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The peculiar personality of strongmen: comparing the Big Five and Dark Triad traits of autocrats and non-autocrats

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ABSTRACT

The personality of political leaders matters for their electoral success and performance once in office. Yet, we still know too little about the personality profiles of leaders worldwide. In this article, we focus on the profile of a particular type of leader, central to contemporary warnings about ‘democratic backsliding’: strongmen. Who are they? Much has been written about their behaviour and policies, but little attention has been granted to their personality profile. As we argue in this article, looking at their personality is a potentially important new avenue to understand the rise and success of strongmen worldwide. We compare the profile of 157 leaders having competed in 81 elections worldwide between June 2016 and July 2019 – including 14 leaders with autocratic tendencies (Putin, Trump, Bolsonaro, Erdoğan, Orbán, Duterte, Netanyahu and several others). Using the ratings provided by 1800+ scholars we show that autocrats score significantly lower on agreeableness and emotional stability, and (marginally) higher on extraversion. Autocrats also score significantly higher than non-autocrats on the Dark Triad (narcissism, psychopathy and Machiavellianism), even when compared to right-wing non-autocrats. These results have important implications for the study of democratic deconsolidation, authoritarianism, and the personality of elected officials.

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Introduction and rationale

The personality of political leaders

The personality of political leaders matters – and, indeed, scholars have been paying increasing attention to it recently (Bittner 2011; Watts et al. 2013; Antonakis, House, and Simonton 2017; Visser, Book, and Volk 2017; Costa Lobo 2018; Nai and Maier 2018; Nai, Martinez i Coma, and Maier 2018). Evidence exists that certain personality profiles could be more conducive to electoral success – for instance, Joly, Soroka, and Loewen (2018) find that politicians low in agreeableness tend to be more successful, Scott and Medeiros...
(2020) highlight the potentially detrimental role of openness, and Nai (2019b) shows that candidates high in conscientiousness and psychopathy tend to attract more votes, whereas extraversion might be detrimental. Beyond this direct effect, some research suggests that voters tend to vote for candidates with personalities that ‘match’ their own (Caprara et al. 2003; Caprara and Zimbardo 2004; Caprara et al. 2007; but see Klingler, Hollibaugh, and Ramey 2018), while others suggest that some candidates might seem more appealing for voters with certain personality profile, but not for others; for instance, evidence suggests that conscientiousness is positively associated with support for one of the most important examples of contemporary autocratic tendencies – Vladimir Putin (Greene and Robertson 2017), and that voters scoring low on agreeableness are more likely to support populist parties (Bakker, Rooduijn, and Schumacher 2016). To be sure, much evidence exists that a voter’s profile matters greatly for their electoral choices, beyond the personality of political figures; for instance, many studies have shown that conscientiousness is positively associated with conservatism and openness with liberalism (Gerber et al. 2010; Hirsh et al. 2010), and recent research shows that psychopathy and narcissism are also associated with political conservatism in voters (Jonason 2014). Yet, the personality of leaders matters as well. Research in corporate behaviour and business administration has consistently shown that the personality traits of people in leadership positions drive their professional achievements (and downfalls). For instance, conscientiousness has been shown to be the most consistent predictor of professional achievements (Judge et al. 1999; Hochwarter, Witt, and Kacmar 2000; Seibert and Kraimer 2001). Extraverted individuals score particularly high in leadership traits (Judge et al. 2002), and agreeable individuals show higher job performance overall (Rode et al. 2008) – even though their success might be lower in early career stages because they risk being perceived as excessively compliant and non-assertive (Judge et al. 1999). High psychopathy has also been consistently linked with better performance in business (Babiak and Hare 2006); in a study of more than 300 white-collar workers, Boddy, Ladyshewsky, and Galvin (2010) show a substantially higher level of psychopathy in workers at upper corporate levels. Similarly, high narcissism has been associated in CEOs with strategic dynamism, grandiosity and bolder acquisitions (Chatterjee and Hambrick 2007).

Going back to politics, several studies about the performance of past US Presidents also suggest that the personality of political leaders drive their success – and their failures – once they hold high executive offices. For instance, evidence exists that the ‘charisma’ of the President drives an overall better economic performance once in office (House, Spangler, and Woycke 1991), that conscientiousness is associated with ‘presidential greatness’ (Rubenzer, Faschingbauer, and Ones 2000), that presidents rated higher on boldness tended to perform better in terms of leadership, crisis management and relations with the Congress (Lilienfeld et al. 2012), and that narcissism can drive leadership abilities, willingness to take risks, boldness and having a more active imagination (Watts et al. 2013). At the same time, grandiose narcissism and psychopathy increase the likelihood of tolerating unethical behaviours in subordinates and ‘placing political success over effective policy’ (Lilienfeld et al. 2012; Watts et al. 2013, 2383).

All in all, strong reasons exist to expect that the personality of political leaders matters for a better understanding of electoral outcomes and effective governance. Yet, very few studies exist that map the personality profiles of different types of political leaders. If their personality is expected to matter, we ought to know more about when, and for whom,
some personality traits are more likely to be present (or absent). For instance, we have shown elsewhere (Nai and Martinez i Coma 2019) that populist candidates tend to score low on agreeableness, but high in extraversion and narcissism. In this sense, we argued, the rise and fall of populist movements worldwide can be better understood also in terms of the personality of their leaders. In this article, we expand on this (limited) research and present the first evidence that another type of political leaders ought to be studied through the lens of personality profile: strongmen.

The rise of political leaders with autocratic tendencies in liberal democracies, in recent years, often called for ad-hoc explanations. For instance, the ascension of Rodrigo Duterte to the Philippines’ presidency in 2016 represented a major rupture in the country’s road to liberal democracy, and many commentators noted that ‘vulgarity […] coarse language and outrageous statements characterized his run for the presidency – to the horror of those accustomed to more genteel national politics, but to the delight of his growing base’ (Teehankee and Thompson 2016, 126). Such coarser political rhetoric, combined with a push for more muscular policies, was also at the core of the election of Donald Trump in 2016 (Oliver and Rahn 2016). These accounts – and many other – lead to a big, unresolved question: are strongmen a particular ‘breed’ of political figures?

The rise of strongmen

Unsurprisingly, most work on authoritarianism focusses on non-democracies or hybrid regimes (e.g. Levitsky and Way 2002; Brancati 2014). The emergence and consolidation of strongmen have been studied in the context of democratic stagnation (Carothers 1997), and their success and political survival has been analysed in terms of, e.g. the role of political institutions (Gandhi and Przeworski 2007; Boix and Svolik 2013). As a form of government, autocracy reflects the total concentration of executive powers into the hands of one person, whose political actions cannot be challenged by the opposition, any form of judicial reviews or other legal checks and balances, or public opinion. By definition, electoral democracies are not autocracies; yet, even in electoral democracies, recent years have seen the surge of autocratic tendencies and a push towards ‘illiberalism’, leading to the contemporary narrative about the ‘crisis of democracy’ and the ‘democratic backsliding’, in Europe and elsewhere (Levitsky and Way 2002; Diamond 2015; Mechkova, Lührmann, and Lindberg 2017; Norris and Inglehart 2019). Autocratic tendencies in electoral democracies are often spearheaded by leaders labelled as ‘strongmen’ – Vladimir Putin in Russia, Recep Tayyip Erdoğan in Turkey, Viktor Orbán in Hungary, Jair Bolsonaro in Brazil, Rodrigo Duterte in the Philippines, or Donald Trump in the USA, to name just a few – that embody a push for a centralization of executive power, hierarchical governance, muscular treatment of opponents and the media, and the promotion of traditionalism and nationalism. Even in countries where they do not hold office, parties and movements lead by wannabe-autocrats have seen their political power increase in recent years – as recent elections in Germany and Sweden testify – and benefit from an undeniably intense, albeit often unfavourable, media coverage.1

In their seminal work on the role of institutions for the survival of autocrats, Gandhi and Przeworski (2007) remarked that ‘[b]linded by ideological antagonisms of the Cold War, we paid little attention to the institutional structure of authoritarian regimes’ (2007, 1292). Paraphrasing their point, we argue in this article that blinded by the institutional and
electoral dynamics of competitive and democratic authoritarianism, we paid so far surprisingly little systematic and comparative attention to who the strongmen really are. Strongmen are often described as displaying an ‘authoritarian’ profile.\(^2\) Initially framed within the study of Nazism and sentiments of anti-Semitism in the aftermath of the Second World War (e.g. Adorno et al. 1950) authoritarianism came back on the scientific agenda in more recent times as a dispositional driver of social and political attitudes, from group identification (Duckitt 1989) to social dominance (Duriez and Van Hiel 2002; Duriez, Van Hiel, and Kossowska 2005; Mirisola et al. 2007). Most research on individual differences in authoritarianism relies on the work by Altemeyer (1981, 1988), according to which ‘Right-Wing Authoritarianism’ (RWA) has three main underlying dimensions: ‘authoritarian submission’, ‘conventionalism’ and ‘authoritarian aggression’. Authoritarian individuals ‘travel in tight circles of like-minded people so much, they often think their views are commonly held in society, that they are the “Moral Majority” or the “Silent Majority”’ (Altemeyer 1998, 48) and tend to exhibit obedient and conventional behaviours, favouring more aggressive social interactions (Duckitt 2015). RWA is often associated with social dominance orientations (SDO), that is, ‘whether one prefers intergroup relations to be equal or hierarchical, or […] the extent to which one desires the in-group to dominate out-groups’ (Duriez, Van Hiel, and Kossowska 2005, 300). Authoritarianism is associated with aggressive social behaviours, such as outgroup antipathy and prejudice (Whitley 1999) and support for intergroup violence (Henry et al. 2005). Translated into behavioural dispositions of political leaders, right-wing authoritarianism is thus the tendency to promote obedience to traditional and conventional norms, to prefer the uniformization of beliefs over differences and out-groups, and to exhibit a pattern of dominant and hierarchical social behaviours intended to consolidate power. Consistent evidence shows that (political) behavioural dispositions are strongly associated with underlying personality traits (e.g. Chirumbolo and Leone 2010; Mondak 2010); in this sense, the question arises as to whether political leaders sharing a behavioural profile that qualifies them as ‘authoritarians’ also share similar personality profiles. Because the personality of leaders matters for their electoral success and performance in office (Joly, Soroka, and Loewen 2018; Nai 2019b; Scott and Medeiros 2020), mapping the personality profile of strongmen could provide a novel approach to understand their rise and performance. In this article, we answer this question by proving a first systematic comparative assessment of the personality profile of 14 political leaders with autocratic tendencies having competed in recent elections worldwide.

Two sets of personality traits: Big Five and Dark Triad

Among the multiple competing classifications of personality in the literature, the Big Five Inventory (John, Naumann, and Soto 2008; Gerber et al. 2010) is by far the most widely accepted. It describes five personality traits: extraversion (sociability, energy, charisma), agreeableness (cooperative and pro-social behaviours, conflict avoidance and tolerance), conscientiousness (discipline, responsibility and a sense that life should be organized), emotional stability (calm, detachment, low emotional distress and anxiety), and openness (curiosity, a tendency to make new experiences). To provide a more nuanced picture of human personality, scholars often associate to the BFI an alternative set of ‘dark’ traits, either as independent constructs (‘Dark Triad’; Paulhus
and Williams 2002; Jones and Paulhus 2014) or indirectly as the absence of other traits (e.g. the absence of the honesty/humility dimension within the HEXACO inventory; Lee and Ashton 2014; but see Spain, Harms, and LeBreton 2014). The three ‘dark’ traits are narcissism (grandiosity, ego-reinforcement behaviours, tendency to seek attention and admiration), subclinical psychopathy (lack of remorse, insensitivity, impulsivity) and Machiavellianism (tendency to use manipulation and strategic behaviours). These three traits are ‘aversive’ but still ‘within the normal range of functioning’ (Furnham, Richards, and Paulhus 2013).

Even though no evidence exists about the personality traits of autocrats worldwide, existing studies in the public at large are informative about the relationship between the two personality inventories (Big Five and Dark Triad) and authoritarianism and social dominance. Because promoting ‘inter-group hierarchies and inequalities resulting from a tough-minded personality and competitive worldviews’ (Hodson, Hogg, and MacInnis 2009, 687), right-wing authoritarianism and SDO have been shown to correlate negatively with openness, while RWA correlates positively with conscientiousness and SDO correlates negatively with agreeableness (Heaven and Bucci 2001; Ekehammar et al. 2004; Van Hiel, Cornelis, and Roets 2007; Perry and Sibley 2012). Extraversion and emotional stability (low neuroticism) are only weakly associated with RWA and SDO (Sibley and Duckitt 2009), although some research shows an association between high neuroticism with a greater propensity for RWA, but only mediated by dangerous world beliefs (Van Hiel, Cornelis, and Roets 2007; Dallago, Mirisola, and Roccato 2012). SDO and a ‘desire for power’ have also been shown to be consistently driven by the Dark Triad, in particular psychopathy and Machiavellianism (Hodson, Hogg, and MacInnis 2009; Jones and Figueredo 2013; Lee et al. 2013), while other studies find a strong negative association between SDO and empathy (Sidanius et al. 2013). Looking at racially motivated attitudes, Jones (2013) finds that psychopathy interacts with RWA to predict a desire to join violent extreme-right (Neo-Nazi) movements, while Machiavellianism interacts with RWA to drive a desire to join traditional political movements advocating for racist ideologies (KKK).

**This study**

In this article, we compare the personality profile of 157 political figures having competed in 81 elections worldwide between June 2016 and July 2019 – which include 14 political leaders with autocratic tendencies (Vladimir Putin, Donald Trump, Jair Bolsonaro, Recep Tayyip Erdoğan, Viktor Orbán, Rodrigo Duterte, Benjamin Netanyahu and several others). Using a new dataset based on the judgments of 1800+ experts in elections and political behaviour (Nai and Martinez i Coma 2019; Nai 2019a), we intend to show that the personality profile (Big Five and Dark Triad) of right-wing autocrats differs from the profile of non-autocrats. It is important to mention that we are not presenting a model that predicts the authoritarian character or personality based on the profile of candidates. We did not ask experts to rate the candidates as authoritarians, autocrats, or otherwise; rather, and independently from the expert ratings, we identified several political figures that are often and consensually described as ‘autocrats’ by political and media observers. In this article, we ask to what extent these political figures share similar personality traits when we compare them with other political figures – irrespectively
of their ideological position. Based on known associations between RWA/SDO, the Big Five and the Dark Triad in the public at large, as described above, we expect leaders with autocratic tendencies to score lower than other political figures in openness, and agreeableness, but higher in conscientiousness and the Dark Triad (especially psychopathy and Machiavellianism).

Data and methods

Expert survey

Measuring the personality of political elites directly, through psychological assessments or via self-reported measures, is virtually impossible. Some studies use self-reported data, based on survey with elites (Dietrich et al. 2012; Joly, Soroka, and Loewen 2018; Schumacher and Zettler 2019), but this remains an exception and is limited to specific cases (e.g. Danish MPs; Nørgaard and Klemmensen 2018). Other scholars rely on psychohistoric analyses of secondary data, for instance, content analysis of political speeches (Winter 1987), more recently improved thanks to advances in machine learning techniques (Ramey, Klingler, and Hollibaugh 2016, 2017); although very promising, this alternative approach is contingent on the existence and comparability of political texts.

In this article we rely on expert assessments to measure the perceived personality of political leaders (Rubenzer, Faschingbauer, and Ones 2000; Lilienfeld et al. 2012; Watts et al. 2013; Visser, Book, and Volk 2017; Nai and Maier 2018). We use a new dataset that includes measures for the personality traits (Big Five and Dark Triad) of 157 candidates having competed in 81 elections worldwide between June 2016 and July 2019 (see Table A1 in the Appendix for a complete list). The dataset is part of a broader research initiative that gathers information about elections worldwide via expert surveys (Nai 2018, 2019a). In the aftermath of each election, a sample of domestic and international experts are asked to evaluate the campaigning strategies used by competing candidates during the election, as well as their personality profile. Expert assessments cannot provide the full nuances of personality differences achievable with self-reported measures. Nonetheless, they allow for the implementation of large-scale comparative studies, like the one presented here, which would be all but impossible with self-reported measures. Furthermore, evidence suggests that cross-observer agreement on personality assessments are likely (e.g. McCrae and Costa 1987; Colbert et al. 2012), that is, external observers are able to rate the personality of individuals in a way that is often consistent with the self-assessments of those same individuals.

We define an ‘expert’ as a scholar who has worked/published on the country’s electoral politics, political communication (including political journalism) and/or electoral behaviour, or related disciplines. Expertise is established by the presence of one of the following criteria: (1) existing relevant academic publications (including conference papers); (2) holding a chair in those disciplines; (3) membership of a relevant research group, professional network, or organized section of such a group; (4) explicit self-assessed expertise in professional webpage (e.g. biography on university webpage). Experts were contacted via a personalized email during the week following the election and received two reminders, respectively one and two weeks after the first invitation. The invitation email contained the link to the questionnaire, administered through Qualtrics. Overall,
1800+ experts provided their judgments so far. The number of expert answers varies across elections and candidates; on average, 6.3 experts evaluated each candidate (on par with similar research on US presidents; see, e.g. Lilienfeld et al. 2012), and the average response rate was approximately 20%. We excluded all candidates for which less than three experts provided information. On average, experts in the overall sample lean to the left \((M = 4.39/10, SD = 1.83)\), 77% are domestic (that is, work in the country for which they were asked to evaluate the election), and 32% are female. Overall, experts declared themselves very familiar with the elections \((M = 8.09/10, SD = 1.72)\) and estimated that the questions in the survey were relatively easy to answer \((M = 6.58/10, SD = 2.34)\). Table A2 in Appendix A presents, for each election in the database, the composition of the expert sample in terms of average left-right position, average self-estimated familiarity with elections in the country surveyed, average self-assessed ease in answering the survey questions, percentage of domestic experts, and the percentage of female experts. In one case our sample does not contain any domestic expert (Madagascar 2018 election), and in three cases only male experts provided ratings (respectively, the Lesotho 2017, Cameroon 2018, and Finland 2019 elections). Overall, however, the expert samples are not particularly skewed.

Personality measures

We replicate the approach described in Nai and Maier (2018, 2019) and sketch the personality of political figures via the Big Five and Dark Triad, two inventories of human personality that have received consistent cross-cultural validation (Foster, Campbell, and Twenge 2003; Schmitt et al. 2007).

To measure the Big Five, we used the Ten Items Personality Inventory (TIPI; Gosling, Rentfrow, and Swann 2003), and asked experts to evaluate two statements about the personality of the candidates for each trait (e.g. the candidate is ‘critical, quarrelsome’); the underlying personality trait is measured as the average value for those statements, aggregating all expert judgments. For the Dark Triad we follow the same approach, where each trait is measured through two separate and independent components. We designed a battery of six items based on the principal component analyses described in the ‘Dirty Dozen’ (D12) in Jonason and Webster (2010, 422). For each trait, we identified the two items that correlate the highest with the trait and used them as items in our battery (e.g. the candidate ‘tends to be callous or insensitive’). Experts had to evaluate each component on a scale from 0 ‘very low’ and 4 ‘very high’. Aggregating the expert answers for each candidate yields five variables in the Big Five inventory (extraversion, agreeableness, conscientiousness, emotional stability and openness) and the three variables in the Dark Triad (narcissism, psychopathy and Machiavellianism).

To be sure, these two ‘short’ measures of personality are by far not perfect. They have the advantage of being very efficient to administer, whilst achieving comparatively good results when compared with other short batteries (see, e.g. Rammstedt and John 2007). Yet, with only two items per trait, these batteries tend to sacrifice validity for reliability – that is, it would be naïve to assume that these two batteries capture all nuances and facets of complex personality constructs such as differences in personality traits (Credé et al. 2012; Spain, Harms, and LeBreton 2014; Bakker and Lelkes 2018). The decision to rely on these short scales was dictated to the nature of the data collection, where experts were asked to answer long questionnaires about a multitude of topics – including
the personality of selected candidates. As such, only limited space was available in our large-scale cross-sectional questionnaires. On the bright side, as we discuss elsewhere, two additional tests suggest high construct validity. First, experts and undergraduate students evaluated very consistently the profile of selected political figures (Nai and Maier 2019). Second, the profile of a selected sample of candidates was often in line with the description of these candidates in media products (e.g. newspaper articles; Nai 2019a). Both tests suggest that our measures, if theoretically imprecise and potentially lacking all nuances of larger and more complex scales, are nonetheless able to capture the broad personality profile of political figures. Having to face a trade-off between potentially imperfect scales and no measures, we believe that the possibility of map the personality of a wide range of political figures across the world outweigh the limitations inherent in short scales.

Reliability of the eight personality measures is relatively high; \( \alpha = .68 \) (extraversion), \( \alpha = .64 \) (agreeableness), \( \alpha = .79 \) (conscientiousness), \( \alpha = .86 \) (emotional stability), \( \alpha = .61 \) (openness), \( \alpha = .86 \) (narcissism), \( \alpha = .88 \) (psychopathy), \( \alpha = .81 \) (Machiavellianism).

Turning to construct consistencies, Table 1 presents the bivariate correlations between the eight traits in the Big Five and Dark Triad inventories, as well as the mean and standard deviation for each trait. The relationship between the two sets of personality does not always follow stable patterns in for ordinary citizens (e.g. Lee and Ashton 2005), but some specific trends are often reported. For instance, for ordinary citizens agreeableness often correlates negatively with all the three ‘dark’ traits, conscientiousness is negatively associated with psychopathy and Machiavellianism, and narcissism is positively associated with extraversion (Paulhus and Williams 2002; Furnham, Richards, and Paulhus 2013). We find these patterns in our candidates as well. Table B6 in Appendix B presents the correlation matrix between Big Five and Dark Triad traits for a convenience sample of US citizens surveyed through the Amazon MTurk online platform (Clifford, Jewell, and Waggoner 2015) in November 2018 \((N = 1199)\). Comparison between patterns for our candidates

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<td>A</td>
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<td>M</td>
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<td>0.75</td>
<td>0.30</td>
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<td>−0.47</td>
<td>−0.30</td>
<td>0.74</td>
<td>0.76</td>
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Note: all variables vary between 0 ‘very low’ and 4 ‘very high’. \( N = 157 \).

Table 1 and ordinary citizen (Table B6) shows consistent trends overall. Only extraversion seems to behave differently in our candidates, perhaps due to the higher values reported for candidates when compared to ordinary citizens on this trait (see below).

Figure 1 presents the distribution of all candidates on the eight personality traits. Variations within each trait appear clearly, suggesting that candidates in our sample cover all types of personality profile measurable. More details about the measures of personality used in this article are illustrated in Appendix D.

Candidates in our dataset score particularly high on average in extraversion and conscientiousness, in line with trends found in several other studies. For instance, Caprara et al. (2003) show significantly higher levels of extraversion in politicians when compared with the general public, Joly, Soroka, and Loewen (2018) show that Belgian MPs score particularly high in conscientiousness, and Nørgaard and Klemmensen (2018) found that Danish MPs were more extraverted, conscientious (and open) than the average Danish voter. Schumacher and Zettler (2019) report that Danish politicians score higher in honesty–humility than voters, which goes somehow against the trend in our dataset where narcissism is the single higher average score for politicians across the eight personality traits; to be sure, low scores on the HEXACO inventory (which includes the honesty–humility trait) does not necessarily equate with high scores on specific traits within the Dark Triad (Spain, Harms, and LeBreton 2014). Interestingly, Donald Trump is the candidate with the single lowest score on conscientiousness of all the 157 candidates in our dataset (0.67 – represented by the extreme outlier in the boxplot), whereas Angela Merkel has the single highest score (3.80). In contrast, Merkel has the single lowest score on extraversion.

Figure 1. Personality profile of all candidates. Note: all variables vary between 0 ‘very low’ and 4 ‘very high’. $N = 157$. E ‘Extraversion’; A ‘Agreeableness’; C ‘Conscientiousness’; Es ‘Emotional stability’; O ‘Openness’; N ‘Narcissism’; P ‘Psychopathy’; M ‘Machiavellianism’. + Indicates extreme values (more than 1.5 * interquartile range away from the median).
(0.56), and Trump the third highest overall (3.61). Trump scores the highest on narcissism (3.91), but he is in good company; among those scoring high on this trait (more than 3.5 out of 4) we also find Emmanuel Macron, Vladimir Putin, or Silvio Berlusconi.

**Fourteen autocrats**

Our dataset contains several political figures that match the profile of right-wing autocrats. In this article, we focus only on those among them who have achieved electoral success, that is, occupy central positions in the executive and/or legislative bodies of their country. This excludes some well-known leaders of far-right parties – such as France’s Marine Le Pen (Front National), Germany’s Alexander Gauland (Alliance for Germany), or the Netherlands’ Geert Wilders (Freedom Party) – who, even if relatively popular in their country and benefit from strong media coverage, failed to gain political power at the national level.

We compare the profile of the following 14 autocrats, in alphabetical order: Andrej Babiš, leader of the populist Action of Dissatisfied Citizens (ANO) and currently Prime Minister of the Czech Republic; Jair Bolsonaro, the president of Brazil since January 2019, who openly advocates for the use of torture and is nostalgic of the country’s dictatorial past; Rodrigo Duterte, Philippines’ president who made little mystery of using extrajudicial killings in his war on drugs, granting him the nickname ‘the Punisher’ (Teehankee and Thompson 2016); Recep Tayyip Erdoğan, president of Turkey since 2014, founder of the Justice and Development Party (AKP) and knowing for consolidating his executive powers through court cases and referenda; Nikola Gruevski, former Prime Minister of the Republic of Macedonia and former leader of the right-wing VMRO-DPMNE, who resigned from his position after a scandal involving widespread wiretapping of opposition and an alleged cover-up of a murder committed by a police officer (Gruevski fled from justice in November 2018 and currently resides in Hungary as political refugee); Benjamin Netanyahu, Israel’s conservative PM with a reputation for being strong on security issues; Narendra Modi, India’s PM with a propensity for projecting images of himself as a fearless, strong and masculine leader; Viktor Orbán, currently Prime Minister of Hungary, leader of the right-wing Fidesz – Hungarian Civic Alliance, and one of the most vocal European supporters of ‘illiberal democracy’, social conservatism and nationalism; Vladimir Putin; president of the Russian Federation since 2012 and frequently criticized for leading the country in an autocratic direction and for his rough treatment of opposition leaders and independent press; Matteo Salvini, leader of the far-right and Eurosceptic Lega and former Deputy Prime Minister and Minister of the Interior of Italy; Serzh Sargsyan, leader of the right-wing Republican Party of Armenia (RPA), who resigned in 2018 six days after taking office as President following widespread protests against what would have been a third consecutive term, seen as autocratic and illegitimate by many; Heinz-Christian Strache, ex-Chairman of the far-right populist Austrian Freedom Party (FPÖ) and Vice-Chancellor of Austria between 2017 and 2019 (he resigned from both functions in the wake of the ‘Ibiza affair’, after appearing in a video portraying him allegedly offering government contracts to a Russian businesswoman against favourable news coverage for his party); in the past Strache, also allegedly, was photographed participating in paramilitary exercises with Nazi groups; Donald Trump, President of the USA since 2016, frequently disparaging the opposition and the media (‘the enemy of the people’), adopting a relatively soft stance against far-right extremists, previously under federal scrutiny for...
collusion with foreign powers (including Russia’s Vladimir Putin), and impeached in December 2019 for abuse of power and obstruction of Congress;\textsuperscript{14} and \textbf{Aleksandar Vučić}, former President of Serbia and leader of the right-wing Serbian Progressive Party (CHC/SNS), involved in several controversies due to his alleged support for convicted war criminal Ratko Mladić and his dismissal of the Srebrenica massacre.\textsuperscript{15}

These leaders are not meant to be an exhaustive list of all autocrats worldwide, as they have been selected only within candidates that have competed in elections between June 2016 and July 2019. Other leaders would have perfectly fit in the selection – for instance Poland’s Andrzej Sebastian Duda – but they are not included in our database as no national election happened in their respective countries during the years covered in the database (so far). Also, of course, the selected leaders only come from countries that have competitive elections, and thus leaders from non-democratic countries such as China, North Korea and Venezuela are excluded de facto. Furthermore, due to the diversity of the political systems covered, the list includes both Presidents and Prime Ministers. Nonetheless, the 14 political figures selected include most if not all major key players in world politics that are often used as paradigmatic examples of the contemporary autocratic surge. Although serving in countries as different as Brazil, Hungary, Turkey, Russia, Israel, The Philippines or the USA, these leaders share a similar image; they all display a muscular and bellicose approach to politics, advocate in their respective countries for the concentration of executive powers, regularly threaten political opponents, and often maintain a conflictual relationship with the media. These political figures are leaders of electoral democracies – and not autocracies – and have come to power through the ballot box and not through military coups or other non-democratic means. Nonetheless, they embody a push towards autocracy that many observers see as a main cause of concern in terms of democratic backsliding worldwide (e.g.; Foa and Mounk 2017; Levitsky and Ziblatt 2018). We discuss in the next section the extent to which these 14 leaders share a similar personality profile, and to what extent that profile diverges from the personality of non-autocrats worldwide.

\textbf{Results}

\textit{The personality of right-wing autocrats}

Figure 2 presents the personality scores for the candidates identified as ‘autocrats’ in our dataset. Full scores for all candidates are presented in Table B1 (Appendix B); furthermore, scores for all personality components, used to build the eight personality scales, are presented in Tables B2 and B3, respectively for the Big Five and the Dark Triad. In Figure 2, the personality profile of each of the 14 autocratic leaders (dark shape) is plotted against the average profile of all autocrats (light-grey dotted area).\textsuperscript{16}

Looking first at the Big Five, autocrats on average score relatively high in \textit{extraversion} ($M = 2.74$) and \textit{conscientiousness} ($M = 2.44$), and rather low on \textit{agreeableness} ($M = 1.17$). On these three traits, Donald Trump has the most extreme values, respectively the highest score in \textit{extraversion}, and the lowest score on \textit{agreeableness} and \textit{conscientiousness}. Scores for \textit{emotional stability} are relatively average ($M = 1.60$), with Vladimir Putin scoring the highest and, again Donald Trump scoring the lowest. For \textit{openness}, Austria’s Heinz-Christian Strache has the lowest score, whereas the highest score is for Babiš and
Figure 2. Personality profile of autocrats. Note: all variables vary between 0 ‘very low’ and 4 ‘very high’. The light-grey dotted area represents the average score of autocrats on all personality traits. The darker bold outline represents the profile of the candidate. E ‘Extraversion’; A ‘Agreeableness’; C ‘Conscientiousness’; Es ‘Emotional stability’; O ‘Openness’; N ‘Narcissism’; P ‘Psychopathy’; M ‘Machiavellianism’.
Netanyahu, ex aequo. Turning to the Dark Triad, the scores for the three traits are overall quite high on average for all leaders, especially narcissism ($M = 3.39$) and psychopathy ($M = 3.05$). Trump again has the highest scores on two traits – narcissism and Machiavellianism – and the second-highest score on psychopathy. Only one leader scores higher than Trump on psychopathy: Nikola Gruevski, Macedonia’s former Prime Minister, allegedly involved in wiretappings and murder cover-ups and currently a fugitive from justice and residing in Hungary as a political refugee.

Table B4 (Appendix B) reports the standard deviations for each candidate and trait. The scores can be read as an indication of how much the experts ‘agree’ on the profile of those candidates and show overall quite strong consistency. The leader evaluated with the highest consistency (lowest average standard deviation) is again Donald Trump ($SD = 0.75$), whereas Italy’s Salvini was evaluated the least consistently ($SD = 1.27$). Looking cross-sectionally, the eight traits were evaluated rather consistently on average, with the higher consistency found for narcissism ($SD = 0.75$) and the lowest for openness ($SD = 1.17$).

**Autocrats vs. non-autocrats**

The average profile of autocrats and non-autocrats is plotted in Figure 3.

Looking first at the Big Five, autocrats score significantly lower in agreeableness ($M = 1.17$, $SD = 0.14$) than non-autocrats ($M = 1.79$, $SD = 0.06$); the effect size of the difference of 0.62 points on a 0–4 scale is relatively strong; $t(155) = 3.15$, $p < .002$, $d = 0.51$. Autocrats also score significantly lower in emotional stability (higher neuroticism) ($M = 1.60$, $SD = 0.22$) than non-autocrats ($M = 2.26$, $SD = 0.07$; $t(155) = 2.98$, $p = .003$, $d = 0.48$), and

![Figure 3](image_url)
(marginally) higher on extraversion (autocrats: $M = 2.74, SD = 0.15$; non-autocrats: $M = 2.37, SD = 0.06$; $t(155) = -1.85, p = .066, d = 0.30$). Autocrats do not score significantly higher or lower than non-autocrats on conscientiousness (autocrats: $M = 2.44, SD = 0.21$; non-autocrats: $M = 2.68, SD = 0.05$; $t(155) = 1.34, p = .182, d = 0.22$) and openness (autocrats: $M = 1.93, SD = 0.12$; non-autocrats: $M = 1.97, SD = 0.06$; $t(155) = 0.21, p = .837, d = 0.03$). Turning to the Dark Triad, autocrats score significantly higher in psychopathy ($M = 3.05, SD = 0.13$) than non-autocrats ($M = 2.15, SD = 0.07$), with a strong effect size; $t(155) = -4.20, p < .001, d = 0.67$. The positive difference is also significant for narcissism (autocrats: $M = 3.39, SD = 0.12$; non-autocrats: $M = 2.77, SD = 0.05$; $t(155) = -3.62, p = .001, d = 0.58$) and Machiavellianism (autocrats: $M = 2.83, SD = 0.13$; non-autocrats: $M = 2.18, SD = 0.06$; $t(155) = -3.15, p = .002, d = 0.51$).

As a robustness check, Table B5 (Appendix B) reverses the logic and estimates the candidates’ autocracy (binary variable) as a function of their personality traits. Given that the dependent variable is strongly skewed towards non-autocrats (only 14 autocrats out of 157 are in our dataset), results are mostly illustrative. Nonetheless, we see trends that are in line with what discussed above, especially for the psychopathy and the Dark Triad more in general.

Unsurprisingly, the differences between autocrats and non-autocrats are more pronounced when looking only at non-autocrats placed ideologically on the left. By contrast, the differences are smaller when comparing autocrats with non-autocrats on the right. Nonetheless, even in this case the difference between autocrats and non-autocrats is still statistically significant (but only at $p < 0.1$) for emotional stability (autocrats: $M = 1.60, SD = 0.22$; non-autocrats(right): $M = 2.05, SD = 0.10$; $t(71) = 1.89, p = .063, d = 0.45$) and Machiavellianism (autocrats: $M = 2.83, SD = 0.13$; non-autocrats(right): $M = 2.45, SD = 0.09$; $t(71) = -1.95, p = .055, d = 0.46$). The difference is even greater for psychopathy (autocrats: $M = 3.05, SD = 0.13$; non-autocrats (right): $M = 2.55, SD = 0.09$; $t(71) = -2.53, p = .014, d = 0.60$) and narcissism (autocrats: $M = 3.39, SD = 0.12$; non-autocrats(right): $M = 2.99, SD = 0.07$; $t(71) = -2.47, p = .016, d = 0.59$).

### Second-order factors

Several studies suggest that external observers tend to use simplified schemata when assessing the personality of public figures (Oltmanns et al. 2004; Caprara et al. 2007). These simplified ‘second-order’ factors allow the observers to make sense of the personality of public figures in a heuristic yet comprehensive way. Caprara et al. (2007) discuss two of these second-order factors when it comes more specifically to the Big Five, in line with the second-order factors of ‘alpha’ and ‘beta’ described in Digman (1997): the first is characterized by friendliness, conscientiousness and emotional stability, whereas the second by energy/extraversion and openness; DeYoung (2006) calls these two meta traits ‘stability’ and ‘plasticity’.

We assessed the presence of these macro structures in our data via a Principal Components Analysis (PCA).

Results, plotted in Figure 4, reveal the presence of two orthogonal underlying dimensions, explaining respectively 52.6% (Dimension 1) and 18.4% (Dimension 2) of the variance. Conceptually, the two underlying dimensions in our data align very closely with what discussed in Caprara et al. (2007): their dimension of friendliness, conscientiousness and emotional stability is close to our Dimension 1 (reversed),
which also includes the opposed effect for the three ‘dark’ traits (absent from their study); their dimension of energy/extraversion and openness is close to our Factor 2, on which extraversion and openness score positively whereas all other traits (including the Dark Triad) have a negligible effect. Results for the Dark Triad are in line with the idea that these traits are opposed to the ‘stability’ metatrait (emotional stability, agreeableness, conscientiousness), as shown for instance in Jonason et al. (2013).

Beyond the traits themselves, the Figure also plots the position of all candidates on the two dimensions (all non-autocrats in light grey), as well as the average position of autocrats and non-autocrats (including the position of Left, Centre and Right non-autocrats). From the Figure it appears clearly that all autocrats, with the exception of Armenia’s Serzh Sargsyan, score low on the first dimension of friendliness, conscientiousness and emotional stability (x-axis); Trump is, again, an extreme outlier. The average position of autocrats is well within the right-hand quadrant of the graph. Autocrats score also relatively low on the second dimension of extraversion/openness, but the differences are less pronounced. From a statistical standpoint, the difference between autocrats and non-autocrats is significant on the first underlying dimension, \( t(155) = -3.82, p < .001, d = 0.61 \), but not in the second, \( t(155) = -0.96, p = .337, d = 0.15 \). The difference on the first dimension is significant also when comparing autocrats with non-autocrats on the right, \( t(71) = -2.26, p = .027, d = 0.54 \).

**Discussion and conclusion**

**Results at a glance**

The candidates identified as ‘autocrats’ in our dataset differ significantly from non-autocrats on several personality traits. They score significantly lower in agreeableness and...
emotional stability, for this second trait even when compared with non-autocrats from the right. The result for agreeableness is consistent with trends found at the individual level in the public at large (Heaven and Bucci 2001; Ekehammar et al. 2004; Perry and Sibley 2012), which is not the case for emotional stability, which is only rarely associated with RWA and only if mediated by dangerous world beliefs (Van Hiel, Cornelis, and Roets 2007; Dallago, Mirisola, and Roccato 2012). They also score (marginally) higher on extraversion. Openness and conscientiousness do not differ significantly between autocrats and non-autocrats. These last two results are somewhat surprising, as research at the individual level shows that right-wing authoritarianism and SDO tend to correlate negatively with openness, while RWA correlates positively with conscientiousness (Heaven and Bucci 2001; Ekehammar et al. 2004; Van Hiel, Cornelis, and Roets 2007; Perry and Sibley 2012). We can only speculate as to why these two traits do not differ significantly between autocrats and non-autocrats. The fact that these two traits have been shown to be particularly important for political success in general – conscientiousness for a stronger electoral performance (Nai 2019b) and openness for a better success once in office (Rubenzer, Faschingbauer, and Ones 2000; Simonton 2006) – might indicate that they are particularly important for political leadership in general, for both autocrats and non-autocrats alike.

Candidates identified as ‘autocrats’ score significantly higher than non-autocrats on the three traits of the Dark Triad, and especially psychopathy, in line with the literature (Hodson, Hogg, and MacInnis 2009; Jones and Figueredo 2013; Lee et al. 2013). Autocrats candidates score significantly higher on the Dark Triad even when compared to non-autocrats from the right. Looking at metatraits, autocrats score particularly low on a first underlying dimension of agreeableness / conscientiousness/emotional stability – what DeYoung (2006) calls ‘stability’ and Digman (1997) calls factor ‘alpha’.

The profile of autocrats is not homogeneous in itself. Comparing all autocrats in our dataset (N = 14) we highlighted several deviations from the average autocrat profile. One candidate, Donald Trump, seems to consistently diverge even from the baseline of autocrats’ average profile: lower agreeableness, conscientiousness and emotional stability, and higher extraversion, narcissism, psychopathy and Machiavellianism. Other studies have discussed the ‘off the charts’ profile of the current US president (Visser, Book, and Volk 2017; Nai and Maier 2018; Nai, Martinez i Coma, and Maier 2018), which suggest in itself that idiosyncrasies are to be expected when assessing the profile of political leaders in contexts as different as the ones studied here. Nonetheless, even beyond these contrasts, the average profile of autocrats differs consistently – and often substantially – from the profile of non-autocrats. It is important to note that these differences in profile were assessed independently of the classification of the political figures as ‘autocrats’. Experts were only asked to rate the personality profile of selected figures, which we subsequently and independently classified as autocrats (or not) because they are often and consensually described as such by political and media observers – as shown in the few selected examples presented.

Limitations

The results presented here face some limitations. From a methodological standpoint, the use of short measures for the Big Five and Dark Triad is not ideal, as these measures tend to sacrifice validity for reliability (Credé et al. 2012; Spain, Harms, and LeBreton 2014; Bakker
and Lelkes 2018). Our results show that strongmen score very high on the three dark traits, which could come from the fact that short measures of the Dark Triad are suboptimal to disentangle the differences between the three traits (Spain, Harms, and LeBreton 2014). Yet, as discussed above, even if theoretically imprecise, these measures are nonetheless able to capture the broad personality profile of political figures. The use of experts to map the personality profile of political figures also does not come without caveats, and some have questioned the ideological objectivity of experts (Curini 2010; Wright and Tomlinson 2018). Yet, as we discuss elsewhere, the extent of ideological biases in expert ratings should not be overestimated (Nai and Maier 2019). From an empirical standpoint, finally, the results presented here are potentially circumscribed to the subsample of authoritarian figures investigated. Future iterations of the dataset will include additional autocrats like, e.g., Andrzej Sebastian Duda in Poland. At that stage, additional tests will be required to assess whether the trends presented here can be replicated. We do not see any theoretical or empirical reason why this should not be the case.

Implications and further research

If we believe the rather alarmist assessment shared by many, authoritarians and autocrats have a strong momentum worldwide and can be expected to increase their grasp on executive and legislative powers. Given the increasing evidence that the personality of candidates matters for their electoral success and accomplishments in office (Bittner 2011; Lilienfeld et al. 2012; Watts et al. 2013; Costa Lobo 2018; Joly, Soroka, and Loewen 2018; Nai 2019b), assessing systematically whether leaders with autocratic tendencies have a specific personality profile could help explain their (real or feared) momentum in elections worldwide and, more broadly, contribute to a better understanding to contemporary trends of democratic deconsolidation (Levitsky and Way 2002; Diamond 2015; Foa and Mounk 2017; Mechkova, Lührmann, and Lindberg 2017; Levitsky and Ziblatt 2018).

The profile emerging from our analyses seems to triangulate with what is known about the electoral success of personality profiles: our results suggest that autocrats differ especially on agreeableness and psychopathy from non-autocrats (respectively, with lower and higher average scores), and those two traits are the ones that have been suggested as potentially relevant to explain the electoral success of candidates (Joly, Soroka, and Loewen 2018; Nai 2019b; Scott and Medeiros 2020). Are autocrats especially benefitting from high psychopathy and low agreeableness, more so than other non-autocrats? And, perhaps even more importantly, to what extent do voters perceive the personality traits of candidates independently from their own preferences? On this matter, the jury is still out. On the one hand, several studies show that voters tend to prefer candidates with personalities that ‘match’ their own (Caprara et al. 2003; Caprara and Zimbardo 2004; Caprara et al. 2007; but see Klingler, Hollibaugh, and Ramey 2018). On the other hand, recent research suggests that specific individual traits drive preferences for specific candidates – for instance, individuals scoring low on agreeableness tend to prefer populist candidates (e.g. Bakker, Rooduijn, and Schumacher 2016); the fact that populists themselves also score low on agreeableness (Nai and Martínez i Coma 2019) is perhaps a way to reconcile the two strands of research. Further research should investigate whether the ideological profile of candidates interacts with their personality profile, and ideally include the profile of candidates within broader models of voting choices, where the decision to vote for a
given candidate is a function of individual differences in both the voter and the candidate, and the interactions between these differences. Research on the differential roles of similarity, normativeness and distinctiveness when comparing political profiles (e.g. Furr 2008) – in our case the profile of voters and the one of elites – could be a promising avenue for future research.

Notes

16. It is important to note that personality traits appearing on opposing ends on the spider-graphs (e.g., Extraversion and Openness) are not polar opposites; the radial visualization is simply chosen for aesthetic purposes and does not reflect logical or empirical polarizations between opposite traits along the axes; scores on all eight traits exist independently of the scores on other traits.

17. To compute the effect size (Cohen’s d) for independent samples t-tests we used the following approximation: \( \frac{2 \times t}{\sqrt{df}} \). Post-hoc (achieved) power analysis conducted with G*Power on the significant t-tests show a power varying between 28% (extraversion) and 77% (psychopathy). All power analyses results are in Appendix C.

18. A Correspondence Analysis (CA) yields very similar results.

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References


