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**On the Willingness to Admit Wrongness:**

**Validation of a New Measure and an Exploration of its Correlates**

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**Abstract**

Wrongness admission is the act of a person publicly acknowledging that they held an inaccurate belief or attitude. Some people seem more willing to engage in wrongness admission than others. These individual differences may be important in understanding the prevention of wrongness admission. The purpose of these studies was to develop and validate a measure of the willingness to admit wrongness. In three studies (*Ntotal* = 579), we created a 7-item scenario-based measure (“WAW”) and found that it was correlated with agreeableness, honesty/humility, and, to a lesser extent, openness to experience. Furthermore, those who scored higher on the WAW were more likely to indicate that they would publicly admit they are wrong on Facebook and were more likely to admit wrongness in daily life. This measure will be helpful as theories of wrongness admission develop, but also when considering interventions that may increase wrongness admission and intellectual humility in the general public.

Keywords: Wrongness Admission; Agreeableness; Humility; Individual Differences

 People do not like to be wrong and especially do not like to admit when they are wrong. This fact is apparent in everyday life. For example, imagine that a person suggests to his/her friend that former president Barack Obama promised that no one would lose his or her preferred doctor under his health care reform. Their friend might reply that the former president never made such a promise. The first person could then show their friend a video of Barack Obama making that exact promise. In this scenario, the friend has three options: (1) ignore the video proof and continue believing their own false attitude, (2) justify their attitude by adding nuance (e.g., “yeah, but that is not what he meant”), or (3) admit that he or she was wrong to their friend. People often engage in the former two options, but seem less comfortable with the latter option. In fact, Carol Tavris and Elliot Aronson (2008) wrote a book describing the many ways – psychological science has discovered – people avoid acknowledging their wrongness to others.

 Although it seems to occur less frequently, people *will* sometimes admit wrongness to others. Further, it is probable that certain people are more willing to admit their wrongness than others. If it is true that individuals vary in their willingness to admit wrongness to others, then understanding the systematic differences between such people would be beneficial for understanding the causes and consequences of wrongness admission. More importantly, understanding these differences could provide insights as to how to increase the likelihood of wrongness admissions when appropriate. Thus, the purpose of the current investigation was to create an individual difference measure of the willingness to admit wrongness, explore its correlates, and establish it as a unique construct.

**The Causes and Consequences of Wrongness Admission**

We have defined wrongness admission as a public disclosure that one has been wrong about a belief or attitude and has subsequently changed that attitude or belief (e.g., Fetterman, Muscanell, Covarrubias, & Sassenberg, 2018). This wrongness admission construct has two important features: attitude accuracy and the public nature of admission. For the former, as opposed to an apology – the expression of remorse for a past behavior (Schumann, 2018) – wrongness admission is focused on the accuracy of beliefs and attitudes that can be refuted by facts. As such, there is no moral component or behavioral act (e.g., treating someone poorly) underlying the “wrongness”. For the latter issue, for this to be an “admission,” it must be public or to another person, otherwise it is merely attitude change (admitting to oneself). While there is ample research on apologies (e.g., Howell, Dopko, Turowski, & Buro, 2011; Howell, Turowski, & Buro, 2012; see also Tangney, 1995 and Schumann, 2018 for reviews), attitude change (e.g., see Petty & Briñol, 2015 for review), and being wrong (e.g., see Tavris & Aronson, 2008 for review), scant research has focused on wrongness admission.

 Aside from a few studies in the 1970s (Cialdini & Mirels, 1976; Braver, Linder, Corwin, & Cialdini, 1977), wrongness admission has not received much attention. There has, however, been a renewed interest in this area. For example, Kreps, Laurin, and Merritt (2017) investigated the outcome of a leader changing their moral stance, finding that people negatively viewed leaders who do so. Other work still, has focused more directly on wrongness admission. As an example, Fetterman and Sassenberg (2015) examined wrongness admission among scientific researchers after a convincing failed replication of their own work. Results suggested that the researchers feared a failed replication would negatively impact their reputations and also underestimated the positive reputational consequences of wrongness admission.

 In another set of studies, Fetterman et al. (2018) found that wrongness admission positively impacted others’ perceptions of the admitter in the areas of competence and communion. Importantly, these findings were replicated across several scenarios, including arguments on Facebook (stranger admitting), in a university lecture (professor admitting), and at the workplace (supervisor admitting). Drawing from the Dual Perspective Model of Agency and Communion (Abele & Wojciszke, 2014), (2018) concluded that people avoided wrongness admission because they were worried that others would see them as incompetent – the common focus of impression management strategies (Wojciszke, Baryla, Parzuchowski, Szymkow, & Abele, 2011). However, wrongness admission not only led to more positive competency ratings, it had an even stronger positive impact on communion ratings – the common focus of impression formations (Asch, 1946). These findings suggest that people perceive wrongness admitters as friendlier and more agreeable.

 The recent work on wrongness admission and impression formation/management is a major step toward understanding the causes and consequences of wrongness admission. However, if an aim of this work is to encourage wrongness admission, then it is first necessary to understand why some people are more willing to admit wrongness than others. Although studies have shown that admitters are perceived as friendly, no studies have yet examined how differences in personality can contribute to wrongness admission.

**Willingness to Admit Wrongness**

 It is important to understand psychological and behavioral phenomena on an individual differences level to develop a theory of the cognitive, motivational, social, and emotional processes involved (Kenrick & Funder, 1988; Kosslyn et al., 2002; Underwood, 1975). Thus, it is critical to understand the individual differences associated with wrongness admission to fully understand this phenomenon. Although there are likely existing personality and individual differences factors associated with the willingness to admit wrongness, none of these factors are directly focused on wrongness admission. Thus, we seek to add to the literature on wrongness admission by creating a direct measure of one’s willingness to admit wrongness to others. Further, we endeavor to confirm the theoretical correlates of wrongness admission willingness as assessed with this new measure, as well as establishing it as a unique construct. To this end, we investigate the correlations of this measure with agreeableness and honesty/humility.

 Agreeableness has been defined many ways, and by many researchers (Graziano & Eisenberg, 1997). In general, though, agreeable people tend to try to get along with people by avoiding, or being judicious in, conflict (Graziano & Tobin, 2002). Further, they are cooperative and polite (Graziano, Hair, & Finch, 1997), prosocial (Graziano & Eisenberg, 1997), and more likely to apologize (Dunlop, Lee, Ashton, Butcher, & Dykstra, 2015; Howell et al., 2011). By its very title, the trait of “agreeableness” inherently reflects a tendency to agree with others. This would, presumably, include the tendency to agree in an argument. Indeed, the fact that agreeable people tend to be more judicious and compliant in conflict suggests that they might be more likely and willing to admit wrongness. Further, the results of (2018), mentioned above, suggest that admitters are at least perceived as more agreeable.

 We make the same predictions regarding the HEXACO dimension of honest/humility (Ashton & Lee, 2007). Ashton and colleagues describe this factor as one measuring individual differences in sincerity, fairness, greed avoidance, and modesty (Ashton, Lee, & de Vries, 2014). Like agreeableness, honesty/humility is associated with proclivities toward apologies (Dunlop et al., 2015). Again, like agreeableness, the very title of “humility” suggests that someone high on this trait would be less likely to place their self-image above facts. As such, someone who is humble – especially intellectually humble, which includes facets of humility and open-mindedness (Krumrei-Mancuso & Rouse, 2016) – should be more likely and willing to admit they are wrong. Again, the results of (2018) do suggest that this is how admitters are perceived.

While agreeableness and honesty/humility likely account for some variation in the willingness to admit wrongness admission, we hypothesize these associations to be only modest in size. In addition, we hypothesized that agreeableness and honesty/humility would only be modest predictors of actual wrongness admission. Although several general personality traits may be associated with WAW, our interests regarding the validation of this measure focused on traits with other-oriented components (i.e., interpersonal traits), as opposed to self-oriented components (e.g., The Dark Triad). We did so because as wrongness admission involves other-oriented behavior. Further research should explore whether self-oriented traits are likewise related to WAW.

**Current Investigation**

 The purpose of the current investigation was to create and validate a willingness to admit wrongness measure. Instead of using a typical personality measure structure – in which one agrees or disagrees with relevant statements about the self – we created a measure in which people respond with their expected behavior across a variety of scenarios. Because there are several situational factors that may affect willingness to admit, we felt that a scenario-based approach was best suited for this measure. For instance, some people might be more likely to admit they are wrong to a friend than to a stranger. Further, wrongness admission willingness may be dependent on argument topic. For example, if people are arguing about the last person to wash the dishes, they may be more likely to admit they are wrong than if they were arguing about the best parenting strategy.

 Instead of a scenario-based measure, a behavioral recall measure (e.g., “in the last two weeks, I admitted I was wrong [yes/no]”) might seem more intuitive. However, this sort of behavioral measurement restricts the variance involved in wrongness admission and does not capture the mental arithmetic one goes through when deciding to admit wrongness. We wanted our instrument to measure the variance between those who are more willing to admit in most situations, compared to those who are less willing to admit or are more choosey with whom and when they admit. As such, our interest is more in the psychological realm than the behavioral realm, even though our measure should clearly predict overall behavioral tendencies.

 Our goal was to create a single factor measure predicting an overall willingness to admit wrongness across situations. Even so, we allowed the data in Study 1 to guide decisions on any factors that we might extract. An additional goal of Study 1 was to explore the correlates of the new measure. We specifically targeted the agreeableness and honesty/humility factors of the Big 5 and HEXACO models, but we also included several other measures of convenience for exploratory purposes.

 The goal of Study 2 was to establish that the new measure would predict actual intentions to admit wrongness. In this study, participants witnessed an argument and indicated what they would do in this situation, in terms of wrongness admission. Importantly, we also controlled for the variance explained by agreeableness and honesty/humility on this outcome.

 Finally, Study 3 examined the predictive validity of the new scale for wrongness admission willingness. To do so, we utilized a daily diary study, in which participants reported instances of being wrong, and whether they admitted it. Again, we controlled for agreeableness.

**Studies 1a & 1b: Measure Creation and Correlate Exploration**

 In Studies 1a and 1b we created a measure of Willingness to Admit Wrongness (WAW) and explore its psychometric properties and correlates. We wanted this instrument to measure individual differences in willingness to admit wrongness broadly: across situations and interaction partners. Therefore, we created 10 scenarios for participants to imagine, using a wide variety of contextual elements.

 The data presented in Studies 1a and 1b were collected as part of a larger overarching research project. As a result, there were several additional measures assessed in the datasets for purposes unrelated to the current project. Here, we report only those additional measures we hypothesized would be relevant to wrongness admission and interpersonal in nature[[1]](#footnote-1).

In examining the correlates of WAW, we predicted that those who are more willing to admit wrongness would also have higher scores on agreeableness and honesty/humility. We did not predict relations with openness to experience and conscientiousness. It seemed, theoretically, that these traits would be associated with the internal process of attitude change more so than the external behavior of wrongness admission assessed by WAW. We also had no compelling reason to believe that WAW was associated with neuroticism or extraversion. Finally, we examined correlations of our measure with the relevant subscales of the Big 6 factors to specify which components are driving the measured effects. This nuanced examination will be important for future studies and the theoretical development of wrongness admission as a construct.

Additionally, we examined the relationship between WAW and resistance to persuasion (Briñol, Rucker, Tormala, & Petty, 2004). We predicted a negative correlation with WAW such that those who are willing to admit they are wrong should be less resistant to persuasion. Further, we predicted a positive correlation between WAW and construing power as a responsibility (for review see Sassenberg, Ellemers, Scheepers, & Scholl, 2014; Scholl, Ellemers, Sassenberg, & Scheepers, 2015; for the measure see Scholl, Sassenberg, Scheepers, Ellemers, & de Wit, 2017). Construing power as responsibility has been demonstrated to correlate with advice-taking (de Wit, Scheepers, Ellemers, Sassenberg, & Scholl, 2017), which shares the intellectually humble features of wrongness admission (, 2018). We also predicted a negative correlation between WAW and Social Dominance Orientation (SDO: Pratto, Sidanius, Stallworth, & Malle, 1994). SDO contains features (power and dominance) that may hinder the willingness to admit wrongness.

Finally, we predicted a positive correlation between WAW and emotional intelligence as measured by the Situational Test of Emotional Understanding (STEU: MacCann & Roberts, 2008). Concepts related to emotional understanding, such as empathy and, more directly, perspective taking, have been found to play a role in attitude change (Norton, Monin, Cooper, & Hogg, 2003). Willingness to admit should be significantly related to emotional understanding.

**Study 1a Method**

**Participants & Procedures**

 Participants were 131 (80 female; *M*age = 27.16) undergraduates and community members in or around Tübingen, Germany. All measures were included in a large online survey. We recruited participants through emails and a listserv via an online participation system. Participants completed an online survey for a chance to win 1 of 3 Amazon Gift Cards for €50. We continued data collection until further calls for participation were fruitless.

Participants completed a battery of questionnaires, received information regarding the purpose of the study, and were thanked for their participation. To encourage participation, we did not force participants to respond to all questions. As such, the *N*s will vary for each measure.

**Measures**

All measures were either validated German versions or translated and back-translated from English. Descriptive and reliability statistics are presented in Tables 1-5.

 **Willingness to Admit Wrongness.** We somewhat modeled the willingness to admit wrongness measure after the scenario-based STEU (MacCann & Roberts, 2008). The items included a variety of situations (e.g. work, home, and online). The situations also varied across argument partner (e.g. stranger, co-worker, and parent) and content (e.g. reducing costs, child-rearing practices, and “best” cars). Participants rated the likelihood that they would admit that they were wrong in each scenario on a 1(*Very Unlikely*) to 5(*Very likely*) scale. An example of a scenario follows:

*You are having an argument with a complete stranger (e.g., on a web-based discussion board, in a class, at conference, etc.). Both of you are quite convinced of your own correctness. However, you begin to realize that the stranger is probably right and that your opinion is not standing up to the facts. In this case, would you publicly admit to being wrong?*

 **HEXACO-Personality Inventory-Revised.** To assess participants’ scores on the Big 6 personality factors, we used the HEXACO-Personality Inventory-Revised (HEXACO-PI-R; Ashton & Lee, 2009). Participants rated their level of agreement with 60 statements on a 1(*Strongly Disagree*) to 5(*Strongly Agree*) scale. The HEXACO-PI-R measures the factors of Honesty-Humility (e.g, “I wouldn’t pretend to like someone just to get that person to do favors for me.”), Neuroticism (e.g., “I sometimes can't help worrying about little things.”), Extraversion (e.g., “In social situations, I’m usually the one who makes the first move.”), Agreeableness (e.g., “Most people tend to get angry more quickly than I do.”), Conscientiousness (e.g., “I often push myself very hard when trying to achieve a goal.”), and Openness to Experience (e.g., “I like people who have unconventional views.”). The HEXACO-PI-R consistently demonstrates good reliability and validity (Ashton & Lee, 2009).

 **Construal of Power as Responsibility.** We used a five-item measure to assess participants’ sense of responsibility to others when in a powerful position (Scholl et al., 2017). After reading a scenario that pits the responsibility of helping a friend against keeping previously scheduled social plans, participants rate their agreement on five statements (e.g., “I feel I need to take care of others’ needs”) on a 1(*Strongly Disagree*) to 7(*Strongly Agree*) scale. This measure has been validated and shown to be reliable (Scholl et al., 2017).

 **Social Dominance Orientation.** We measured SDO using a 16-item instrument that measures a preference for inequality within societies and among social groups (Pratto et al., 1994). After reading each statement (e.g. “If certain groups stayed in their place, we would have fewer problems”), participants are asked if they have positive or negative feelings regarding the item using a 7-point Likert-type scale from 1(*Very Negative*) to 7(*Very Positive*).

**Situational Test of Emotional Understanding.** We measured emotional understanding using the Situational Test of Emotional Understanding (STEU; MacCann & Roberts, 2008). Participants read 42 vignettes (“Clara receives a gift. Clara is most likely to feel?”) and determined the most likely resultant emotion from 5 possible emotions (e.g., “Happy”, “Angry”, “Frightened”, “Bored”, “Hungry”). For each question, there is one “acceptable” answer, as rated by emotion experts (Mayer, Salovey, & Caruso, 2008). Thus, we recoded responses into a binary response of incorrect (0) or correct (1) and averaged across items.

**Study 1b Method**

**Participants & Procedures**

 Participants were 105 adults recruited from Amazon’s Mechanical Turk (52 Female; *M*age = 36.66). We paid participants $1.00 for completing the task. Participants completed a battery of questionnaires online, received information regarding the study, and were thanked.

**Measures**

The WAW, HEXACO, and SDO were measured using English versions of the same measures used in Study 1a. All descriptive and reliability statistics are presented in Tables 1-5.

 **Resistance to Persuasion.** We used the 16-item Resistance to Persuasion Scale (Briñol, Rucker, Tormala, & Petty, 2004) to assess individual differences in self-perceptions of persuasion resistance (e.g. “I am strongly committed to my own beliefs”). Participants responded to the measure on a 1(*Extremely Uncharacteristic of You*) to 5 (*Extremely Characteristic of You*) scale. Higher scores on this measure are indicative of a greater resistance to persuasion.

**Study 1 Results**

**Psychometric Properties**

We explored the psychometric properties of the 10 items by combining data from Studies 1a and 1b, resulting in a total of 234 participants in the model analysis. There were no significant differences between participant scores across studies and nationalities (*p* = .374). The Kaiser-Meyer-Olkin test of sampling adequacy suggested that our sampling was adequate, .867 (Cerny & Kaiser, 1977). We ran an Exploratory Factor Analysis, using Principal Factor Analysis, which suggested a single factor explaining 44.37% of the variance, with a second factor adding 10.12% variance. Item-total correlations were high for all items (all *r*s > .477) and all items loaded onto a single factor (loadings > .525). The loadings for the second factor were uninterpretable and all items loaded more strongly on the first factor. We removed three cross-loaded items and maintained one additional cross-loaded item due to its high loading (.741) on the first factor (the full scale is in the Appendix)[[2]](#footnote-2).

**The Correlates of the Willingness to Admit Wrongness**

We assessed the relationship between the newly developed WAW measure and established personality measures using correlation analysis. As predicted, WAW was significantly and positively correlated with agreeableness (Table 1) and honest/humility (Table 2). WAW was also significantly associated with openness to experience (Table 3) and marginally with conscientiousness (Table 4). Of these significant associations, the strongest correlation was with agreeableness and the smallest was with conscientiousness. There were no significant associations between the WAW and neuroticism or extraversion or any of the sub-factors of these traits, *p*’s > 0.168.

To better understand which component of the four Big 6 factors was most responsible for the observed correlations, we examined the associations between WAW and the sub-factors of agreeableness, honesty/humility, openness to experience, and conscientiousness. The agreeableness sub-factor “flexibility” was most strongly related to WAW (Table 1). For honesty/humility, the “fairness” component had the strongest relation with WAW (see Table 2). The “inquisitiveness” sub-factor of openness to experience had the strongest correlation to WAW (Table 3). Finally, the component most related to WAW from the conscientiousness factor was “organization” (Table 4).

We hypothesized a significant negative correlation between WAW and resistance to persuasion, and this was supported (Table 5). We suspected that WAW might be negatively associated with SDO and positively associated with construing power as responsibility. This was indeed the case (Table 5). We also suspected that WAW would be positively associated with emotional understanding, which was also supported (Table 5).

Finally, we analyzed the association between WAW and demographic variables. There was a significant association with age such that older individuals scored higher on WAW, *r* (207) = .144, *p* = .038. There was not a significant effect of gender, *F*(1, 206) = 1.58, *p* = .211.

**Discussion**

In Studies 1a and 1b, we created a new willingness to admit wrongness measure: “WAW”. This scenario-based measure has one factor, which appears to measure willingness to admit wrongness to others across situations and across argument partners. We found that those who tend to admit wrongness are also more agreeable, honest and humble, open to experience, and somewhat more conscientious. Specifically, the relationships between WAW and these higher order factors are driven by the specific aspects of flexibility, belief in fairness, inquisitiveness, and organization. The relations with openness and conscientiousness are likely due to their involvement in recognizing that one is wrong (i.e., attitude change). Wrongness admitters also tend not to resist persuasion attempts and are higher on emotional understanding. These results are intuitive, because to admit wrongness, one must be willing to be persuaded and be more likely to take other people’s perspectives. Finally, high WAW scorers were more likely to construe power as a responsibility and were lower in social dominance.

**Study 2**

In Study 2, we attempted to establish predictive and discriminate validity for the WAW measure. To this end, we asked participants how they would respond to a situation that afforded them the opportunity to admit wrongness. Specifically, we showed participants a fake Facebook argument in which one of the characters either admitted or did not admit wrongness and asked them if they would have admitted they were wrong and post a comment to this effect. We contrasted this option with admission avoidance and private attitude change. Participants also completed a battery of personality questionnaires, including the WAW, a measure of the Big 5 (Donnellan, Oswald, Baird, & Lucas, 2006), and the honesty/humility items of the HEXACO[[3]](#footnote-3). We hypothesized that those scoring high on the WAW would be more likely to indicate that they would admit wrongness in a Facebook post and be less likely to avoid posting, even after controlling for both agreeableness and honesty/humility.

 The first author collected this data as part of a different experiment and included the personality measures and likelihood of admission question for exploratory purposes. As such, the study included factors and manipulations that we do not report here (main data reported in , 2018), though the personality and likelihood of admission data have not been reported elsewhere. Before analyzing any relations between the personality and likelihood of admission, the first author met with the second and third authors to formulate the hypotheses. The second and third authors then ran the analyses, and the results are reported here. As such, we treat this as a confirmatory study.

**Method**

**Participants & Procedure**

 Participants were 225 students enrolled at a large southwestern university (138 female; *M*age = 20.86). We recruited participants through an online SONA system and the study was conducted online. We based our sample size on the predicted effects of the main purposes of the study. Participants received half a credit toward their introductory psychology course. Participants provided informed consent, read a fake Facebook argument, reported their impressions of one of the characters in the argument, completed the personality battery, indicated what they would have done in the same situation, provided their demographics, and read a debriefing and were thanked for their participation.

**Measures**

**Willingness to Admit Wrongness.** We used the 7-item WAW to assess willingness to admit. This scale demonstrated acceptable reliability (*M* = 3.67; *SD* = .73; $α$ = .81). A Confirmatory Factor Analysis of our single factor model resulted in adequate model fit (Jackson, Gillaspy Jr. & Purc-Stephenson, 2009): $χ^{2}$(13) = 26.70, *p* = .014; RMSEA = .069; CFI = .970; SRMR = .044, confirming our EFA reported in Study 1.

**Honesty-Humility.** We utilized the 10-item Honesty-Humility scale of the HEXACO-PI-R assess participants’ level of this trait (Ashton & Lee, 2009). The scale again demonstrated acceptable reliability (*M* = 3.39; *SD* = .58; $α$ = .70).

**Mini-IPIP.** We used the Mini-IPIP to assess participants’ scores on the Big Five Personality traits (Donnellan et al., 2006). This is a 20-item instrument that uses four items each to measure the personality dimensions of Extraversion (e.g., “I am the life of the party”), Agreeableness (e.g., “I sympathize with others’ feelings”), Conscientiousness (e.g., “I get chores done right away”), Neuroticism (e.g., “I have frequent mood swings), and Openness (e.g., “I have a vivid imagination”). Participants indicate their level of agreement to these items using a 5-point scale (1 = “Very Inaccurate” to 5 = “Very Accurate”). The alpha reliabilities of the scales ranged from acceptable to poor: Extraversion (*M* = 3.05; *SD* = .91; $α$ = .73), Agreeableness (*M* = 3.82; *SD* = .70; $α$ = .63), Conscientiousness (*M* = 3.36; *SD* = .80; $α$ = .61), Neuroticism (*M* = 3.04; *SD* = .81; $α$ = .59), and Openness (*M* = 3.76; *SD* = .65; $α$ = .51).

**Reported Intention of Admission.** After witnessing a fake Facebook argument, in which one of the characters admitted or did not admit their wrongness, we asked participants what they would have done in the same situation. Their options were: (1) I would have made a post admitting that I was wrong (public admission), (2) I would NOT have made a post admitting that I was wrong (admission refusal), or (3) I would have admitted I was wrong, but not made a post (private attitude change). The majority of the participants indicated that they would have changed their attitude (50.22%), while 38.67% said that they would have publicly admitted. Only 11.11% indicated admission refusal.

**Results**

We assessed the association between WAW and the other personality measures via correlation analyses (see Supplemental Materials for full matrix). Replicating Study 1, there were significant positive correlations between WAW and Honesty/Humility, *r*(224) = .300, *p* < .001, Agreeableness, *r*(224) = .283, *p* < .001, Conscientiousness, *r*(224) = .130, *p* = .051 (marginally), and Openness, *r*(224) = .139, *p* = .037, with the latter two correlations being the weakest. Interestingly, there was also a significant negative correlation between WAW and neuroticism, *r*(224) = -.217, *p* = .001, which we did not find in Study 1. There was, again, no association with extraversion, *r*(224) = .029, *p* = .666. Once again, there was a significant positive association with age, *r*(224) = .150, *p* = .025. There was not, however, a significant effect of gender, *F*(1, 224) = .18, *p* = .670.

 We used a multinomial logistic regression to test for an association between WAW, Honesty-Humility, Agreeableness, and participants’ reported likelihood of admitting s/he was wrong. The third category (i.e., private attitude change) served as the reference category for the multinomial logistic regression. We included Honesty-Humility and Agreeableness in the model, to establish discriminant validity. Results are in Table 6.

Results indicated that for every one-unit increase in a participant’s WAW score, the odds of that participant publicly admitting they were wrong on Facebook – instead of private attitude change – was $e^{0.619} $or 1.858 higher. Further, for every one-unit increase in a participant’s WAW score, the odds of that participant not admitting they were wrong – instead of private attitude change – was $e^{-1.260}$ or .284 lower (see also Figure 1). Humility and Agreeableness did not significantly change these odds.

**Discussion**

In Study 2, we were able to replicate some of the findings of Study 1. Indeed, wrongness admitters appear to be honest and humble, agreeable, and slightly more conscientious and open. Importantly, we were also able to establish predictive and discriminant validity for the WAW. Participants were more likely to say that they would publicly admit that they were wrong on Facebook if they scored higher in WAW, when controlling for agreeableness and honesty/humility. These findings suggest that the WAW is likely measuring actual intentions to admit wrongness and is not redundant with either agreeableness or honesty/humility.

**Study 3**

 The scenarios and responses in Study 2 were hypothetical. In Study 3, we utilized a daily diary protocol to measure wrongness admission in everyday life. In an initial session, participants completed a battery of measures, including the WAW and the Mini-IPIP Big 5 measure. Every evening for two weeks, participants reported whether they were wrong about something and, if so, whether they admitted it. We predicted that those scoring high on WAW would be more likely to report daily wrongness admission, when controlling for agreeableness.

 The first author collected this data in collaboration with numerous researchers, as is typical with time intensive and expensive protocols (Finkel, Eastwick & Reis, 2015). As such, numerous tasks and measures were included, and many were unrelated to the current investigation. Here, we focused on WAW, daily wrongness admission, and agreeableness. As in Study 2, the first, second, and third authors met to devise the hypotheses before analysis. The final analysis was a joint effort by the first three authors, which resulted in numerous tests. Each test had similar, significant results, but we chose to report the easiest to interpret. As such, we consider this a partially confirmatory study.

**Method**

**Participants & Procedure**

 We recruited participants through an online SONA system at a large southwestern university. On the recruitment page, participants read that they would be participating in an initial online survey, followed by 14 daily surveys to be completed every evening. They could earn up to 8 credits for their undergraduate introductory psychology course. We gave them 1 credit for completing the initial survey and .5 credits for each daily survey. As an added incentive to complete the daily surveys, we informed participants that they would be dropped from the protocol if they missed more than five surveys. One hundred thirty-seven undergraduates completed the initial survey and 120 (94 Female; *M*age = 20.82) completed at least some of the daily surveys.

 For the initial survey, participants completed a set of online questionnaires. Within this battery of questionnaires was the WAW and Mini-IPIP. Participants also provided their email addresses for the daily surveys, and we provided them with the requirements and instructions for the remainder of the protocol. This initial study occurred over one week. The following Monday, all participants began receiving the daily surveys at 5pm. They had till 3am to complete that day’s survey with the past 24 hours in mind. This continued for 14 consecutive days. On average, participants completed 8.56 surveys.

**Measures**

 **Willingness to Admit Wrongness.** We used the 7-item WAW to measure willingness to admit. This scale demonstrated acceptable reliability (*M* = 3.57; *SD* = .76; $α$ = .83). A single common factor model using a Maximum Likelihood estimator resulted in adequate model fit: $χ^{2}$(13) = 35.43, *p* < .001; RMSEA = .113; CFI = .934; SRMR = .048. The RMSEA value is likely inflated due to the smaller sample size (Kenny, Kaniskan, & McCoach, 2015)

**Mini-IPIP.** We used the Mini-IPIP to assess participants’ scores on the Big Five Personality traits (Donnellan et al., 2006), as in Study 2. The alpha reliabilities of the scales ranged from acceptable to poor: Extraversion (*M* = 3.10; *SD* = .91; $α$ = .71), Agreeableness (*M* = 3.88; *SD* = .70; $α$ = .67), Conscientiousness (*M* = 3.49; *SD* = .79; $α$ = .65), Neuroticism (*M* = 3.68; *SD* = .68; $α$ = .58), and Openness (*M* = 3.67; *SD* = .67; $α$ = .67).

**Daily Diary Items**. Participants responded to a battery of items related to their thoughts, feelings, behaviors, and daily events, every evening. Within these items, participants indicated whether they had been wrong (“Yes” or “No”). They then indicated whether they (1) did not report being wrong about anything during the day, (2) were wrong, but did not admit wrongness, and (3) were wrong and admitted wrongness. Over the two weeks, 9 participants reported never being wrong. For the rest, there were 72 instances of being wrong and not admitting it (private attitude change). There were 97 instances of being wrong and admitting it (public admission). To quantify the tendency to admit wrongness in daily life, we subtracted the instances of no-admissions from admissions (*M* = 1.58, *SD* = 3.45). A positive score, then, represents a person who admitted more often than not admitting. A negative score represents a person who refused to admit more often than they admitted. Those who had a zero were no more likely to admit than not admit or they were never wrong.

**Results**

 We assessed the association between Wrongness Admission and the Big 5 via correlation analyses (see Supplemental Materials for full matrix). Replicating our previous results, there were significant positive correlation between WAW and openness, *r*(136) = .239, *p* = .005. However, unlike in the previous studies the correlations between WAW and agreeableness and conscientiousness were not significant, though the correlations were positive (*r*s < .150, *p*s > .081). There were no associations between WAW and neuroticism and extraversion (*r*s < -.038, *p*s > .659). There was not a significant association between WAW and age, *r*(136) = .114, *p* = .188, nor a significant effect of gender, *F*(1, 136) = .15, *p* = .695.

We also examined the correlation between WAW and daily reported wrongness admission, with the daily reported wrongness admission averaged across days. The WAW scale was significantly, positively related to average daily wrongness admission, *r* (120) =.197, *p* = .031. To test whether WAW predicted tendencies toward wrongness admission in daily life, we entered z-scored WAW and Agreeableness as predictors in a multiple regression with the tendencies toward wrongness admission difference score as the predicted variable. We hypothesized that WAW would be a significant positive predictor and that agreeableness would not. Agreeableness did not predict tendencies toward wrongness admission in daily life, *b* = .03, SE = .32 *t* = .10, *p* = .923. As predicted, WAW did predict tendencies toward wrongness admission in daily life, *b* =.695, SE = .32, *t* = 2.14, *p* = .034, 95% CI [.052,1.338][[4]](#footnote-4).

**Discussion**

In Study 3, we added further to the predictive and discriminate validity of the WAW. The WAW predicted tendencies toward wrongness admission in daily life. Importantly, it did so beyond agreeableness. Therefore, we conclude that the WAW is measuring willingness to admit wrongness and it is not equivalent to agreeableness. The insignificant positive correlation between WAW and agreeableness in this dataset is puzzling. However, it could be explained by the smaller sample size and/or lower reliability scores in our sample.

**General Discussion**

Recent lines of inquiry have begun investigating the factors that lead to and prevent wrongness admissions, as well as the consequences of admitting wrongness. By identifying the individual difference factors that lead some people to be more likely to admit wrongness than others, additional insights into the social and cognitive processes of wrongness admission are possible. As such, the burgeoning literature on wrongness admission will be greatly benefited by a measure of individual differences in the willingness to admit wrongness.

Study 1 included the creation of a scenario-based measure of willingness to admit wrongness, or “WAW”. The WAW is a 7-item measure of willingness to admit wrongness to others, spanning numerous situations, topics, and conversational partners. This measure was positively associated with agreeableness, honesty/humility, and, to a lesser degree, openness and conscientiousness. In addition, the WAW was positively associated with construing power as responsibility and emotional understanding and negatively associated with resistance to persuasion and SDO. In Studies 2 and 3, we found that WAW was positively associated with both hypothetical public wrongness admission (Study 2), compared to private attitude change, and daily wrongness admission tendencies (Study 3). In both cases, these associations were found when controlling for agreeableness (Studies 2 & 3) and honesty/humility (Study 2). Further, only WAW – not agreeableness or honesty/humility – predicted wrongness admission.

**Implications**

 Investigating the factors that lead to or prevent wrongness admission may seem trite. Indeed, one might assume most people would admit to others when they are wrong. However, it appears that this is not always the case. Most people, anecdotally, can probably think of a time when they refused or saw someone refuse to admit wrongness. In fact, in Studies 2 and 3, the willingness to admit wrongness publicly, whether in a hypothetical situation or in daily life, was far from 100%. Moreover, given the variance in WAW scores, it appears that some people are less willing to admit than others.

Wrongness admission is potentially of critical importance in conversations about politics and law. Even in minor arguments (e.g., about doing the dishes) wrongness admission might be vital for successful relationships (Davis et al., 2011; Davis et al., 2013). As such, it is important to investigate the predictors of wrongness admission, including individual differences in willingness to admit.

 Studying the factors that lead someone to be more willing to admit wrongness may provide hints as to how to increase wrongness admissions tendencies. For example, we found that there was a significant correlation between WAW and emotional understanding. Empathy and perspective taking are implicated in emotional understanding (Schutte et al., 2001; Mayer, Caruso, & Salovey, 2000), as well as agreeableness (Graziano, Habashi, Sheese, & Tobin, 2007; Chopik, O’Brien, & Konrath, 2016), honesty/humility (Exline & Hill, 2012; LaBouff, Rowatt, Johnson, Tsang, & Willerton, 2012), and even conscientiousness (John, Caspi, Robins, Moffitt, & Stouthamer-Loeber, 1994; Chopik et al., 2016). As such, it is possible that training people to be more empathetic and/or to take other people’s perspectives may lead to more admissions.

 One realm in which increasing, or selecting for, willingness to admit wrongness might be important is the workplace. Previous work has shown that honesty/humility and agreeableness have numerous implications for the workplace (Barrick & Mount, 1991; Lee, Ashton, & DeVries, 2005). As willingness to admit was significantly associated with both honesty/humility and agreeableness, it is likely that wrongness admission would also be impactful in workplace situations. As an example, a supervisor signaling humility or agreeableness by admitting wrongness in an argument might have downstream impacts on workplace emotion, job satisfaction, organizational citizenship behaviors, and counter-productive workplace behaviors (Hogan & Kaiser, 2005).

**Additional Considerations and Future Directions**

 The purpose of the current studies was to develop a tool for further investigations into the causes and consequences of wrongness admission. We also wanted to assess whether the new measure was redundant with standard personality traits. However, we did not use an exhaustive list of covariates, and we do expect that other factors will be significantly associated with wrongness admission. For example, it is likely that willingness to admit wrongness is associated with measures of intellectual humility (e.g., Krumrei-Mancuso & Rouse, 2016). Additionally, we alluded to a link between WAW and empathy and perspective taking, but did not include a direct measure of these factors (e.g., Davis, 1983). Future research should examine these possibilities as well as other potential correlates.

 We also focused on other-oriented personality traits (i.e., agreeableness and honesty/humility) as opposed to self-oriented personality traits. Investigating self-oriented factors in willingness to admit wrongness might provide insights into the motivations underlying this individual difference. For example, among the Dark Triad model of personality, individuals high in narcissism are primarily concerned with appearing competent, while those higher in Machiavellianism are willing to appear less competent, and more communal, in order to manipulate others (Jones & Paulhus, 2009). As recent work (, 2018) has found that competency-related judgements are a concern of – and perhaps barrier to – wrongness admission, it could be that narcissists would score low and Machiavellians would score high on the WAW.

 Wrongness admission as a construct appears to be a socially desirable one. As such, the WAW might be open to “faking good”. This problem is, indeed, an issue for most individual difference measures (Ones, Viswesvaran, & Reiss, 1996). However, other research has found that social desirability can be reduced using neutral language (Bäckström, Björklund, & Larsson, 2009) and that, in low demand situations (i.e., anonymity and college samples), the worry over social desirability is minimal (see Paulhus & Vazire, 2007 for review). Our measure uses neutral language and anonymous samples. Furthermore, in Study 2, we found that most participants openly reported that they would not publicly admit wrongness. Even so, further work should investigate potential issues of social desirability.

 Finally, our investigation focused on between-subject variability in wrongness admission. Another interesting line of work could focus on within-subject variability in wrongness admission across situations. That is, a highly politically motivated person might be less likely to admit wrongness in a political argument than in an argument about cars. Also, in general, one’s variability on the WAW might be predictive of interesting self-related individual differences measures (e.g., Machiavellianism). Such hypotheses are beyond the scope of the current work and would require another type of measure, but future work should investigate such possibilities.

**Conclusion**

 Across three studies we created and validated a measure of willingness to admit wrongness. We also performed a preliminary exploration of the correlates of wrongness admission tendencies. This measure will be helpful as theories of wrongness admission develop, but also when considering interventions that may increase wrongness admission and intellectual humility in the general public. This latter goal would be particularly important in improving human relations and communication between groups (Chancellor & Lyubomirsky, 2013). Furthermore, this measure may be of use in applied settings, such as the workplace and couples’ therapy, or any other situation in which conflict resolution is important.

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**FIGURE CAPTIONS**

*Figure 1.* Mean Wrongness Admission Tendencies scores across admission choices with standard error bars.

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| **Table 1. Study 1 Correlations between Agreeableness, Agreeableness sub-factors, and WAW (*N* = 214)** |
|  | Mean | SD | 1. | 1a. | 1b. | 1c. | 1d. | 2. |
| 1. Agreeableness | 3.17 | .66 | (.790) |  |  |  |  |  |
|  1a. Forgiveness | 2.46 | 1.05 | .780\*\* | (.658) |  |  |  |  |
|  1b. Gentleness | 3.16 | .83 | .740\*\* | .416\*\* | (.617) |  |  |  |
|  1c. Flexibility | 3.01 | .73 | .746\*\* | .412\*\* | .538\*\* | (.353) |  |  |
|  1d. Patience | 3.73 | .94 | .722\*\* | .402\*\* | .324\*\* | .396\*\* | (.654) |  |
| 2. WAW  | 3.66 | .78 | .358\*\* | .243\*\* | .188\*\* | .402\*\* | .262\*\* | (.823) |

*Note:* Alpha Reliabilities are shown on the diagonal. \*\* = *p* < .01 and \* = *p* < .05

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| **Table 2. Study 1 Correlations between Honesty/Humility, Honesty/Humility sub-factors, and WAW (*N* = 214)** |
|  | Mean | SD | 1. | 1a. | 1b. | 1c. | 1d. | 2. |
| 1. Honesty/Humility | 3.33 | .67 | (.742) |  |  |  |  |  |
|  1a. Sincerity | 3.17 | .77 | .573\*\* | (.761) |  |  |  |  |
|  1b. Fairness | 3.39 | 1.12 | .738\*\* | .327\*\* | (.778) |  |  |  |
|  1c. Greed Avoidance | 3.05 | 1.09 | .745\*\* | .233\*\* | .322\* | (.745) |  |  |
|  1d. Modesty | 3.69 | .89 | .654\*\* | .152\* | .271\*\* | .393\*\* | (.657) |  |
| 2. WAW  | 3.66 | .78 | .222\*\* | .060 | .227\*\* | .198\*\* | .082 | (.823) |

*Note:* Alpha Reliabilities are shown on the diagonal. \*\* = *p* < .01 and \* = *p* < .05

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| **Table 3. Study 1 Correlations between Openness to Experience, Openness sub-factors, and WAW (*N* = 214)** |
|  | Mean | SD | 1. | 1a. | 1b. | 1c. | 1d. | 2. |
| 1. Openness to Experience | 3.56 | .68 | (.756) |  |  |  |  |  |
|  1a. Aesthetic Appreciation | 3.39 | 1.16 | .815\*\* | (.776) |  |  |  |  |
|  1b. Inquisitiveness | 3.72 | .94 | .714\*\* | .437\*\* | (.481) |  |  |  |
|  1c. Creativity | 3.58 | .87 | .670\*\* | .408\*\* | .228\*\* | (.552) |  |  |
|  1d. Unconventionality | 3.53 | .75 | .685\*\* | .377\*\* | .389\*\* | .351\*\* | (.515) |  |
| 2. WAW  | 3.66 | .78 | .163\* | .175\* | .205\*\* | -.034 | .099 | (.823) |

*Note:* Alpha Reliabilities are shown on the diagonal. \*\* = *p* < .01 and \* = *p* < .05

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| **Table 4. Study 1 Correlations between Conscientiousness, Conscientiousness sub-factors, and WAW (*N* = 214)** |
|  | Mean | SD | 1. | 1a. | 1b. | 1c. | 1d. | 2. |
| 1. Conscientiousness | 3.61 | .59 | (.749) |  |  |  |  |  |
|  1a. Organization | 3.66 | .94 | .793\*\* | (.600) |  |  |  |  |
|  1b. Diligence | 3.69 | .84 | .715\*\* | .405\*\* | (.584) |  |  |  |
|  1c. Perfectionism | 3.57 | .79 | .625\*\* | .282\*\* | .306\*\* | (.571) |  |  |
|  1d. Prudence | 3.54 | .76 | .703\*\* | .501\*\* | .309\*\* | .226\*\* | (.615) |  |
| 2. WAW | 3.66 | .78 | .127 | .163\* | .136\* | -.022 | .068 | (.823) |

*Note:* Alpha Reliabilities are shown on the diagonal. \*\* = *p* < .01 and \* = *p* < .05

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| **Table 5. Study 1 Correlations between Power Construal, STEU, SDO, Resistance to Persuasion, and WAW** |
|  | Mean | SD | 1. | 2. | 3. | 4. | 5. |
| 1. Construal of Power as Responsibility (N = 130) | 5.13 | 1.13 | (.849) |  |  |  |  |
| 2. STEU (N = 117) | .62 | .12 | .289\*\* | (.727) |  |  |  |
| 3. SDO (N = 208) | 2.45 | 1.16 | -.187 | -.152 | (.951) |  |  |
| 4. Resistance to Persuasion (N = 104) | 3.18 | .63 | - | - | .126 | (.897) |  |
| 5. WAW (N = 234) | 3.66 | .78 | .287\*\* | .210\* | -.158\* | -.233\* | (.823) |

*Note:* Alpha Reliabilities are shown on the diagonal. \*\* = *p* < .01 and \* = *p* < .05

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| **Table 6. Study 2 Results from Multinomial Logistic Regression on Admitting Wrongness** |
|  | Making post admitting wrongness versus Admitting with no post | Not have admitted versus Admitting with no post |
| $$β$$ | *p* | $$β$$ | *p* |
| WAW | .250 | .009 | -.508 | < .001 |
| Humility | .090 | .307 | .033 | .799 |
| Agreeableness | -.015 | .866 | -.033 | .805 |

**Appendix A**

**Willingness to Admit Wrongness Admission**

This scale measures what people do when they are wrong in arguments and discussions. Please answer as truthfully as possible. Your answers will remain anonymous. Please indicate how likely you would be to admit that you are wrong in the following scenarios.

1 = very unlikely

2 = unlikely

3 = neither likely nor unlikely

4 = likely

5 = very likely

1. You are having an argument with a complete stranger (e.g., on a web-based discussion board, in a class, at conference, etc.). Both of you are quite convinced of your own correctness. However, you begin to realize that the stranger is probably right and that your opinion is not standing up to the facts. In this case, would you publicly admit to being wrong?

2. You are having an argument with a co-worker about a child-rearing practice. Both of you are quite convinced of your own correctness. However, you begin to realize that your co-worker is probably right and that your opinion is not standing up to the facts. In this case, would you admit to being wrong?

3. You are having an argument with your partner about who was the last person to wash the dishes. You are both convinced that it was not the other. However, you begin to realize that your partner is probably right and that you did not wash the dishes last. In this case, would you admit to being wrong?

4. You are having an argument with a subordinate at work about how to reduce costs for the company. Both of you are quite convinced of your own correctness. However, you begin to realize that the subordinate is probably right and that your opinion is not standing up to the facts. In this case, would you admit to being wrong?

5. You are having an argument with your parent about a child-rearing practice. Both of you are quite convinced of your own correctness. However, you begin to realize that your parent is probably right and that your opinion is not standing up to the facts. In this case, would you admit to being wrong?

6. You are having an argument with a subordinate at work about which car is more economical for families. Both of you are quite convinced of your own correctness. However, you begin to realize that the subordinate is probably right and that your opinion is not standing up to the facts. In this case, would you admit to being wrong?

7. You are having an argument with a child you are caring for about some random fact. Both of you are quite convinced of your own correctness. However, you begin to realize that the child is probably right and that your opinion is not standing up to the facts. In this case, would you admit to being wrong?

Rejected items:

You are having an argument with a co-worker about how to move forward on a big project. Both of you are quite convinced of your own correctness. However, you begin to realize that your co-worker is probably right and that your opinion is not standing up to the facts. In this case, would you admit to being wrong?

You are having an argument with your supervisor about how to reduce costs for the company. Both of you are quite convinced of your own correctness. However, you begin to realize that your supervisor is probably right and that your opinion is not standing up to the facts. In this case, would you admit to being wrong?

You are having an argument with your supervisor about which car is more economical for families. Both of you are quite convinced of your own correctness. However, you begin to realize that your supervisor is probably right and that your opinion is not standing up to the facts. In this case, would you admit to being wrong?

1. Other measures included new measures under development, such as the Post-apocalyptic and Doomsday Prepping Beliefs measure – correlations with WAW are reported in Fetterman, Rutjens, Landkammer, and Wilkowski (2018). Some measures were included to validate other new measures. Still, other measures were included for specific purposes completely unrelated to the current study. In all cases, there are no other significant correlations with WAT. [↑](#footnote-ref-1)
2. Using the 10-item score only insignificantly increases the size of the effects across studies. The 7-item score is the more conservative measure, though more internally consistent. [↑](#footnote-ref-2)
3. We also included a measure of the Dark Triad (Jones & Paulhus, 2014) for purposes beyond the scope of the current research. [↑](#footnote-ref-3)
4. An identical model was run with openness. Openness was not a significant predictor (*p* > .983), while WAW remained a significant predictor (*p* = .038). [↑](#footnote-ref-4)