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Milieu effects on the Dark Triad traits and their sex differences in 49 countries

Abstract

Robust mean-level estimates ($N > 11k$) from 49 countries for the Dark Triad traits (i.e., narcissism, psychopathy, and Machiavellianism), and sex differences therein, were recently published and linked to several country-level or milieu features from when the data was collected (Jonason et al., 2020). Here we paired those data with several milieu indicators (e.g., life expectancy, homicide rates) from three timepoints (and change between them) where the average participant ($\approx 22yo$) would have been a child ($\approx 6yo$), an adolescent ($\approx 11yo$), and a teenager ($\approx 16yo$). Variance in narcissism was far more sensitive to variance in milieu conditions in general and across all three time points than Machiavellianism or psychopathy. The milieu conditions differentiated the traits somewhat with income and education revealing negative correlations with narcissism, positive correlations with Machiavellianism, and null correlations for psychopathy. Sex differences in Machiavellianism and narcissism were correlated with homicide rates across the three timepoints. We found erratic evidence that changes in milieu conditions in ones' past predicted the traits, but larger sex differences in the traits were associated with decreased life expectancies and homicide rates between

childhood and adolescence, suggested as conditions get better sex differences get larger as evolutionary models predict.

Keywords: Narcissism; Psychopathy; Machiavellianism; Dark Triad; Cross-cultural; Sex Differences

There is considerable evidence that people's personality traits are influenced by formative experiences in their childhood (Brummelman et al., 2018; Kolla et al., 2013; Nguyen & Shaw, 2020). For example, the diathesis-stress model, suggests that socialization experiences activate latent dispositional biases in later childhood and adulthood (Thomaes et al., 2018). Alternatively, evolutionary-developmental psychologists suggest that personality traits may be optimized to solve age-relevant adaptive problems (Bjorklund, 2020) and they are sensitive to childhood conditions like disrupted attachment processes (Brewer et al., 2018; Nickisch et al., 2020; Patch & Figueredo, 2017). However, this research tends to focus on the experiences people have over their development at the local level like within their family or at their school (Dragioti et al., 2012; Moreira et al., 2020; Thomaes et al., 2013), relies on retrospective self-reports of those experiences (Horton et al., 2006; Vignoles & Otway, 2006), and is general based on data from one or a few countries (Craparo et al., 2013; Zajenkowska et al., 2014). Individual-level and local approaches may be limited in that (1) they fail to capture the role larger patterns in society have in personality development and (2) self-reports about childhood experiences may be influenced by various errors. As a potential alternative, we suggest researchers might investigate what we will call milieu¹ effects or the examination of country-level, contextual differences (Jonason et al., 2020; Schmitt et al., 2017).

To understand the role of milieu effects on personality development, we focus on the Dark Triad traits (Furnham et al., 2013) of psychopathy (e.g., callous social attitudes and impulsivity; Kavanagh et al., 2013), Machiavellianism (e.g., cynicism and strategic thinking; Jones, 2016), and narcissism (e.g., a sense of entitlement and exhibitionism; Sedikides, 2021). The role of problematic, harsh, competitive, or impoverished conditions in the

¹ Merriam-Webster dictionary defines this as "the physical or social setting in which something occurs or develops" (<https://www.merriam-webster.com/dictionary/milieu>).

development of these traits is rather clear (Thomaes et al., 2013, 2018; Zajenkowski et al., 2021) but if traits like these are calibrated on lived experiences (Chang et al., 2019; Crawford & Anderson, 1989; Jonason et al., 2016), those experiences someone lives in—their milieu—may be related to the development of different traits. The milieu they live in provides information about patterns in the world, even though they may be somewhat distal from the individual, and most theories on personality development contend that individuals take in information from the world over development to calibrate their approach to life as seen in their personality. Nevertheless, some evidence (Jonason et al., 2020) suggests that narcissism (mostly), Machiavellianism (less so), and psychopathy (negligibly) are sensitive to milieu effects (e.g., mortality rates from 49 countries), but these predictors were from the same year as the collected data. To understand developmental processes, it might be necessary to examine similar milieu indicators in participant's past. In this study, we examine how country levels of the Dark Triad traits in adulthood (i.e., 20+; Chopik & Grimm, 2019) might be predicted by a range of indicators that described the milieu people may have been living in when they were children, adolescents, and teenagers.

To understand country-level patterns in the Dark Triad traits, we, first, focused on measures of harshness and measures of Westernization. Narcissism and psychopathy may be related to a competitive approach to life (Żemojtel-Piotrowska et al., 2020) which may be informed by difficult or harsh childhood conditions (Hoeve et al., 2009). Having learned that life is harsh, being characterized by narcissism and psychopathy may be reasonable responses to living in such conditions (Poraj-Weder, 2014); a hypothesis consistent with the diathesis-stress model of personality (Thomaes et al., 2013, 2018). In contrast, Machiavellianism is not collinear with the others (but see, Miller et al., 2017; Vize et al., 2018) with psychopathy in all matters. Instead, it may be more about tactical maneuvering to consolidate power and build alliances (Jones, 2016). As such, Machiavellianism may be accentuated in more

modernized, safe, and stable places (Jonason et al., 2020), including those farther from the equator (Jonason & Schmitt, 2017) where there is more gender equality and civil rights (Van de Vliert & Van Lange, 2019).

Second, we want to understand how sex differences at the country-level may be sensitive to local contingencies in milieu. There is substantial evidence for sex differences in personality (Del Giudice, 2009, 2013), including the Dark Triad traits (Jonason et al., 2019, 2020; Neumann et al., 2012). Sex differences in these traits (and others) may be the result of learning mechanisms (Eagly & Wood, 1999) or ancestral patterns in costs and benefits for engaging one approach to life or another (Buss, 2009). Typically, researchers cannot disentangle these predictions but the use of cross-cultural data has some promise for doing so. Constructivist/feminist models of sex differences in personality suggest that as societies become safer and more “modern” sex differences should get smaller whereas evolutionary models suggest that as society’s hold on people’s behaviors and attitudes (and therefore personality) lessens, people will be freed up to better maximize their preferences, thereby creating larger sex differences. To date, evidence is more consistent with the latter approach (Giolla & Kajonius, 2019; Jonason et al., 2019, 2020; Neumann et al., 2012; Schmitt et al., 2017), but these studies focused on present, not past, milieu effects. Therefore, we replicate and extend work showing that in countries with larger sex differences will be less “Westernized” (e.g., gender equality) and safe (e.g., homicide rates) places.

While people’s direct experiences may play a role in the development of personality, we contend that the conditions in which they find themselves simply living in serve to provide important information to help people calibrate their personality to best navigate the world they are living in. We examine the milieu that people developed in at three timepoints in the past and use them to (1) predict current rates of the Dark Triad traits and (2) the magnitude of sex differences in young adulthood. Although strictly not developmental

psychology in the traditional sense which focuses on individual-level conditions, our study uses theoretically selected time periods to hint at the role of milieu effects to predict scores on the traits and their sex differences.

Method

The research is based on summary data reported previously (Jonason et al., 2020), which included 11,723 participants (66% women, 34% men; $Mean_{Age} = 21.53$; $SD_{Age} = 3.17$) from 49 countries. We used the means and sex differences (i.e., Cohen's d) for the Dark Triad traits in each country as data derived from the Dirty Dozen (Jonason & Webster, 2010) measure of the Dark Triad traits which were translated and back translated in sites where the measure had not already been officially translated (e.g., Poland, Germany).² Participants indicated their agreement (1 = *not at all*, 5 = *very much*) to the 12 items such as “I tend to lack remorse,” (i.e., psychopathy), “I tend to want others to admire me” (i.e., narcissism), and “I have used deceit or lied to get my way” (i.e., Machiavellianism), which were internally consistent (Cronbach's $\alpha = .75_P$; $\alpha = .85_N$; $\alpha = .84_M$) and had metric (and partial scalar) measurement invariance within and between W.E.I.R.D. and non-W.E.I.R.D. world regions, metric invariance across countries, scalar invariance for by-sex comparisons, and congruence between the individual and group levels (Jonason et al., 2020; Rogoza et al., 2021).

In building our dataset, we paired these country-level details about the Dark Triad traits with several country-level factors from when the average participant would have been a child (≈ 6), an adolescent (≈ 11), and a teenager (≈ 16) and differences between these time points as measures of cultural change.³ We

² The present study was not pre-registered, but the data used are available on the Open Science Framework (https://osf.io/5kwn4/?view_only=faaddf1346264a8088ff28e2b59f70cb).

³ We adopted this approach because multilevel modeling, as used previously in this topic (Johnson, 2020), did not yield any insight. This may be due to limited power. We calculated changes from one year to another by

collected several country-level variables from the Official United Nation Development Report Data Center.⁴ First, we used the *Income Index* (2001, 2006, 2011) which is the GNI (gross national index) per capita (2017 PPP International \$, using a natural logarithm) expressed as an index with a minimum value of US\$100 and a maximum value US\$75,000. Second, we implemented the *Unemployment Index* (2000, 2005, 2010), which represents the percentage of the labor force population (ages 15+) not in paid employment or self-employed but who are available for work and have taken steps to seek employment. Third, we employed the *Coefficient of Human Inequality* (2010, 2016),⁵ which is the average inequality in three basic dimensions of human development (i.e., life expectancy, inequality in education, inequality in income), and calculated as an arithmetic mean of the values. Fourth, we used the *Education Index* (2001, 2006, 2011), defined as the mean years of schooling (of adults) and expected years of schooling (of children), both expressed as an index obtained by scaling with the corresponding maxima. Fifth and final, we used the *Life Expectancy Index* (2001, 2006, 2011), which is the life expectancy at birth expressed as an index with a minimum value of 20 years and a maximum value of 85 years; and the *Homicide Rate* (2000, 2005, 2010) which is the number of unlawful deaths inflicted upon a person with the intent to cause death or serious injury, expressed per 100,000 people. And sixth, we used the *Coefficient of Economic Freedom* (2001, 2006, 2011) from the Heritage Foundation official website,⁶ which is based on 12 quantitative and qualitative factors, grouped into four categories: Rule of Law (i.e., property rights, government integrity, judicial effectiveness), Government Size (i.e., government spending, tax burden, fiscal health), Regulatory Efficiency (i.e., business freedom, labor freedom, monetary freedom), and Open

extracting the value of an indicator from an earlier year from the value of a later year (e.g., Income Index change 2001->2006 = Income Index 2006 - Income Index 2001).

⁴ <http://hdr.undp.org/en/>

⁵ In this case, 2010 and 2016 were used because the previous years were unavailable.

⁶ <https://www.heritage.org/index/>

Markets (i.e., trade freedom, investment freedom, financial freedom). Each of the 12 economic freedoms within these categories is graded on a scale of 0 to 100. A country's overall score is derived by averaging these 12 equally-weighted economic freedoms.

Results

In Table 1, we report the correlations for the mean rates of the Dark Triad traits in young adulthood. Narcissism was the most sensitive to variance in milieu quality (e.g., lower life expectancies and income across all three timepoints), followed by Machiavellianism (e.g., more education across all three timepoints, less inequality across two timepoints), and psychopathy had no links. Collectively, changes in these conditions were erratically linked to mean-level rates of the Dark Triad traits (Table 2).

Next, in Table 3 we present the correlations between the magnitudes of sex differences in the traits and the same milieu conditions. More unemployment at childhood predicted more narcissism in young adulthood whereas more unemployment in one's teens predicted more adult Machiavellianism and psychopathy. More homicides across all three timepoints predicted adult rates of narcissism and Machiavellianism. And last, (Table 4) it appears that as conditions improve in terms of life expectancies and homicide rates between childhood and adolescence lead to larger sex differences in all three of the traits.

Discussion

One would be hard-pressed to find anyone who disagrees with the idea that childhood conditions are critical in understanding adult behavior. However, much of this work is limited by a reliance on retrospective reports of one's childhood, a reluctance or omission to examine sex differences, and a focus on local, interpersonal indicators of conditions in childhood both in data and in theoretical models. In contrast, we consider the role of distal features of one's country to test how milieu effects over people's childhoods might predict the Dark Triad traits and sex differences therein. We assembled a database that included descriptive data on

the means of the Dark Triad traits from prior research (Jonason et al., 2020) in 49 countries along with sex differences (Cohen's d) and paired them with country-level data from online databases that detail the dangerousness, health, economic, equality, and education ratings of each country. We will consider in detail four general trends.

First, variance in narcissism and psychopathy at the country-level were sensitive to indicators of milieu harshness like mortality, income, homicide, and education (especially for narcissism) across time periods. Psychodynamic (Dragioti et al., 2012) and life history (Figueredo et al., 2006) interpretations suggest this may mean these traits are a kind of coping response, protecting one's ego in the first place and enabling local calibration to solve mating and survival challenges in the second. In fact, such an effect has been immortalized in the 1985 song by Billy Ocean: *When the going gets tough, the tough get going*.

Second, we revealed that Machiavellianism might not only be distinct from the other two traits (Jones, 2016; Miller et al., 2017; Vize et al., 2018) in how it responds to childhood conditions, but it might also be specific to modernized societies. For example, a more stable country with less mortality and more income, economic freedom, and education may produce Machiavellian populations in adulthood. Modern societies are uniquely stable and safe, which serve as inputs. In such societies where there is long-term stability, formal power structures, and a numerous population, adopting Machiavellian ways of navigating the social and professional world are likely to lead to more favorable outcomes. Imagine a large university: A Machiavellian employee—building alliances, maneuvering for power—is likely to be far more successful than the impulsive psychopath or grandiose narcissist who may engage in bullying, sexual harassment, and data fraud.

Third, we focused on what accounts for variance in sex differences in various countries. We found limited indications that sex differences were sensitive to macro-level predictors over the course of people's lives. The most compelling piece of evidence is that

greater rates of homicide predict larger sex differences in the Dark Triad. This was especially pronounced in the childhood years, an effect that was unsurprisingly coupled with life expectancy rates. Harsher childhood conditions, then, appear to amplify sex differences at the country level. Given the secondary nature of our data, we cannot assert that women fell (becoming more communal) or men rose (becoming more agentic) in their rates of the Dark Triad traits in response to existential threats, but both are reasonable (Jonason et al., 2019).

And last, sex differences in all three traits were sensitive to unemployment rates, albeit in distinct timepoints: sex differences in narcissism were sensitive to childhood and preteen unemployment, but sex differences in the other two traits were sensitive to teenage unemployment rates. This pattern is consistent with the diathesis model of narcissism in that narcissism is expected to emerge in adulthood in response to childhood conditions (Thomaes et al., 2013, 2018) and might be extended to the other traits as well. Perhaps psychopathy and narcissism—as “coping strategies”—are more about solving adult problems (e.g., mating, power), whereas narcissism is also about solving childhood problems (e.g., attention, safety) which is consistent with a psychodynamic interpretation of the latter trait (Dragioti et al., 2012; Moreira et al., 2020).

Limitations and Conclusions

Although we provided the first account of the relationships between mean-level of the Dark Triad traits and sex differences therein across three timepoints in people’s past relying on robust estimates of each, our study is nevertheless, limited. First, in the absence of longitudinal data (Baker & Mednick, 1984; Chopik & Grimm, 2019) we can only establish temporal precedence. Second, the Dirty Dozen measure of the Dark Triad traits, which has stable psychometric properties around the world (Rogoza et al., 2021), has its detractors (Maples et al., 2014). While other measures exist (e.g., Raskin & Terry, 1988), we were constrained by the primary data collection, which used the Dirty Dozen for efficiency and to

minimize participant fatigue. Third, our study failed to include the candidate-additions to the Dark Triad traits of sadism (Buckels et al., 2013) and spitefulness (Marcus et al., 2014), and alternative country-level factors, such as pathogen-prevalence (Schaller, 2016) and latitude (Jonason & Schmitt, 2017). And fourth, one could argue that our results suffer from Type 1 error. While we did not adjust for this, our data is fairly underpowered to start given the reliance on 49 countries in this project. As such, we felt it (1) tolerable to have more error and (2) important to report the array of effects not just the ones that were significant. We consider all these limitations as calls for subsequent research to better understand the role of milieu conditions in generating psychological effects in people's lives in larger samples with, "better" and broader measures, and different milieu factors.

Despite these limitations, we have improved on what is known about how milieu factors like homicide rates and changes in those factors across different developmental periods in people's lives are related to country-levels of the Dark Triad traits and sex differences therein. As shown previously (Jonason et al., 2020), narcissism is the most susceptible to milieu effects, apparently higher in "harsher" locations, Machiavellianism appears higher in modernized places in terms of enhanced education and income, and psychopathy seems rather insensitive to milieu variance. However, these effects appear to be rather stable across developmental periods. And last, sex differences in the traits appear to be larger in safer places (Jonason et al., 2019; Schmitt et al., 2017) which is more consistent with evolutionary models than sociocultural ones regarding sex differences. Our study is a leap forward in understanding the etiology of the Dark Triad traits as they are situated within broader social contexts.

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TABLES

Table 1

Correlations Between Mean Rates for Each Trait in Relation to Milieu Conditions

	Narcissism	Machiavellianism	Psychopathy
Unemployment Index 2000	-.12	-.12	-.12
Unemployment Index 2005	-.19	-.26	-.23
Unemployment Index 2010	-.14	-.15	-.17
Life Expectancy Index 2001	-.42**	.12	-.03
Life Expectancy Index 2006	-.42**	.12	-.03
Life Expectancy Index 2011	-.43**	.12	-.04
Income Index 2001	-.50**	.28	-.13
Income Index 2006	-.47**	.33*	-.12
Income Index 2011	-.47**	.30*	-.14
Homicide Rate 2000	-.06	<.01	-.06
Homicide Rate 2005	-.12	<.01	-.07
Homicide Rate 2010	-.12	.01	-.04
Education Index 2001	-.39**	.40**	-.18
Education Index 2006	-.38**	.40**	-.10
Education Index 2011	-.39**	.37**	-.11
Coefficient of Economic Freedom 2001	-.32*	.16	-.12

Coefficient of Economic Freedom 2006	-.39**	.30*	-.04
Coefficient of Economic Freedom 2011	-.39**	.23	-.11
Coefficient of Human Inequality 2010	.26	-.39*	<.01
Coefficient of Human Inequality 2016	.29	-.31*	.06

* $p < .05$, ** $p < .01$

Table 2*Correlations Between Mean Rates for Each Trait and Changes in Milieu Conditions*

	Narcissism	Machiavellianism	Psychopathy
Unemployment Index change 2000->2005	-.12	-.23	-.19
Unemployment Index change 2005->2010	.14	.26	.16
Life Expectancy Index change 2001->2006	<.01	<.01	.01
Life Expectancy Index change 2006->2011	.18	-.13	-.05
Income Index change 2001->2006	.28	.25	.11
Income Index change 2006->2011	.23	-.37*	-.11
Homicide Rate change 2000->2005	-.03	-.14	-.04
Homicide Rate change 2005->2010	.01	-.02	.08
Education Index change 2001->2006	.39**	.06	.17
Education Index change 2006->2011	.02	-.30*	-.04
Coefficient of Economic Freedom change 2001->2006	-.09	.25	.19
Coefficient of Economic Freedom change 2006->2011	.02	-.19	-.17
Coefficient of Human Inequality change 2010->2016	.07	.26	.15

* $p < .05$, ** $p < .01$

Table 3*Correlations for Country-Level Sex Differences in Relation to Milieu Conditions*

	Narcissism	Machiavellianism	Psychopathy
Unemployment Index 2000	.31*	.22	.20
Unemployment Index 2005	.32*	.27	.25
Unemployment Index 2010	.23	.32*	.31*
Life Expectancy Index 2001	-.07	-.12	.05
Life Expectancy Index 2006	-.12	-.16	-.02
Life Expectancy Index 2011	-.10	-.15	.02
Income Index 2001	.16	.14	.22
Income Index 2006	.14	.15	.25
Income Index 2011	.13	.13	.23
Homicide Rate 2000	.47**	.41**	.25
Homicide Rate 2005	.47**	.38*	.25
Homicide Rate 2010	.47**	.32*	.25
Education Index 2001	.13	.14	.21
Education Index 2006	.13	.16	.23
Education Index 2011	.11	.14	.23
Coefficient of Economic Freedom 2001	.03	.07	.20
Coefficient of Economic Freedom 2006	.04	.06	.26
Coefficient of Economic Freedom 2011	-.03	.02	.20
Coefficient of Human Inequality 2010	.00	-.05	-.22
Coefficient of Human Inequality 2016	.05	-.06	-.16

* $p < .05$, ** $p < .01$

Table 4

Correlations for Country-Level Sex Differences in Relation to Changes in Milieu Conditions

	Narcissism	Machiavellianism	Psychopathy
Unemployment Index change 2000->2005	.01	.08	.07
Unemployment Index change 2005->2010	-.21	.04	.08
Life Expectancy Index change 2001->2006	-.50**	-.45**	-.38**
Life Expectancy Index change 2006->2011	.21	.19	.03
Income Index change 2001->2006	-.18	.02	.13
Income Index change 2006->2011	-.17	-.22	-.30*
Homicide Rate change 2000->2005	-.49**	-.46**	-.43**
Homicide Rate change 2005->2010	-.10	-.24	-.03
Education Index change 2001->2006	-.14	.15	-.07
Education Index change 2006->2011	-.15	-.17	-.04
Coefficient of Economic Freedom change 2001->2006	.02	-.02	.09
Coefficient of Economic Freedom change 2006->2011	-.17	-.11	-.16
Coefficient of Human Inequality change 2010->2016	.11	-.04	.09

* $p < .05$, ** $p < .01$