	Expressive / varying voice	.23	[.03, .41]	2(102)
3(221)	[-.28, .44]	.09	Fluent speaking (vs. nervous)	.25	[.07, .42]	6(373)
3(221)	[-.08, .32]	.12	Pleasantness of voice	.22	[.06, .37]	3(221)
3(165)	[-.26, .05]	-.11	Powerful / confident voice (vs. soft)	.18	[.00, .34]	2(135)
n/a	n/a	n/a	Loudness	.45		1(30)
2(142)	[-.36, -.04]	-.21	Pitch	.00	[-.25, .25]	2(142)
2(109)	[-.08, .49]	.22	Speech rate	.31	[.12, .47]	2(109)
4(197)	[-.01, .39]	.20	Speech vs. non-speech	.30	[.13, .45]	3(151)
n/a	n/a	n/a	Interruptions	n/a	n/a	n/a
<u>Appearance</u>						
3(632)	[-.26, .24]	-.01	Attractiveness	.53	[.44, .60]	2(602)
1(100)		.02	Babyfacedness vs. maturity	-.10		1(100)
1(502)		.00	Distinctiveness	-.25		1(502)
1(100)		-.06	Neatness	.34		1(100)
1(100)		-.11	Stylishness	.13		1(100)
1(100)		-.09	Formality	.17		1(100)
n/a	n/a	n/a	Eyeglasses	n/a	n/a	n/a
n/a	n/a	n/a	Volume of Mouth / full lips	n/a	n/a	n/a
1(100)		-.05	Hair length (long)	-.01		1(100)
n/a	n/a	n/a	Dark hair color	n/a	n/a	n/a
1(100)		.03	Height	.16		1(100)
1(100)		-.07	Muscular	.20		1(100)
1(100)		-.05	Weight	-.36	[-.50, -.20]	2(130)
1(100)		.11	Dark clothes	.07		1(100)

Note. *k* = number of included samples, *n* = overall sample size. The effect size and confidence interval (CI) estimations are based on a random effects model (empty CI cells included only one study). Cues in bold showed at least small ($r \geq .10$) effects for both utilization and validity (same direction; across at least two studies).

Overview results

In the following, we will summarize the results separately for each trait domain. We hereby focus on cue validities and cue utilizations that were at least small in effect size ($r \geq .10$; Cohen, 1992). Cues that were used by observers to judge a specific trait and were at the same time related to actual trait values (in the same direction, with results from at least two studies), were identified as potential influences that drive trait accuracies.

Neuroticism. Non-cheerful expressions, a tense and nervous body language, an unexpressive, non-fluent, unpleasant, and silent voice, low amount of speaking, unattractiveness and a non-neat appearance, low height and being less muscular were all indicators of being neurotic and led observers to the same impression. Other cues (e.g., dominant facial expression, self-assured body language, ease of understanding, powerful voice, not wearing eyeglasses) were associated with being judged less neurotic but were not related to individuals' actual neuroticism. Wearing darker clothes and having darker hair were one of the few cues that were related to actual levels of neuroticism but were not used by observers when judging this trait (see Table 3).

Extraversion. Out of all the investigated traits, extraversion included the greatest number of valid cues that were also used by observers. These cues include cheerful facial expression, dominant facial expression, general facial expressiveness, forward leans, gestures, self-assured posture, relaxed posture, expressive/varying voice, fluent speaking, pleasantness of voice, confidence of voice, loudness of voice, speech rate, amount of talking, attractiveness, neatness, stylishness, lack of eyeglasses, volume of mouth, hair length, and the lack of dark clothes. The cues eye contact, body movement, and head movements (among others) were used by observers to judge extraversion but were not related to actual extraversion (see Table 4).

Openness. For openness, only self-assured/open posture, pleasantness of voice, volume of mouth, and hair length were valid and utilized cues. There were multiple cues (e.g.,

cheerful facial expression, fluent speaking, attractiveness, neatness, stylishness) that were used when judging openness, however, they were not related to actual openness. Less talking was related to actual openness, but observers did not use this cue (see Table 5).

Agreeableness. A cheerful facial expression, small stride length, fluent speaking, attractiveness, and neatness of appearance were the only cues that were related to actual agreeableness and used by observers to judge this trait. Many cues that observers associated with agreeableness (e.g., eye contact, relaxed body language, pleasantness of voice, babyfacedness) were not valid indicators. Furthermore, there were a few valid cues (high pitch, non-dominant facial expression) that were not identified by observers (see Table 6).

Conscientiousness. Cues that drove accuracy for conscientiousness judgments exclusively belonged to the domains of body language and appearance. These were self-assured/open posture, lack of self-touch, attractiveness, lack of distinctiveness in appearance, neatness, formality, and having shorter hair. Many more cues (e.g., fluent speaking, pleasantness of voice, wearing eyeglasses) were used when judging conscientiousness, but were not actually related with individuals' conscientiousness (see Table 7).

Intelligence. Here, cue validities refer to the relationship between cues and intelligence measured via cognitive ability tests (with the exception of one study that only included self-reports). For intelligence, paralinguistic cues played the biggest role in explaining accuracy. Especially, easiness of understanding, pleasantness of voice, speech rate, and amount of speech were used by observers and at the same time related to actual (measured) intelligence. Cues that were used but not valid were (for example): eye contact, amount of gestures, powerful voice, and attractiveness² (see Table 8).

Summary and comparison.

Results of the included studies suggest that, for all traits, there are at least a few nonverbal cues that allow for accurate glimpses into one's personality. For most traits (i.e., extraversion, openness, conscientiousness, intelligence) this is in line with research showing

above chance judgment accuracies, even by strangers (for overviews see: Connelly & Ones, 2010; Connolly, Kavanagh, & Viswesvaran, 2007; Hall, Andrzejewski, Murphy, Mast, & Feinstein, 2008; Kenny et al., 1992; Kenny, Albright, Malloy, & Kashy, 1994). However, even for traits that are typically viewed as not easily observable (i.e., agreeableness, neuroticism) we find multiple valid cues.

Nearly all the valid cues were also used by observers when judging the specific traits, showing that perceivers generally have the ability to correctly identify relevant cues. However, observers often overestimated the actual size of relationships, this potentially resulted in lower accuracies. Furthermore, there were many cues for which the included studies did not provide evidence for validity, but that were nevertheless used for judgments. These cues, thus, might represent some sort of common bias/inaccurate stereotype when judging the respective traits.

The five most utilized cues across all traits were attractiveness, dominant facial expression, cheerful facial expression, pleasantness of voice, and ease of understanding ($r = .33 - .45$). The five most valid cues were speech vs. non-speech, loudness, expressive / varying voice, wearing dark clothes, and speech rate ($r = .14 - .18$). Generally, the portion of cues that drove accuracy was highest for the paralanguage domain, highlighting the importance of voice and speech characteristics when judging personality.

In Table S3 in the online supplement, we additionally provide vector correlations³ for cue validities and cue utilizations across traits. Results show high inter-correlations for cue utilizations. This especially applies to extraversion, neuroticism (recoded as emotional stability), and intelligence (mean intercorrelations for the three traits = .68), as well as to openness and agreeableness ($r = .72$). This means that for judgments on these traits, available cues were used in a similar way (i.e., in the sense that the most and least utilized cues for one trait were also the most and least used cues for the other traits). The strong relationships between trait judgments might be related to general favorability of these traits and specific

cues (e.g., attractive individuals, with a cheerful expression and self-assured postures were generally judged as being high in extraversion, emotional stability, and intelligence). Low correlations were found for the cue utilization regarding extraversion and conscientiousness ($r = .14$).

For cue validities, we found a more mixed pattern: There were high inter-correlations between the cue validities for extraversion, emotional stability, and conscientiousness (mean intercorrelations for the three traits $r = .51$). For example, the neatness of appearance was significantly correlated with self/informant ratings on all three traits, while voice pitch played a negligible role. Noticeably smaller or even negative (e.g., openness & conscientiousness: $r = -.27$) correlations between cue validities were found for other trait combinations. This suggests that the relationship between nonverbal cues and actual personality across traits is more diverse than the perceived associations.

Potential Moderators

The mentioned relationship between nonverbal cues and personality (judgments) can be influenced by a variety of personal, situational, and trait-specific factors that affect the strength of cue utilities/validities. Funder (1999, 2012, also see Ch. 2 by Letzring & Funder in this handbook) distinguishes between four classes of moderators: Differences between traits (good trait), differences regarding the available information (good information), differences between perceivers (good judge), and differences between targets (good target).

A good trait on the individual cue level refers to traits that have, relative to other traits, a high number of valid cues that are also utilized by observers. Comparing the traits, one can notice that extraversion stands out by being associated with the highest number of valid and utilized nonverbal cues. This is in line with previous research identifying extraversion as a trait that is easily-observable across many different contexts (see Back & Nestler, 2016 and overviews mentioned above). Agreeableness however, is one of the traits hardest to judge accurately. Our results show that the lack of accuracy when judging agreeableness is not

generally due to missing knowledge or judgment biases but also due to the limited number of valid cues available (e.g., for agreeableness only 10% of investigated cues showed validities of at least $r = .20$. Extraversion in contrast had a percentage of 18).

The quantity and quality of information (i.e., good information) can also influence cue validities and cue utilities. One could imagine, for example, that over time (of interacting with someone) cue validities for dynamic cues increase due to more reliable variance in cue expression between different targets (e.g., reliable differences in the amount of head movements, which could be related to extraversion, might only emerge after a few minutes of interaction). Furthermore, the type of situation and their trait relevance might serve as moderators for cue validities (e.g., a tense body language might be a highly valid cue for judging neuroticism when the situation activates this specific trait but not in a neutral situation). While levels of accuracy have shown to increase over time (e.g., Borkenau et al., 2004; Letzring, Wells, & Funder, 2006) and to differ between settings varying in trait relevance (Hirschmüller, Egloff, Schmukle, Nestler, & Back, 2015; Letzring et al., 2006), influences on single cue validities have not been investigated yet. Considering the right side of the lens model (i.e., cue utilities), good information can also refer to the type of judgment channel (e.g., video with or without sound, audio only) observers are exposed to. For example, multiple studies included in this chapter (e.g., Borkenau & Liebler, 1992a, 1992b, 1995; Murphy, Hall, & Colvin, 2003; Reynolds & Gifford, 2001) compare cue utilizations for different kinds of judgments channels. Results by Borkenau and Liebler (1995) suggest that if valid cues are not observable (e.g., there are no paralinguistic cues), the utilization of observable non-valid cues (e.g., specific body language cues) increases, which would result in lower accuracy.

Regarding the expression nonverbal cues, good targets would refer to a group of individuals that provides more nonverbal cues and/or more variance in nonverbal cues, resulting in potentially stronger cue validities. Generally, research has identified the traits of

extraversion and emotional stability as features of good targets (i.e., targets that act more and express their emotions, cf. Colvin, 1993; Human & Biesanz, 2011; Human, Biesanz, Finseth, Pierce, & Le, 2014), but, to the best of our knowledge, specific changes in cue validities or utilities have not been investigated. There have, however, been many studies separating results by targets' sex (e.g., Aronovitch, 1976; Berry & Landry, 1997; Lippa, 1998; Riggio & Friedman, 1986; Shrout & Fiske, 1981; Simpson, Gangestad, & Biek, 1993). Lippa (1998), for example, found multiple nonverbal cues that were valid indicators of females' extraversion but not of males' extraversion, suggesting that it should be easier to judge females' extraversion.

Someone who is identified as a good judge should be better at identifying and using valid cues (and not using non-valid cues) compared to other judges, thus reaching higher accuracies. Another influence could be that good judges evoke more valid cues in targets. As most judgment accuracy studies do not include interactions between observers and targets, this explanation has received little empirical attention so far (but see Letzring, 2008). While the question "who is a good judge" has engaged researchers for a long time, results have been ambiguous (cf. Back & Nestler, 2016, see Davis & Kraus, 1997; Hall, Andrzejewski, & Yopchick, 2009; Taft, 1955 for meta-analyses). There have been a few studies analyzing cue utilities for different groups of (potentially good) judges (e.g., Hartung & Renner, 2011; Hirschmüller, Egloff, Nestler, & Back, 2013; Nestler & Back, 2017). For example, Hartung and Renner (2011) showed that socially highly curious judges generally used more available cues and were thus more likely to detect valid cues for visible traits (in this case extraversion and openness).

Outlook and future research

Here we will summarize suggestions that, in our view, would benefit future research on nonverbal cues and their relation to trait accuracy. First, while meta-analytical results presented in this chapter can serve as a first overview of validities and utilities for a variety of

cues, more, and more comprehensive studies are needed. Most included studies only investigated a small number of cues (< 10) and there are many trait-cue combinations for which empirical evidence is limited. It would also be beneficial to replicate the presented results across more diverse target samples and judgment contexts. Furthermore, results across studies are often difficult to integrate. For example, some studies only presented correlations controlled for sex and age, while other studies only reported significant cue relationships. Furthermore, nearly all studies focused on aggregated observer utilities (i.e., correlations computed for personality judgments aggregated across observers). Results based on this approach, in contrast to the single observer approach (separate correlations for each observer), depend on the number of observers within a study (more observers lead to higher utilities because of higher reliability of those ratings, cf. Back & Nestler, 2016; Hall & Bernieri, 2001; Nestler & Back, 2017), making it difficult to compare studies with a varying number of observers. Thus, we urge researchers, to (at least in online supplementaries) present comprehensive results, which include zero-order cue validities and cue utilities (aggregated and single observer) for all assessed cue and trait combinations.

Second, as stated previously, the research on how potential moderators influence cue validities and cue utilities, especially good information, good target, and good judge, is limited. Therefore, it would be beneficial to investigate how cue validities change over time and settings (good information) and to additionally present results separated by specific target criteria (besides sex), to identify subgroups that might constitute as good targets. In a similar way, systematically comparing single-observer cue utilities across judges would shed more light on the good judge.

Third, the advance of big data and accompanying machine learning techniques provides opportunities for the investigation of nonverbal cues. Research shows that, based on digital footprints, computer algorithms are often better in judging personality than humans (Youyou, Kosinski, & Stillwell, 2015) and it would be fruitful to transfer these methods to the

judgment of pictures, videos, or audio files. Thus, it could be investigated if computer algorithms can outperform human judges in these contexts and how humans vs. computers differ in their cue utilizations. Machine learning approaches could also be used as an economic and more objective tool for the quantification of nonverbal cues (i.e., use machine learning approaches instead of raters to judge the degree of smiling of targets).

In summary, with this chapter, we offer a first overview of how and which nonverbal cues contribute to accuracy for different traits. Results show that, for all traits, there are at least a few nonverbal cues that allow for accurate glimpses into one's personality, and perceivers often showed the ability to identify relevant cues. We plan to expand this overview in the future and to regularly update the results in the online supplement (osf.io/9p64g). We hereby invite interested readers to contribute to a more exhaustive documentation and add additional studies. In the years to come, with collaborations like this, we will be able to offer more comprehensive insights on which cues drive trait accuracies.

Footnotes

¹ With the raw data provided on osf.io/9p64g it is easily possible to compute results for different kinds of allocations (e.g., separate results for dominance and sociability aspects of extraversion; separate results for stylishness related to hairstyles).

² For more studies and meta-analyses concerning the specific link between attractiveness and intelligence please refer to Jackson, Hunter, & Hodge, 1995, Kanazawa, 2011, Langlois et al., 2000, and Mitchem et al., 2015. Mirroring the results we present here, recent research suggests that there is an absent or low correlation between attractiveness and actual intelligence (cf. Mitchem et al., 2015).

³ In this case vector correlations refer to correlations between Fisher z-transformed cue validity/utilization correlations across traits.

Table S1.

Studies Investigating the Relationship Between Nonverbal Cues and Personality / Personality Judgments

Authors	Type	N (T)	N: (P)	Jud. Chan nel	N: (R)	Cue Types	No. of cues	Traits
Albright, Kenny, & Malloy (1988; Study 3)	CU	169	3-5	Inter	P	Ap	5	E O C
Albright, Malloy, Dong, Kenny, Fang, Winquist, & Yu (1997; Study 1)	CU	80	4	Inter	P	Fe Ap	4	NE O A C
Albright, Malloy, Dong, Kenny, Fang, Winquist, & Yu (1997; Study 2)	CU	149	4-5	Ph	P	Fe Ap	4	NE O A C
Aronovitch (1976)	CU	57	50	Au	obj	Pl	6	NE A C
Asendorpf, Banse, & Mücke (2002)	CV CU	139	3	VS	1-2	Fe Bl Pl	6	E
Back, Penke, Schmukle, Sachse, Borkenau, & Asendorpf (2011)	CV	382			30	Ap	1	E
Back, Schmukle, & Egloff (2010) & (2011)	CV	73			4	Fe Bl Pl Ap	22	E A
Berry & Hansen (2000)	CV	112			2	Fe Bl Pl	8	NE O A C
Berry & Landry (1997)	CV	113			14- 22	Ap	2	NE O A C
Biel, Aran, & Gatica-Perez (2011)	CU	442	5	VS	obj	Bl Pl	11	NE O A C
Borkenau, Brecke, Möttig, & Paelecke (2009)	CU CV	149	24	Ph	7	Fe	1	NE O A C
Borkenau & Liebler (1992a) & (1992b)	CU CV	100	6	VS Vws Au	P	Fe Bl Pl Ap	45	NE O A C
Borkenau & Liebler (1995)	CV CU	100	6	VS Vws	2-6 obj	Fe Bl Pl Ap	59	NE O A C I
Brown, Palameta, & Moore (2003) ^a	CV CU	20	30	VS	2	Fe Bl Ap	7	A
Burgoon, Birk, & Pfau (1990)	CU	60	30	Inter	2	Fe Bl Pl	9	NE I
Burnett & Motowidlo (1998)	CU	60	5-8	Vws	2-5	Fe Bl Ap	5	E A C

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Authors	Type	N (T)	N: (P)	Jud. Channel	N: (R)	Cue Types	No. of cues	Traits
Campbell & Rushton (1978)	CV	46			1-2	Fe Bl Pl	15	NEI
Creed & Funder (1997)	CV	149			4	Bl Pl	5	N
Eaton & Funder (2003)	CV CU	152	1	Inter	4	Pl	2	E
Ferguson (1977)	CV CU	15	1	Inter	?	Pl	4	E
Funder & Sneed (1993)	CV CU	151	2	VS	6	Fe Bl Bl	9	NEOAC
Gifford & O'Connor (1987; Study 2) & Gifford (1991) & (1994)	CV CU	60	21	Vws	1-2	Fe Bl	29	EA
Gifford, Ng, & Wilkinson (1985)	CV CU	34	18	Vws	2	Fe Bl Pl Ap	12	Other (social skills, motivation)
Gillath, Bahns, Ge & Crandall (2012)	CV CU	208	3	PH (shoes)	2	Ap	18	NEOAC
Hartung & Renner (2011)	CV CU	182	1	Inter	P	Fe Bl Pl Ap	62	EO
Hirschmüller, Egloff, Nestler & Back (2013): Study 1 & 2	CV CU	56	177	VS	2-6	Pl Ap	3	E
Hirschmüller, Egloff, Schmuckle, Nestler, & Back (2015)	CV CU	50	45	VS	4-6	Pl	1	N
Hirschmüller, Schmuckle, Krause, Back & Egloff (2018)	CV CU	99	40	VS	4	Fe Bl Pl Ap	26	N
Ickes & Barnes (1977)	CV	124			2	Pl	1	N
Kaurin, Heil, Wessa, Egloff, & Hirschmüller (2018)	CV CU	104	15	VS	2	Fe Bl Ap	18	NEOAC
Kendon, & Cook (1969)	CV	15			1	Fe Pl	5	NEA
Kenny, Horner, Kashy, & Chu (1992): Study 1	CU	64	56	VS	4	Fe Bl Ap	4	NEOAC
Kenny, Horner, Kashy, & Chu (1992): Study 2	CU	108	3	inter	P	Ap	1	E
Kenny, Horner, Kashy, & Chu (1992): Study 3	CU	70/ 83	3-4	inter	P	Ap	1	E

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Authors	Type	N (T)	N: (P)	Jud. Channel	N: (R)	Cue Types	No. of cues	Traits
Koppensteiner & Grammer (2010)	CU	40	30	Vws (stick-figure)	obj	Bl	8	NEOAC
Koppensteiner, Stephan & Jäschke (2016)	CU	60	18-22	Vws (stick-figure)	obj	Bl	7	EAI
Levesque & Kenny (1993)	CV	80			1-2	Bl Pl	4	E
Lippa (1998)	CV CU	67	6	VS	2	Fe Bl Pl	28	E
Lyons, Tickle-Degnen, Henry, Cohn (2004)	CV CU	12	33	VS	4	Fe Bl Pl Ap	9	NEOAC
Mallory & Miller (1958)	CV	372			?	Pl	5	E
Meier, Robinson, Carter, & Hinsz (2010): Study 1	CV	84			10-18	Fe Ap	3	EA
Meier, Robinson, Carter, & Hinsz (2010): Study 2	CV	133			10-18	Fe Ap	3	EA
Montepare & Dobish (2003)	CU	32	≈ 12	Ph	8	Fe	5	EA
Murphy (2007)	CU CV	42	7/ 20	VS	1-2	Fe Bl Pl	26	I
Murphy, Hall, & Colvin (2003)	CV CU	79	≈ 35	VS	5	Fe Bl Pl	17	I
Naumann, Vazire, Rentfrow, & Gosling (2009)	CV CU	113	6	Ph	2	Fe Bl Ap	10	NEOAC
Nestler, Egloff, Kүfner, & Back (2012): Study 1	CV CU	36	91	Ph	3 obj	Ap	11	NEOAC
Nestler, Egloff, Kүfner, & Back (2012): Study 2	CV CU	40	95	PH	3 obj	Ap	12	NEOAC
Pedersen (1973)	CV	170			obj	Bl	1	NEI
Penke & Asendorpf (2008)	CV	283			2	Fe Bl	4	Other (sociosexuality)
Petrician, Todorov & Grady (2014)	CV	102			obj	Fe	3	NEOAC
Reynolds & Gifford (2001)	CV CU	30	7-28	VS Au Vws	2-57	Pl Ap	10	I
Riggio & Friedman (1986)	CV CU	62	12	VS	2-5	Fe Bl Pl	5	NEAI
Riggio, Lippa, & Salinas (1990)	CV CU	28-54	12	VS	2-5	Fe Bl	5	NEA

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Authors	Type	N (T)	N: (P)	Jud. Channel	N: (R)	Cue Types	No. of cues	Traits
Scherer (1978)	CV CU	24	9	Au	6-10	Pl	12	N E A C
Schmid Mast & Hall (2004)	CV CU	48	5	Ph	2-5	Fe Bl Ap	10	Other (status)
Schultheiss & Brunstein, (2002)	CV CU	68	4	VS	2	Fe Bl Pl	13	E
Shrout & Fiske (1981)	CU	44	8	VS	> 1	Fe Bl Pl	14	A
Simpson, Gangestad, & Biek (1993)	CU CV	210	> 1	Vws	> 1	Fe Bl	17	E A O
Stopfer, Egloff, Nestler, & Back (2014)	CU	93-103	12	Ph	2-6	Fe Ap	3	N E O A C
ten Brinke, Porter, Korva, Fowler, Lilienfeld, & Patrick (2017)	CU CV	50-51	40	VS	1-2	Fe Bl	4	Other (psychopathy)
Vazire, Naumann, Rentfrow, & Gosling (2008)	CV CU	160	7	Ph	< 1	Fe Ap	16	N E A
Zebrowitz, & Montepare (1992)	CU	88	118/48	Ph	P	Ap	2	A
Zebrowitz, Hall, Murphy, & Rhodes (2002)	CU CV	502	24	Ph	14-32	Ap	3	I
Zebrowitz, Voinescu, & Collins (1996)	CU	103	24	Ph	2-72	Fe Ap	5	A

Note. Type = Type of research: CV = Cue validity, CU = Cue utilization. N(T) Number of targets. N(P) = Number of perceivers per target. Jud. Channel = Judgment channel: VS = Video with sound, Vws = Video without sound, Au = Audio only, Ph = Photograph only, Inter = Short interaction. N(R) = Number of cue raters per target per cue. Cue types = Domains of cues included in the respective study: Fe = Facial expression, Bl = Body language, Pl = Paralanguage, Ap = Appearance. No of cues = number of cues identified within the study that exclusively belong to the four cue domains. Traits included in the study, mapped on the Big Five and Intelligence: N = Neuroticism, E = Extraversion, O = Openness to experience, A = Agreeableness, C = Conscientiousness, I = Intelligence.

Table S2.

Allocation of traits and cues to superordinate domains

Neuroticism	Neuroticism; self-consciousness; social anxiety; <i>composure; emotional – unemotional; emotional stability; self-doubting – self-confident</i>
Extraversion	Ambitious-dominant; assertiveness; dominance; engagement/dominance; extraversion; extroversion; expressive-confident; gregarious-extraverted; leadership competence; masculinity (BSRI); narcissism (NPI: leadership/authority); other-directedness; power motive; sociability; submissive – dominant; <i>aloof-introverted; extraverted – introverted; humorous – serious; inhibition; introversion; lazy-submissive; shyness; sociable – unsociable</i>
Openness	Culture; culture/openness; culture-openness to experience; imaginative; interest/invitation; openness; openness to experience
Agreeableness	Affiliation; affiliative nurturance; agreeableness; femininity (BSRI); good-natured; honesty; likability; altruism; concern for others; social composite score; teamwork competence; trustworthiness; unassuming- ingenuous; warm – agreeable; warmth; <i>arrogant-calculating; cold-quarrelsome; kind – cruel; narcissism (NPI: exploitativeness/entitlement); phony/arrogant; provocative</i>
Conscientiousness	Conscientiousness; drive; lazy – energetic; planning and organization competence
Intelligence	Competence; intelligence; IQ; speaking ability; verbal comprehension test
Cheerful facial expression	Cheerful; cheerfulness of facial expression; degree of felt smile; Duchene smiles; (positive) emotional reactions; expression of positivity; extensive smiling; extent of smiling; frequency of smiling; friendliness of facial expression; friendly expression; friendly facial expression; grumpy – friendly expression; happy facial expression; intense smiling; joyfulness; laugh number; laugh rate while not speaking; laughs frequently; no smiling – extensive smiling; non-Duchene smiles; noticeably positive facial expression (smile); open smiles; positive facial expression; smile; smile extent while not speaking; smile extent while speaking; smile number; smile time; smiles; smiling; smiling (time); smiling while listening; smiling while speaking; smiling/facial pleasantness; time per smile; total smiling; wide open smile
Dominant facial expression	facial expression of dominance; self-assured expression; self-assured facial expression; timid – self-assured expression; visual dominance
Eye contact	amount of time spent gazing at others; attend; avoided – engaged in eye contact; engages in constant eye contact; eye contact; eye contact (time); eye gaze at partner; eye-gaze; facial regard; fixation; facial gazing; short glances; frequency of eye contact; frequency of gaze; frequency of gaze while speaking; gaze; gaze mean duration overall; gaze mean duration while speaking; gaze number; gaze rate while not speaking; gaze time; intense look into camera; look while speaking; looking while listening; mean length of eye contact; number of eye contacts; time of looking into the camera; percent looking while listening; percent looking while speaking; total looking; <i>gaze aversion; looking away from camera; downward gaze (time); downward gazes (number)</i>
Eyebrow movements	Brow furrowing; concern furrows; eyebrow flashes (number.); eyebrow flashes and raises; eyebrow lifts; frowns; raised eyebrows
General expressiveness	Facial expressions; facial expressiveness; inexpressive – expressive face; <i>unchanging facial expression</i>
Unconcerned (vs. serious)	Calm facial expression; indifferent expression; serious – unconcerned expression; unconcerned expression; <i>serious face; serious facial expressions</i>
Body movement	Amount of body movement; body activity; body swaying; fast movements; foot movement; is physically animated; moves around a great deal; leg movement; many body movements; moved around a little – a great deal; number of turning points; overall motion; position

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	change; postural shift rate while speaking; rapid body movement; slow – fast movements; speed & energy of body movement; trunk movements
Closed arms	Arm wrap; arms folded; closed arms; closed arms while sitting; crossed arms; <i>arms held in an open vs. wrapped position; closed – open arms while sitting</i>
Forward lean / proximity	avoided – approached physical contact; body lean; body orientation; forward lean; forward lean (time); makes or approaches physical contact with the partner; makes physical contact with partner; proximity; torso leaning; <i>personal space; trunk recline</i>
Gestures	Amount of time spent gesturing; broad gestures; degree of arm swinging while walking; energetic gestures; fast gestures; frequent gestures; frequent hand movements; gestural fluency; gestures; gestures while speaking; gesturing; hand gestures (number); hand movement; illustrating hand movements; illustrator duration; illustrator gestures; infrequent – frequent hand movements; number of arm movements; talking with hands; total gesturing; <i>lack of arm swinging</i>
Head movements	Frequent head movements; head cant; head cants (time); head movements; head moves; head nodding; head nods; head shake; head shakes; infrequent – frequent head movements; nod rate; nodding; nods; upward head tilt; <i>does not tilt head</i>
Self-assured / open vs. slouching	Body openness; dominant behavior/movements; energetic stance; erect (vs. slouched) posture; leg openness; occupying much space; open posture (time); self-assured body movements; self-assured body posture; self-assuredness of movement; straight posture; upright posture; <i>slouching</i>
Self-touch	Body adaptor duration; body contact (hands in contact with body); facial adaptor duration; priming self-touch (grooming); self-manipulation; self-manipulating (self-touching) hand movements; self-touch; touched own body rarely – frequently; touches oneself frequently; touches self frequently; touching the self; touching the self while listening; touching the self while speaking
Stride length	Long strides; small steps – long strides; stride length; <i>number of steps to leave; number of steps to chair</i>
Tension / nervousness (vs. relaxed)	Body tension; controlled way of sitting; fidgeting; stiff walking; tense body posture; tense stance; tremors; <i>controlled – relaxed sitting; expansive (vs. constricted); nervous – relaxed movements; relaxed sitting; relaxed way of walking; stiff – relaxed walking</i>
Ease of understanding	Clear communication; clear style of speech; difficult – easy to understand; ease of understanding; easy to understand; easy to understand speech; enunciates; language that was easy to understand; mumbles – articulates
Expressive/ varying voice	Articulate voice; dynamic range; energetic and cheerful voice; expressive voice; fundamental vocal frequency (variance); modulation; pitch variety; resonance; resonance of voice; rhythmic speech; vocal intensity (variance); voice animation
Fluent speaking (vs. nervous)	Calm voice; calm way of speaking; fluency; pauses; response latencies; fluent speaking; haltingly – fluently speaking; hectic – calm speaking; speaking fluency; speaks fluently; speaks fluently and expresses ideas well; verbal fluency; voice wavers – calm voice; <i>halting speech; haltingly speaking; hectic speaking; hesitation while speaking; nonfluencies; use of fillers during speech; vocal nervousness</i>
Interruptions	Interrupts partner; silent interruptions; simultaneous speech: simple interruptions; simultaneous speech: butting-in-interruptions; simultaneous speech: overlaps; <i>interrupted me frequently – rarely</i>
Loudness	fundamental vocal frequency (average); high volume of voice; loud voice; loudness; loudness of voice; speaks in a loud voice; <i>loud voiced – soft voiced</i>
Pitch	Deep – high voice; high pitch; high pitch of voice; high pitched voice; high tone of voice; high voice; pitch; vocal intensity (average)

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Pleasantness of voice	cheerful tone of voice; friendly tone of voice; pleasant speech style; pleasant voice; pleasantness of voice; unpleasant – pleasant voice; warmth of voice; <i>unpleasant voice</i>
Powerful /confident voice (vs. soft)	confident manner; full voice; harshness of voice; powerful voice; self-assured; sharpness of voice; strength of voice; weak – powerful voice; <i>breathiness of voice; smooth voice; soft-voiced; thinness of voice</i>
Speech rate	fast talker; rapid rate; speaks quickly; speech rate; voice rate
Speech vs. non-speech	Amount of utterances; had not spoken – had spoken a lot; is talkative (as observed in this situation); number of words; sound-silence ratio; speaking time; speech; speech duration; talking; time spent talking; time talking; verbalization; <i>number of silences during conversation</i>
<hr/>	
Attractiveness	Attractive; attractive face; attractive person; attractiveness; attractiveness of face and body; facial attractiveness; healthy appearance; physical attractiveness; Ill – well-proportioned body
Babyfacedness vs. maturity	Baby face; babyfacedness; childlike face; facial babyishness; feminine; feminine appearance; hard – soft facial lineaments; perceived age (young); round face; soft-lineaments; childlike – mature face; <i>hard facial lineaments; perceived age; round – thin face</i>
Dark clothes	Dark garments; light – dark garments; <i>colorful dress</i>
Dark hair color	Dark hair; <i>dark – light hair; light hair</i>
Distinctiveness	Distinctive appearance; distinctiveness of forehead; distinctiveness of nose; <i>facial averageness</i>
Eyeglasses	Eyeglasses
Formality	Chic dress; formal dress; formality of dress; formally dressed; <i>formal – informal dress; informal dress; outlandishness of dress</i>
Hair length (long)	long hair; hair length; short – long hair
Height	Body height; stature; short – tall stature; tall stature
Muscularity	Less – more muscular physique; muscular; muscular physique; <i>less muscular physique</i>
Neatness	Neat appearance; neat vs. messy appearance; neatly dressed; neatness; neatness of dress; organized appearance; refined appearance; trimness; unrefined – refined appearance; well-groomed face; <i>unrefined appearance</i>
Stylishness	Dressed-up person; expensive clothes; fashionable and refined appearance; fashionable body & dress; fashionable clothes; fashionable dress; fashionable face & hairstyle; flashy accessories; made-up face; not made up – made up face; plain – showy dress; showy dress; stylish clothes; stylish appearance; stylish dress; stylish hair; stylishness; trendy hairstyle; unfashionable – fashionable dress; unstylish – stylish hair; wears much jewelry; <i>plain clothes; unfashionable dress</i>
Volume of Mouth / full lips	Thin – full lips; volume of mouth; <i>thin lips</i>
Weight	Body size; stout physique; weight; <i>low body weight; stout – slim physique</i>

Note. BSRI = Bem Sex-Role-Inventory. NPI = Narcissistic Personality Inventory. The allocation

process was done by the authors of this study and based on theoretical and practical

considerations. Italicized cues were reverse scored.

Table S3.

Vector correlations of cue utilization and cue validity within and across traits

	2	3	4	5	6	7	8	9	10	11	12
1. CU Emotional stability	.47	.72	.63	.63	.05	.50	-.05	.34	.28	.63	.40
2. CV Emotional stability		.56	.56	.30	-.22	.33	-.23	.17	.41	.45	-.15
3. CU Extraversion			.81	.62	-.07	.60	.06	.14	.33	.67	.26
4. CV Extraversion				.42	-.12	.40	.01	.28	.54	.62	.14
5. CU Openness					.37	.72	.38	.39	.28	.55	.24
6. CV Openness						.16	.24	-.22	-.27	-.13	.25
7. CU Agreeableness							.42	.41	.27	.36	.12
8. CV Agreeableness								.39	.16	.11	-.11
9. CU Conscientiousness									.69	.34	-.07
10. CV Conscientiousness										.43	-.21
11. CU Intelligence											.41
12. CV Intelligence											

Note. CU = Cue utilization. CV = Cue validity. Number of cues range from 31 to 39.

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