Nomological network of two-dimensional Machiavellianism☆

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ABSTRACT

Machiavellianism captures one's cynical view of humanity and willingness to use immoral means to achieve one's goals. Although Machiavellianism consists of views and tactics dimensions, a unitary approach dominates our understanding of this construct. Therefore, we aimed to further substantiate its dimensionality and elucidate each dimension's unique characteristics. An international collaboration ($k = 15$, $N = 17,004$; 57.39% male; aged 11–85, $M = 26.97$) contributed datasets from Korea, Hungary, Canada, USA, and Australia. We tested a no-mological network comprising associations of Machiavellianism's dimensions with demographic variables and four conceptual domains: development (trauma, family functioning, world-view), personality (Big Five, HEXACO, narcissism, psychopathy), emotionality (emotional intelligence, regulation), and behavior (self-report, game scenarios). Meta-analytic confirmatory factor analysis supported the two-dimensional structure. Men were higher on views and tactics than women, and age did not influence Machiavellianism overall. Mean Machiavellianism varied across national cultures differently for views and tactics. Both dimensions related to adverse developmental experiences and negatively to agreeableness and honesty-humility. The views dimension related to emotionality negatively, and higher distrust and delinquency, whereas the tactics dimension related to aspects of psychopathy, and lower conscientiousness and empathy. Overall, we provide essential theoretical advancements and the foundation for future research into Machiavellianism.

1. Introduction

Writing on the nature of prudence and modernity, Niccolo Machiavelli is (in)famous for callous and pragmatic leadership advice and repudiating traditional morality as naïve. His treatise, *The Prince* (Machiavelli, 1532/1935), argues that "one should wish to be both, but, … it is much safer to be feared than loved" (p. 134), and that "a prince, so long as he keeps his subjects united and loyal, ought not to mind the reproach of cruelty" (p. 133). His work on the nature of power continues to influence political thought, being both embraced and condemned (see Soll, 2014). On a continuum throughout society, individuals vary in their agreement with his ideology - their level of Machiavellianism. Machiavellianism (Christie & Geis, 1970) captures one's cynicism of humanity and willingness to embrace immoral behaviors to achieve a goal one deems worthwhile.

Machiavellianism provides important insight into a wide range of domains, such as positive and negative cooperation (Wilson, Near, & Miller, 1998, 1996), deception and lying (Geis & Moon, 1981), empathy

and emotional intelligence (Austin, Farrelly, Black, & Moore, 2007; Pilch, 2008), leadership and organizational performance (Zettler & Solga, 2013), and psychopathology (Monaghan, Bizumic, & Sellbom, 2016). Machiavellianism has been adopted into the dark triad of personality (Paulhus & Williams, 2002) which is rapidly gaining popularity (as well as criticism; e.g., Glenn & Sellbom, 2015). Research, ergo our understanding, is currently founded upon a singular dimension, simply ranging from low to high.

Departing from the legacy of this approach, strong evidence demonstrates that Machiavellianism is two-dimensional. Confusion around the construct's dimensionality is not surprising given the original factor structure was a *post-hoc* hypothesis and subsequent factor analyses were largely troublesome. Christie and Geis (1970) developed the Mach-IV (the primary measure of Machiavellianism) through the deductive method, conceptualizing an underlying approach to maintaining power inherent within the writings of Machiavelli. They assumed that there are three main facets of Machiavellianism: tactics, views, and morality. The final items, however, were chosen because

they best discriminated high from low scoring respondents on a singular Machiavellianism dimension.

In a review of independent factor analyses of the Mach-IV, Fehr, Samsom, and Paulhus (1992) argued that only the views and tactics dimensions emerge consistently when accounting for labelling and method factors. Their subsequent (Paulhus, 1982; as cited in Fehr et al., 1992) and independent (e.g., Andrew, Cooke, & Muncer, 2008; Calvete & Corral, 2000) factor analyses supported this conjecture. The views dimension captures a negative view of human nature, that is, the beliefs that humanity is untrustworthy and selfish. The tactics dimension captures the justification of immoral behavior to achieve a goal. Machiavellianism exists as the higher-order aggregate of these two dimensions.

Recently, Monaghan et al. (2016) derived a psychometrically stronger two-factor scale from the Mach-IV (ten-item Two-Dimensional Mach-IV; TDM-IV). Item and factor analyses investigated the Mach-IV's original three-factor structure, determining that the morality subscale was not viable, and that 10-items captured and distinguished the views and tactics dimensions. The TDM-IV had an invariant factor structure over two samples and over a three-month test-retest analysis. The TDM-IV provides the opportunity to make important theoretical advancements by elucidating the nature of Machiavellian views and tactics.

1.1. Nomological network: key domains for investigation

The pattern of relationships between two-dimensional Machiavellianism and key theoretical constructs explicates its construct validity, and provides insight into its nomological network (Cronbach & Meehl, 1955; Smith, 2005). Identifying robust associations within the network requires replication and meta-analysis across samples and measures. Although this process is the cornerstone of robust scientific investigation, it has been relatively neglected, and even troublesome, in modern psychological research (Cumming, 2012; Open Science Collaboration, 2015; Wagenmakers, Wetzels, Borsboom, & Van Der Maas, 2011).

Our development of a nomological network will consist of several sequential steps. First, replication and invariance modelling across cultures, genders, and languages provides evidence that the two-factor structure is robust, a cardinal attribute given the Mach-IV's structure is notoriously difficult to replicate (e.g., Kuo & Marsella, 1977; Martinez, 1980). Then, the nature of each dimension is explicated through their relationship with key demographic factors (i.e., gender, age, and culture), and associations within conceptually important domains: development, emotionality, broader personality, and behavioral domains.

Developing hypotheses about the nomological network requires augmenting the limited information on each dimension with unidimensional research. Studies have identified unique effects of each dimension on political ideology (Gold, Friedman, & Christie, 1971), borderline personality organization (Láng, 2015a), reward sensitivity (Birkás, Csathó, Gács, & Bereczkei, 2015), development (Láng & Lénárd, 2015), empathy, and emotional intelligence (Andrew et al., 2008). Monaghan et al. (2016) demonstrated that the views dimension associated positively with all domains of psychopathology, whereas the tactics dimension associated positively with externalizing and impulsivity domains, and weakly with depression domains. Extrapolating from these findings and the construct definitions, the views dimension likely associates with dysregulated emotionality, negative world-views, and distrust; whereas the tactics dimension likely associates with impulsivity, callousness, and empathy (negatively).

Research into demographic influences suggests higher levels of Machiavellianism among men than women (e.g., Austin et al., 2007; Brewer, Abell, & Lyons, 2013; Jones & Paulhus, 2009). Despite the Mach-IV being used in a variety of cultures (e.g., Calvete & Corral, 2000; Kuo & Marsella, 1977), few studies have investigated cultural variations in Machiavellianism. Starr (1975) found higher levels of Machiavellianism in Arabic, when compared to American, women. It, however, appears that variations in factor structures between cultures

hinders this research (Kuo & Marsella, 1977). Age's influence on Machiavellianism remains unclear, as researchers argue that Machiavellianism increases (Sutton & Keogh, 2001; Vitell, Lumpkin, & Rawwas, 1991), decreases (Barlett & Barlett, 2015; Mudrack, 1989; Rawwas & Singhapakdi, 1998), and has no relationship with age. Sutton and Keogh (2001) found that only Machiavellian views (dubbed "lack of faith in human nature"), and not Machiavellianism overall, increased with age.

Machiavellianism's development appears to be largely influenced by the environment, with only modest genetic inheritance (Vernon, Villani, Vickers, & Harris, 2008; Veselka, Schermer, & Vernon, 2011). Machiavellian views and tactics are likely learnt socially and reinforced through direct modelling of attachment figures (Kraut & Price, 1976) in combination with traumatic, harsh, and neglectful environments (e.g., Láng & Birkás, 2014; Láng & Lénárd, 2015; McIlwain, 2011). Substantial evidence supports lower empathy, theory of mind, and emotional intelligence among those higher on Machiavellianism (Ali, Amorim, & Chamorro-Premuzic, 2009; Austin et al., 2007), and differentially between the views and tactics dimensions (Andrew et al., 2008).

The Five-Factor Model (FFM) is the most widely endorsed model of broad personality, and along with its six-factor variation (HEXACO; Lee & Ashton, 2012) conceptualizes individual variation in behavior as the product of relatively stable, universal, and biologically based traits (DeYoung et al., 2010; McCrae et al., 2000; McCrae & Costa, 1997). Machiavellianism associates strongly - almost axiomatically - with lower levels of agreeableness and honesty-humility because these traits represent core features of the dark triad traits (Book, Visser, & Volk, 2015). Although the views dimension's fearful and distrusting worldview may account for associations between Machiavellianism and neuroticism, the tactics dimension's relationship to higher-order antagonism may explain negative associations with conscientiousness (Furnham, Richards, Rangel, & Jones, 2014; Jones & Paulhus, 2009; Vernon et al., 2008). However, the negative associations with conscientiousness and emotional stability are inconsistent with the Machiavellian archetype of being cold and calculated.

Finally, Machiavellianism consistently associates with interpersonal manipulation within behavioral experiments, because the Mach-IV was developed using this criterion (Christie & Geis, 1970). Individuals higher in Machiavellianism engage in both positive (prosocial) and negative (manipulation) cooperation, breaking expectations of reciprocity when beneficial (Christie & Geis, 1970; Gunnthorsdottir, McCabe, & Smith, 2002; Sakalaki, Richardson, & Thepaut, 2007). It is likely that the views dimension is responsible for distrusting collaborators, whereas the tactics dimension relates to actively manipulating others for personal gain. Nevertheless, current literature in this area is largely founded upon the assumption that Machiavellianism is unidimensional.

1.2. The current study

We utilized existing data through an international collaboration to enrich our understanding of two-dimensional Machiavellianism. We first aimed to identify a robust factor structure as the base for the network. Based on previous analyses (Monaghan et al., 2016), we hypothesized that all structural analyses would support the two-dimensional factor structure of the TDM-IV (Hypothesis 1). We then aimed to establish a nomological network comprising demographics, developmental, personality, emotional, and behavioral domains. Given limited multidimensional studies, construct definitions and unidimensional research largely guided hypotheses. We made no hypotheses regarding cultural differences.

We hypothesized that men would have higher levels of Machiavellian views and tactics than women given robust associations in the literature (Jones & Paulhus, 2009) (Hypothesis 2). Next, we expected that analyses would fail to reject a null effect of age on any

aspect of Machiavellianism, because the direction of effect in the literature varies (Mudrack, 1989; Vitell et al., 1991) (Hypothesis 3). The research reviewed demonstrates Machiavellianism relates to poor early life experiences (e.g., Láng & Birkás, 2014; McIlwain, 2011). We hypothesized that this would be primarily the case for the views dimension rather than the tactics dimension because the views dimension captures a cynical and untrusting beliefs about others (Hypothesis 4). Further, Machiavellianism associates with a lower capacity to manage negative emotions and with lower emotional intelligence and self-esteem (e.g., Ali et al., 2009). We expected this association would also be primarily due to Machiavellian views, given associations in the literature between the views dimension and internalizing psychopathology (Monaghan et al., 2016) (Hypothesis 5).

We had several sub-hypotheses for the relationship of Machiavellianism with personality traits. First, we hypothesized that Machiavellianism would associate negatively with honesty-humility (Hypothesis 6a) and agreeableness (Furnham et al., 2014) (Hypothesis 6b). We further expected that neuroticism would relate to views positively because views associates with internalizing psychopathology (Hypothesis 6c), and that tactics would relate negatively to conscientiousness given tactics associates with impulsivity (Monaghan et al., 2016) (Hypothesis 6d). In relation to dark triad variables, we hypothesized that psychopathy would more closely align with the tactics dimension (Hypothesis 6e), and vulnerable aspects of narcissism would align with Machiavellian views (Hypothesis 6f) given associations with impulsivity/externalizing psychopathology and with internalizing psychopathology, respectively.

In behavioral experiments, we hypothesized that the views dimension would facilitate distrust given its basis in misanthropy (Monaghan et al., 2016) (Hypothesis 7a). On the other hand, the tactics dimension - endorsing goal-directed duplicity/exploitation when beneficial (Christie & Geis, 1970) - would associate with engaging in the dominant behavioral strategy, reward sensitivity, and punishment insensitivity (Birkás et al., 2015) (Hypothesis 7b).

2. Method

2.1. Participants

The cumulative dataset consisted of 17,004 (57.39% male) participants aged between 11 and 85 with a mean age of 26.97 ($SD = 11.28$). Samples consisted of adolescents ($N = 135$), correctional inmates ($N = 472$), general public ($N = 12,023$), and students ($N = 4374$) from Korea, Hungary, Canada, USA, and Australia. (Table 1 contains detailed participant information.)

2.2. Procedure

In 2015, we requested data from researchers via email ($N = 40$) who recently published papers using the Mach-IV in our key conceptual domains. We attempted to contact selected researchers over the course of one year, by repeatedly emailing the primary author, and then the secondary author when the primary author did not reply (38% response rate). The data collection period was established a priori, and no additional data were collected outside this set period. All data collected within this period are reported in this article. We acquired one public-domain dataset (Personality Testing, 2015). Of the 17 datasets collected, we excluded two datasets (Monaghan et al., 2015; Repacholi, Slaughter, Pritchard, & Gibbs, 2003) due to their small sample sizes ($N < 85$). As a result, we utilized 15 Mach-IV datasets published or sampled between 1994 and 2015, and calculated the TDM-IV in each dataset.

Although we utilized meta-analytical statistical techniques, we elucidated two-dimensional Machiavellianism using a multi-dataset and not a systematic meta-analytical approach. All analyses that we conducted on the datasets are reported in this article, and no analyses were removed from or included in this article due to their statistical significance. For example, no covariates were tested other than those reported. (We did, however, initially run factor analyses on all 15 datasets before analyzing power, see Section 3.2.1.) We conducted the analyses after collecting all datasets, and we established criteria for excluding cases and datasets prior to conducting the analyses. Including analyses based on significance inflates Type 1 error rates and convolutes the nomological network with false positives (Simmons, Nelson, & Simonsohn, 2011).

2.3. Measures

Machiavellianism was measured by the Two-Dimensional Mach-IV (TDM-IV; Monaghan et al., 2016), a 10-item derivative of the Mach-IV (Christie & Geis, 1970). The TDM-IV ($\alpha = 0.83$, $\omega_{\text{two-factor}} = 0.86$) consists of the internally consistent views ($\alpha = 0.76$) and tactics ($\alpha = 0.80$) subscales. Views ($r = 0.90$) and tactics ($r = 0.83$) subscales correlated strongly with the full scale and correlated moderately with each other ($r = 0.50$ (r, ω, and α are based on the total sample). One sample (Lau & Marsee, 2013) used item wording for children (Nachamie, 1970). Items asked participants how much they agreed with the presented statements on either 5-point or 7-point Likert scales from *disagree strongly* (1) to *agree strongly* (5/7). Example items: "Anyone who trusts anyone else is asking for trouble" (views subscale) and "Most people are basically good and kind" (tactics subscale; reverse-scored) (items are in Supplementary material A).

We extracted scales from each dataset that related to our key domains of investigation, placing them into one of four nomological network domains as outlined in Table 3.1 (developmental and emotional domains) and Table 3.2 (personality and behavior domains). (See the original papers for study designs and scale information, and Supplementary material B for descriptions of behavioral studies.)

3. Results

3.1. Data cleaning and screening

We employed a uniform cleaning and screening protocol across all datasets ($N_{\text{raw data}} = 17,600$), based on widely accepted recommendations (e.g., Tabachnick & Fidell, 2007). Several univariate outliers ($p < .001$) were recoded at 3.29 standard deviations from the mean, and we deleted cases that were considered multivariate outliers based on Mahalanobis distances ($p < .001$) and leverage (hat) values. Data were removed from participants who responded to < 90% of the TDM-IV (due to our modelling of item level data) or 80% of another scale's items. No variable had > 5% missing data and the data were considered missing completely at random (Little, 1988). Based on these findings, data were imputed using Maximum Likelihood (ML; 25 iterations; Tabachnick & Fidell, 2007).

3.2. Explication of the nomological network

3.2.1. Test of structure

Confirmatory factor analysis (CFA; ML estimation) tested Hypothesis 1 that Machiavellianism consists of two dimensions (views and tactics; based on the variance-covariance matrix). Different components of model fit were assessed through several indices. First, SRMR values should be close to 0.08 and RMSEA values close to 0.06 to represent acceptable fit (with lower values representing better fit; Hu & Bentler, 1999). Second, CFI (Bentler, 1990) and NNFI (Tucker & Lewis, 1973) values should be larger than 0.90 to indicate that the model is appropriately specified. Although a non-significant χ^2 is desirable (Barrett, 2007), it is rarely achieved in psychological research with large samples. We conducted CFA on samples ($k = 10$) with acceptable power ($\beta > 0.80$) to distinguish between our model ($df = 33$) fitting the data well (RMSEA = 0.050) and fitting poorly (RMSEA = 0.085; MacCallum, Browne, & Sugawara, 1996).

Table 1
Dataset descriptive statistics: authors, year, sample composition, and measurement.

Author/s	Year	N	% male	Mean age (SD)	Age range	Location	Sample	Mach-IV version (response categories)
Ashton, Lee, & Son	2000	569	45.87	22.01 (2.19)	19–30	Chonju, South Korea	Undergraduate students	Korean (7)
Austin, Farrelly, Black, & Moore	2007 i	340	32.35	21.52 (3.35)	17–41	Edinburgh, UK	Undergraduate students	English (5)
Austin, Farrelly, Black, & Moore	2007 ii	182	28.02	55.23 (14.61)	20–85	Edinburgh, UK	General	English (5)
Birkás, Csathó, Gács, & Bereczkei	2015	128	55.47	22.56 (3.09)	18–33	Pécs, Hungary	Under/graduate students	Hungarian (7)
Bizumic & Fung	2016	491	27.09	22.00 (6.91)	17–74	Canberra, Australia	Undergraduate students	English (7)
Gunnthorsdottir, McCabe, & Smith	2002	259	35.45	18.77 (1.97)	17–35	Arizona, USA	Undergraduate students	English (7)
Láng	2015 a	266	40.98	32.40 (5.45)	23–45	Pécs, Hungary	General	Hungarian (7)
Láng & Birkás	2014	455	36.70	17.27 (0.77)	16–19	Pécs, Hungary	Secondary school students	Hungarian (7)
Lau & Marsee	2013	135	48.89	13.59 (2.19)	11–17	New Orleans, USA	Adolescent sample	English, Kiddie (5)
Lee & Ashton	2005	158	42.41	23.89 (7.41)	18–54	Ontario and Calgary, Canada	Undergraduate students	English (5)
Personality Testing	2015	11,575	65.43	29.01 (11.60)	13–78	International	Internet	English (5)
Sellbom et al.	2012	472	100	31.13 (9.51)	18–63	Michigan, USA	Correctional inmates	English (7)
Williams	1994 a	552	30.25	19.02 (2.27)	17–43	Michigan, USA	Undergraduate students	English (5)
Williams	1994 b	867	25.95	18.49 (1.27)	17–29	Michigan, USA	Undergraduate students	English (5)
Williams	1995	555	34.05	19.08 (2.03)	17–35	Michigan, USA	Undergraduate students	English (5)

Note. The dataset from Austin et al. (2007) was divided into the undergraduate (identified in table by i) and general (identified in the table by ii) samples used in their paper. UK = United Kingdom, USA = United States of America. Personality Testing = Data obtained from www.personality.testing.org. Dataset cited as Láng and Birkás (2014) was also used in the paper Láng and Birkás (2015). Dataset cited as Láng (2015a) was also used in the Láng and Lénárd (2015). Response categories = length of the Likert scale.

We ran the same two-dimensional model on each dataset, with each item loading onto its respective factor (items are presented in Supplementary material A). We replicated the original model structure (Monaghan et al., 2016) by estimating the error covariance between items 6 and 7 because of significant modification indices likely due to similar item wording - directly addressing lying vs. honesty, whereas other items assessed motives for lying. The median, standard deviation, and range of model fit estimates suggested that the TDM-IV reliably recreated the observations in all datasets (Table 2). The two-dimensional model fitted the data significantly better than the unidimensional alternative in all datasets. In contrast, the Mach-IV's one-factor and original three-factor structure (Christie & Geis, 1970) fitted the data poorly in all datasets. (Model fit statistics for individual datasets, and model comparisons are in Supplementary material C.) We proceed to investigate Machiavellianism through the TDM-IV only, given alternative factor structures were not viable.

Two-stage meta-CFA (Cheung & Chan, 2005) investigated the structure across the datasets, weighting estimates appropriately by sample size (random-effects modelling; weighted least squares). Stage 1 compared correlation matrices between samples, suggesting the percentage of total variance explained by the between study effect (I^2) was substantial, ranging from 0.58 to 0.96 (inflated by the large sample size in the Personality Testing (2015) dataset). Stage 2 fitted the TDM-IV model to the pooled correlation matrix, suggesting the factor structure fitted the data well: $\chi^2(45, N = 17,004) = 2671.80$, CFI = 0.972, NNFI = 0.953, SRMR = 0.034, RMSEA = 0.011 [0.009, 0.014].

Multigroup CFA assessed the TDM-IV's invariance across samples. An unconstrained configural model (factor structures constrained to be equivalent) was compared to a metric invariance model (factor structure and loadings constrained) (Kline, 2011; Little, 2009). Change in model fit, ΔCFI < 0.01 (Chen, 2007; Cheung & Rensvold, 2002), suggests invariance between groups/datasets. The unconstrained configural model, $\chi^2(330) = 1366.60$, CFI = 0.976, and the constrained invariance model, $\chi^2(402) = 1841.30$, CFI = 0.967, fitted the data well. Factor structure and loadings were considered invariant across the datasets, $\Delta\chi^2(72) = 474.70$, $p < .001$, ΔCFI = 0.009. Overall, the results supported Hypothesis 1 that the TDM-IV's factor structure was robust and equivalent across samples, permitting subsequent analyses.

3.2.2. Identification of demographics

We then tested Hypotheses 2–4 concerning the relationship between Machiavellianism and gender, age, and culture. Meta-analyses used random-effects modelling to allow for unconditional inference to the wider population and account for random heterogeneity between true effect sizes (we assumed the true effects were drawn from normal distributions). Analyses were run using the Hunter-Schmitt method (Schmidt & Hunter, 2014) calculated by the "psychmeta" (Dahlke & Wiernik, 2018) and "metafor" (Viechtbauer, 2010) R packages. Under this method, we individually corrected each estimate for attenuation due to measurement error (α), which is considered artefactual variance. We then accounted for the moderating effect of Likert scale lengths (i.e., 5-point and 7-point) in all meta-analyses and accounted for gender as a moderator when analyzing age. (Forest plots are in Supplementary materials D and E. Estimates weighted only by sample size (Barebones estimates), and without excluded datasets are in Supplementary material F.)

3.2.2.1. Effect of gender[1]. We tested Hypothesis 2 that males would, on average, score higher on Machiavellianism than females using meta-analytic techniques to weight standardized mean differences appropriately by sample size and accounting for positive bias ($\hat{g}$; we will denote the population estimate as δ; Hedges, 1981). We excluded one sample (Sellbom et al., 2012) as it contained only male participants. Results suggested a significant effect for gender with all confidence intervals excluding zero: TDM-IV, δ = 0.27 [CI_{95} = 0.13, 0.40], $\hat{\tau}^2$ (residual heterogeneity) = 0.015, I^2 (heterogeneity not accounted for by sampling variance) = 51.11%, $Q(12) = 22.92$,

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[1] CFA demonstrated that the TDM-IV's factor structure fitted males, $\chi^2(33) = 874.32$, $p < .001$, CFI = 0.970, NNFI = 0.959, SRMR = 0.035, RMSEA = 0.051 [0.048, 0.054], and females, $\chi^2(33) = 776.63$, $p < .001$, CFI = 0.959, NNFI = 0.944, SRMR = 0.035, RMSEA = 0.056 [0.052, 0.059], independently. Invariance models also fitted the data at configural ($\chi^2(66) = 1651.00$, CFI = 0.965), metric ($\chi^2(74) = 1764.90$, CFI = 0.963), intercepts ($\chi^2(82) = 1865.70$, CFI = 0.961), and mean ($\chi^2(88) = 2710.30$, CFI = 0.943) levels of model constraint. Changes between models were considered invariant between configural and metric models, $\Delta\chi^2(8) = 113.92$, $p < .001$, ΔCFI = 0.002, and between metric and intercept models, $\Delta\chi^2(8) = 100.83$, $p < .001$, ΔCFI = 0.002, and as expected, variant between intercepts and means, $\Delta\chi^2(2) = 844.61$, $p < .001$, ΔCFI = 0.018.

Table 2

TDM-IV model fit estimates across datasets: medians and ranges.

	Fit estimates						Correlations	
	χ^2	p	CFI	NNFI	SRMR	RMSEA [95% CI]	Views & tactics	Items 6 & 7
Median	69.93	.002	0.940	0.918	0.053	0.053 [0.039, 0.071]	0.44	0.42
Range	[40.05, 684.71]	[< .001, .19]	[0.902, 0.989]	[0.867, 985]	[0.027, 0.060]	[0.029, 0.067]	[0.28, 0.76]	[0.03, 0.53]

Note. Full CFA results can be found in Supplementary material C. All models' $df = 33$. Only datasets with sufficient power ($\beta > 0.80$) to discriminate between well-fitting and poorly-fitting models based on RMSEA were included ($k = 10$). The correlations between items 6 and 7 represent the correlations between their error terms.

$p = .03$ (test of residual heterogeneity); views, $\delta = 0.24$ [CI$_{95}$ = 0.07, 0.42], $\hat{\tau}^2 = 0.039$, $I^2 = 72.01\%$, $Q(12) = 35.22$, $p < .01$; and tactics, $\delta = 0.21$ [CI$_{95}$ = 0.07, 0.35], $\hat{\tau}^2 = 0.012$, $I^2 = 55.64\%$, $Q(12) = 25.72$, $p = .012$. I^2 estimates suggest that there remained a moderate amount of unexplained variation across studies. These results suggested men report being more Machiavellian than women, with population effect sizes ranging from 0.21 to 0.27. We, therefore, included gender ratio as a covariate in subsequent analyses.

3.2.2.2. Effect of age. We used two approaches to test Hypothesis 3 - the influence of age. First, meta-analytic techniques estimated the correlation (observed correlation denoted by $\hat{r}$, and population by ρ) between age and Machiavellianism weighting each sample appropriately by sample size, and correcting the slight negative bias (Olkin & Pratt, 1958). We removed one dataset (Personality Testing, 2015) from the analysis of TDM-IV and views because it introduced unnecessary error through disproportionately influencing overall estimates (meta-analytic outlier based on residual estimates and Cook's distances; see Viechtbauer & Cheung, 2010).

Meta-analysis suggested age did not associate with self-reported Machiavellianism significantly, with estimates of the population correlation ranging from -0.13 to -0.02 with all confidence intervals including zero: TDM-IV, $\rho = -0.02$ [CI$_{95}$ = -0.17, 0.13], $\hat{\tau}^2 = 0.008$, $I^2 = 66.00\%$, $Q(11) = 30.92$, $p = .001$; views, $\rho = 0.05$ [CI$_{95}$ = -0.05, 0.14], $\hat{\tau}^2 < 0.001$, $I^2 = 7.83\%$, $Q(11) = 15.73$, $p = .15$; tactics, $\rho = -0.13$ [CI$_{95}$ = -0.28, 0.02], $\hat{\tau}^2 = 0.010$, $I^2 = 83.79\%$, $Q(12) = 115.199$, $p < .01$.

We also regressed Machiavellianism on age (controlling for gender) using all data to identify trends over a wider age range (11–88 years). We excluded the correctional inmate dataset (Sellbom et al., 2012) because its substantially higher Machiavellianism scores introduced error by disproportionally influencing results. We analyzed datasets that used 5-point Likert scale ($M_{Age} = 27.55$, $SD_{Age} = 11.34$), and 7-point Likert scale ($M_{Age} = 23.68$, $SD_{Age} = 7.81$) independently. The results suggested a significant effect of age for TDM-IV$_{5\text{-point}}$ $\beta = -0.12$, $SE = 0.00$, $t = -14.93$, $p < .001$; TDM-IV$_{7\text{-point}}$ $\beta = -0.08$, $SE = 0.00$, $t = -3.74$, $p < .001$; views$_{5\text{-point}}$, $\beta = -0.12$, $SE = 0.00$, $t = -13.88$, $p < .001$; views$_{7\text{-point}}$, $\beta = -0.05$, $SE = 0.00$, $t = -2.15$, $p = .03$; tactics$_{5\text{-point}}$, $\beta = -0.10$, $SE = 0.00$, $t = -12.40$, $p < .001$; and tactics$_{7\text{-point}}$, $\beta = -0.10$, $SE = 0.00$, $t = -4.25$, $p < .001$. A visual inspection of regression plots found no evidence of non-linear relationships. Overall, regression results suggested Machiavellianism decreased with age.

3.2.2.3. Effect of culture. We minimized confounding variables by investigating culture's influence in samples that used a 7-point Likert scale and students ($k = 5$, $N = 1902$), controlling for gender. We operationalized culture as national culture, dividing samples into four national cultural groups: Korean ($N = 569$), Australian ($N = 491$), Hungarian ($N = 583$), and US ($N = 259$). ANCOVA suggested a small yet significant effect for culture, TDM-IV, $F(3,1883) = 29.06$, $p < .001$, $\eta^2_{partial} = 0.04$; tactics, $F(3,1883) = 22.61$, $p < .001$, $\eta^2_{partial} = 0.04$; and a medium effect for views, $F(3,1883) = 70.44$, $p < .001$, $\eta^2_{partial} = 0.10$. (Detailed analyses are in Supplementary

material G.) Unplanned post-hoc comparisons (1000 bootstrapped samples) suggested Hungarians had significantly higher TDM-IV scores than the other cultures. Hungarians also held the strongest Machiavellian views, significantly greater than other cultures (other cultures did not differ significantly). In contrast, Australians held the highest Machiavellian tactics scores, followed by Koreans, Hungarians, and then US participants.

3.2.3. Relation to conceptual domains

We then investigated associations between the scales (Tables 3.1 and 3.2) and the manifest views and tactics variables using zero-order correlations, and with their latent variables using structural equation modelling (SEM). We interpreted overall trends to minimize sample/indicator-specific random error. Given the number of analyses inflated Type-I error, we focused on $p < .001$. We used semipartial correlations over SEM parameters in two samples (Birkás et al., 2015; Lau & Marsee, 2013) given insufficient power. In all SEM analyses, TDM-IV items loaded onto their respective views or tactics latent trait. Given many datasets comprised scale-level variables and not individual item scores, we estimated the endogenous latent variables using single indicator models (error = $(1 - \alpha) * SD^2_{indicator}$). All models fitted the data acceptably (Supplementary material H contains model fit statistics). Zero-order correlations and SEM pathways are presented in Tables 4 and 5 (SEM figures are in Supplementary material I).

3.2.3.1. Developmental and emotional factors. Analysis of developmental factors comprised four scales evaluating previous or current family functioning, trauma, or peer relations in adolescence, and two scales assessing world-views (Table 3.1). Machiavellianism related consistently to poor family functioning and attachment, traumatic early life experiences, and peer conflict (Table 4). The views dimension showed stronger relationships with peer conflict, parental alienation, and a belief in an unjust and dangerous world, supporting Hypothesis 4. In contrast, Machiavellian tactics associated with only aspects of attachment (trust and communication) and family level communication and life satisfaction more strongly than views.

We captured emotionality on one performance and two self-report measures of emotional intelligence, two measures of empathy/callous unemotionally, two measures of self-esteem, and two measures of emotional dysregulation/management skills (Table 3.1). The Machiavellian views latent variable uniquely associated with lower self-report and performance emotional intelligences, self-esteem, and emotional dysregulation in support of Hypothesis 5. The Machiavellian tactics latent variable associated with empathy deficits more strongly than views, with weaker, yet significant, associations with Inventory of Callous-Unemotional (ICU) traits. Interestingly, the tactics dimension related positively, and the views dimension related negatively, to the Mayer-Salovey-Caruso Emotional Intelligence Test.

3.2.3.2. Personality. One HEXACO and two FFM measures assessed Machiavellianism's relation within broad personality frameworks (Table 3.2). As expected, honestly-humility and all aspects of Machiavellianism correlated strongly (Hypothesis 6a). Results (Table 5) across each FFM estimate were reasonably consistent, with

Table 3.1
Measures used in nomological network: development and emotional style.

Domain	Scale	Sub/scale information (internal consistency, α)	Data from
Development	*Peer Conflict* Scale (PCS, 20 items; 4-point Likert; Marsee, Kimonis, & Frick, 2004)	Two subscales: Overt (direct aggression, 0.91); relational (social manipulation, 0.85)	Lau and Marsee (2013)
	Family Adaptability and Cohesion Evaluation Scales IV (FACES, 5-point Likert; 62 items; Olson, 2011)	Family communication and satisfaction with family life subscales, and the cohesion, flexibility, and total ratio scores (0.73–0.90, enmeshed subscale = 0.61)	Láng and Birkás (2014)
	Child Abuse and Trauma Scale (CATS, 38 items; 4-point Likert, Sanders & Becker-Lausen, 1995)	Total abuse/trauma and the neglect/negative home atmosphere, punishment, and sexual abuse subscales (0.54–0.90)	Láng (2015a)
	Inventory of Parent and Peer Attachment (IPPA-R; 38 items; 7-point Likert; Gullone & Robinson, 2005)	Trust, communication, and alienation scales (> 0.75). Parent component only, average of mother and father reports were used	Láng and Birkás (2014)
	System Justification Scale (SJS; 8 items; 9-point Likert; Kay & Jost, 2003)	Belief that the current social system is fair and legitimate (0.75)	Williams (1994a[1])
	Belief in a Dangerous world (BDWS; 12 items; 7-point Likert; Altemeyer, 1988)	Perceptions of social danger and threat (0.80[1]; 0.83[2])	Williams (1994b[1], 1995[2])
Emotional style			
Emotional intelligence (EI)	*Bar-On EQ-i:S* (51 items; Bar-On, 2002)	Self-report EI estimates. Emotional quotient (EQ; 0.91). Intrapersonal (0.82), interpersonal (0.80), adaptability (0.76), stress management (0.80), and general mood (0.89) composite scales	Austin et al., (2007 Dataset 1)
	Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT 2.0; 141 items; Mayer, 2002)	Performance EI estimates. Overall EI (0.90), experiential (0.90), and strategic (0.72) area scores	Austin et al., (2007 Dataset 1)
	Trait Emotional Intelligence Questionnaire–Short Form (TEIQue-SF; 30 items; Petrides & Furnham, 2009)	Self-report EI estimates. Overall EI (0.89)	Austin et al., (2007 Dataset 2)
Experience and expression	*Emotional Empathy Scale* (EES; 33 items; 4-point Likert; Mehrabian & Epstein, 1972)	Assesses emotional reactivity to other's emotions (0.70)	Sellbom et al. (2012)
	Global Self-Esteem Scale (GSE; 10 items; 6-point Likert; Rosenberg, 1965)	Positive and negative feelings about one's self-worth (0.90[1]; 0.90[2]; 0.90[3])	Williams (1994a[1], 1994b[2], 1995[3])
	Extrinsic Contingency Focus Scale (ECFS; 20 items; 5-point Likert; Williams, Schimel, Hayes, & Martens, 2010)	Measures the extent to which individuals base their self-esteem on externally defined contingencies. (0.82[1]; 0.83[2]; 0.83[3])	Williams (1994a[1], 1994b[2], 1995[3])
	Inventory of Callous-Unemotional Traits (ICU; 24 items; Kimonis et al., 2008)	ICU total score (0.78)	Lau and Marsee (2013)
	Abbreviated Dysregulation Inventory (ADI; 30 items; 4-point Likert; Mezzich, Tarter, Giancola, & Kirisci, 2001)	Emotional dysregulation (0.84) subscale. The behavioral dysregulation (0.83) subscale was included in the behavioral domain	Lau and Marsee (2013)

Note. Hyperscript ([X]) indicates which dataset corresponds to the internal consistency estimates.

significant correlations between Machiavellianism and agreeableness (negative; Hypothesis 6b), Machiavellian views with neuroticism (Hypothesis 6c) and with extraversion (negative, but inconsistent), and Machiavellian tactics with conscientiousness (negative; Hypothesis 6d).

Machiavellianism associated with psychopathy strongly, with associations differing between the Levenson's Self-Report Psychopathy (LSRP) and Psychopathic Personality Inventory (PPI; Table 5). Machiavellian tactics showed stronger associations with PPI-II (impulsive-antisociality) and PPI-III (coldheartedness) than Machiavellian views (supporting Hypothesis 6e). Latent views and tactics dimensions did not correlate with PPI-I (fearless-dominance) significantly. LSRP and both primary and secondary psychopathy correlated strongly with overall Machiavellianism, tending to be marginally stronger for views than tactics. Narcissism related to Machiavellian views consistently, with sporadic associations between tactics and narcissism, and Antisocial Process Screen Device estimates (supporting Hypothesis 6f).

3.2.3.3. Behavior. We investigated behavior using self-report measures on interpersonal exploitation and reward/punishment-sensitivity, and three behavioral studies. Self-report data suggested Machiavellianism associated with emotional manipulation and sensitivity to rewards, while appearing unrelated to sensitivity to punishment (SPSRQ). The views dimension associated with delinquency and behavioral dysregulation uniquely. After removing participants who did not complete, or did not understand the task ($N = 104$), both subscales correlated significantly with defecting in the classic prisoner's dilemma, whereas only the views latent variable significantly associated with defecting in support of Hypothesis 7a. We analyzed the trust game separately for player 1 ($n = 122$) and player 2 ($n = 63$), given different decisions and information. Binary logistic regression models regressed participant's move on gender and either TDM-IV, or both views and

tactics. Player 1's choice [trust (1) vs distrust (0)] did not associate significantly with TDM-IV, $r_{point-biserial} = 0.05$, $\chi^2(8) = 5.55$, $p = .70$, Exp(B) = 1.14, $R^2 = 0.01$ (Cox and Snell), or with views ($r_{point-biserial} = 0.00$, $\beta = -0.15$, Exp(B) = 0.86, $p = .54$) and tactics ($r_{point-biserial} = 0.09$, $\beta = 0.26$, Exp(B) = 1.30, $p = .20$) subscales in the combined model, $\chi^2(8) = 4.32$, $p = .83$, $R^2 = 0.02$. Similarly, Player 2's choice [reciprocate (0) or exploit (1)] did not associate significantly with TDM-IV, $r_{point-biserial} = 0.18$, $\chi^2(8) = 9.18$, $p = .33$, Exp(B) = 1.22, $R^2 = 0.07$, or with views ($r_{point-biserial} = 0.23$, $\beta = 0.35$, Exp(B) = 1.42, $p = .31$), and tactics ($r_{point-biserial} = 0.08$, $\beta = -0.11$, Exp(B) = 0.89, $p = .68$) subscales in the combined model, $\chi^2(8) = 3.29$, $p = .92$, $R^2 = 0.06$. Therefore, Machiavellianism did not associate with trust or exploitation significantly, failing to support Hypothesis 7a and 7b in this sample.

4. Discussion

We established a deeper understanding of Machiavellianism through the development of a nomological network. There is scarce knowledge of the views and tactics dimensions, notwithstanding arguments for a two-dimensional approach (Fehr et al., 1992; Monaghan et al., 2016). Researchers contributed data from Korea, Hungary, Canada, USA, and Australia that facilitated a thorough investigation into the demographics, development, emotionality, personality, and behavior associated with Machiavellianism. Machiavellianism comprised two cross-culturally robust dimensions, each emerging with unique theoretical characteristics and implications within the nomological network.

A conceptual understanding of two-dimensional Machiavellianism can now be postulated. Machiavellianism is the higher-order aggregate construct – the extent to which one perceives callous interpersonal exploitation as valid and morally acceptable, because humans are

Table 3.2

Measures used in nomological network: personality and behavior.

Domain	Scale	Sub/scale information (internal consistency, α)	Data from
Personality			
Broad	*Big Five Inventory* (BFI; 44 items; 5-point Likert; (John & Srivastava, 1999)	Extraversion (0.86[1]), agreeableness (0.75[1]), conscientiousness (0.80[1]), neuroticism (0.85[1]), openness (0.78[1]). All α exceeded 0.71[2]	Lee and Ashton (2005[1]), Sellbom et al. (2012[2])
	International Personality Item Pool-NEO (IPIP-NEO; 50 items; 5-point Likert; Goldberg et al., 2006)	Extraversion (0.89[1]; 0.88[2]), agreeableness (0.83[1]; 0.80[2]), conscientiousness (0.78[1]; 0.81[2]), neuroticism (0.86[1]; 0.88[2]), openness (0.77[1]; 0.76[2])	Austin et al., (2007 Dataset 1[1]; Dataset 2[2])
	HEXACO-PI (60 items; 5-point Likert; Lee & Ashton, 2005)	Extraversion (0.83), agreeableness (0.76), conscientiousness (0.76), neuroticism (0.77), openness (0.72), honesty - humility (0.71)	Lee and Ashton (2005)
Narcissism	*Hypersensitive Narcissism Scale* (HSNS; 10 items; 5-point Likert; Hendin & Cheek, 1997)	Narcissism (0.73)	Bizumic and Fung (2016)
	Narcissistic Personality Inventory (NPI; 40 items; dichotomous[2] and 5-point Likert[1]; Raskin & Terry, 1988)	Narcissism (0.89[1]; 0.81[2])	Lee and Ashton (2005[1]), Sellbom et al. (2012[2])
Psychopathy	*Levenson's Self-Report Psychopathy Scale* (LSRP, 26 Items; 4[34], 5[1] & 7[2] - point Likert; Levenson, Kiehl, & Fitzpatrick, 1995)	Total (0.81[3]; 0.87[4]), primary (16 items; 88[1]; 0.81[2]; 0.81[3]; 0.87[4]), and secondary (10 items; 0.64[3]; 0.66[4])	Lee and Ashton (2005[1]), Ashton, Lee and Son (2000[2]), Sellbom et al. (2012[3]), Bizumic and Fung (2016[4])
	Psychopathic Personality Inventory (PPI; 4-point Likert; 187 items; Lilienfeld & Andrews, 1996)	Psychopathy (0.91), and the fearless-dominance (PPI-I; 0.87), impulsive/antisociality (PPI-II; 0.92) subscales. We also included the coldheartedness (PPI-III; 0.75) subscale	Sellbom et al. (2012)
	Antisocial Process Screen Device (APSD, 20 items; 3-Point Likert; Frick & Hare, 2001)	Narcissism subscale (7-items; 0.69)	Lau and Marsee (2013)
Behavior			
Self-report	*Emotional Manipulation Scale* (EMS; 41 items; 5-point Likert; Austin et al., 2007)	Emotional manipulation, (0.88), poor emotional skills (0.66), and emotional concealment (0.73) subscales	Austin et al., (2007 Dataset 2)
	Sensitivity to Punishment-Sensitivity to Reward Scale (SPSRQ; yes/no scale; 48 items; Torrubia, Avila, Moltó, & Caseras, 2001)	Sensitivity to punishment (24 items; 0.89) and reward 24 items; 0.75)	Birkás et al. (2015)
	Brief Self-Report Delinquency Scale (SRD; 19 items; Elliott, Huizinga, & Ageton, 1985)	Brief version (0.80) did not include items about: sexual behavior, nonviolent delinquency, drug use, and family history	Lau and Marsee (2013)
Behavioral task	*Trust Game* (Berg, Dickhaut, & McCabe, 1995)	Dyads interacted to win real money ($0–$40), choosing to either reciprocate trust or utilize a defecting strategy to maximize personal gain	Gunnthorsdottir et al. (2002)
	Prisoner's Dilemma (Tucker, 1950, as cited in Poundstone, 1993); 11-point item from cooperate (0) to defect (10)	Prisoner's scenario where best mutual outcome requires trusting other player not to play dominant strategy	Bizumic and Fung (2016)
	Iowa Gambling Task (Bechara, Damasio, Damasio, & Anderson, 1994)	Four virtual card decks, two are associated with short-term reward but long-term loss, two are associated with long-term rewards. Deck preference score used (disadvantageous decks – advantageous decks) and money made overall	Birkás et al. (2015). Only a subsample completed the task (*n* = 60)

Note. Hyperscript ([X]) indicates which dataset corresponds to the internal consistency estimates. Estimates of internal consistency for the MSCEIT are split-half with Spearman-Brown.

untrustworthy and will act similarly if given the chance. In line with previous research, Machiavellianism appears grounded in heterogeneous maladaptive developmental environments. Reward sensitivity and low levels of trait agreeableness and honesty-humility facilitate interpersonal exploitation, distrust, and goal-focused behavior broadly. Pattern of results supported the views dimension's definition, which includes a negative view of human nature and that others are untrustworthy and selfish. Machiavellian views tended to be primarily associated with an unjust and dangerous worldview, alienated early life experiences, emotional intelligence / management difficulties, and narcissistic dispositions. Thus, as one's Machiavellian views increase, one becomes more fearful (Monaghan et al., 2016), neurotic, and distrusting of others. Similar support was found for the tactics dimension's definition, which includes the justification of interpersonal exploitation to achieve a goal. Machiavellian tactics tended to be primarily associated with coldheartedness, antisociality, and empathy deficits, and arise from a lack of parental communication and harsh discipline, along with lower trait conscientiousness and risk sensitivity.

The proposed two-dimensional structure was robust and fitted the data well based on the medians and variances of model fit indices to account for the error of estimate. Beyond replication, meta-CFA supported the factor structure across all samples when weighted by sample size, and multigroup CFA demonstrated that the structure and factor-loadings were equivalent across 10 samples spanning four countries,

and in a large international sample. We implemented widely utilized but potentially liberal guidelines (Chen, 2007; Cheung & Rensvold, 2002) for supporting measurement invariance, and conclusions should be interpreted with some caution given significant χ^2 tests, and equivocal simulation research findings on CFI change (Meade, Johnson, & Braddy, 2008). Overall, we provided initial evidence that the TDM-IV is relatively stable across countries, age distributions, gender ratios, sample types, Likert scale lengths, and languages. In contrast, the Mach-IV's one and three-factor structures did not fit the data well, which is unsurprising given the Mach-IV's factor structure varies between samples even when they are matched on location, occupation, age, and gender ratio (Panitz, 1989). The Mach-IV also varies cross-culturally – even when controlling for age, gender, education, and social desirability (Kuo & Marsella, 1977). TDM-IV provided a strong foundation for subsequent analyses, capturing 90.25% of the Mach-IV's variance.

It is unsurprising that men emerged, on average, as holding stronger Machiavellian views and tactics than women – supporting Hypothesis 2 and the majority of literature (Christie & Geis, 1970; Jones & Paulhus, 2009). The same effect occurs among similar personality constructs (e.g., psychopathy; Patrick, 2005) and externalizing psychopathology. Although the TDM-IV was gender (construct) invariant, gender differences could indicate divergent dominant reproductive strategies, differential item functioning, or differences in the manifestation of the construct (Jones & Paulhus, 2009; Wilson et al., 1996).

Table 4
Developmental and emotionality components of the nomological network: pearson correlations and SEM pathways.

Domain	Scale	Subscale	Machiavellianism					Dataset
			TDM-IV	Views		Tactics		
			Zero-order	Zero-order	SEM Std. Coefficient	Zero-order	SEM Std. Coefficient	
Development								
Peer	PCS	Overt	.29**	.26**	.22**,a	.20*	.16*,a	8
		Relational	.29***	.28**	.23**,a	.19*	.17*,a	8
Environment	FACES		−.18***	−.15**	−.15	−.13**	−.13	5
		Flexibility	−.14**	−.13**	−.14	−.10	−.10	5
		Cohesion	−.17***	−.14**	−.15	−.13**	−.15	5
		Family comm.	−.21***	−.14**	−.08	−.21***	−.30***	5
		Family life	−.21***	−.16**	−.14	−.18***	−.22*	5
	CATS		.23***	.18**	.16	.19**	.22	6
		Neglect	.23***	.19**	.20	.19**	.20	6
		Punishment	.17**	.12*	.06	.16**	.24*	6
		Sexual abuse	.14*	.12*	.17	.10	.06	6
	IPPA	Trust	−.23***	−.18***	−.18*	−.19***	−.19*	5
		Communication	−.20***	−.15**	−.12	−.18***	−.22**	5
		Alienation	.20***	.18***	.22*	.12*	.08	5
World-view	Belief in just world		−.18***	−.20***	−.29**	−.05	.07	10
	Belief in a dangerous world		.08*	.19***	.28***	−.09*	−.17**	11
			.13**	.28***	.48***	−.12**	−.23**	12
Emotionality								
Intelligence	Bar-On (EQ total)		−.32***	−.34***	−.50**	−.16*	.08	3
		Intrapersonal	−.07	−.10	−.18	−.02	.08	3
		Interpersonal	−.41***	−.43***	−.67***	−.21**	.10	3
		Stress manage	−.20**	−.21**	−.34*	−.10	.06	3
		Adaptability	−.16*	−.10	.07	−.17*	−.30	3
		General mood	−.28***	−.32***	−.55**	−.11	.17	3
	MSCEIT		−.26***	−.36***	−.62***	−.04	.31*	3
		Experiential	−.20**	−.30**	−.53**	.00	.30*	3
		Strategic	−.27***	−.34***	−.62**	−.08	.23	3
	TEIQue-SF		−.27***	−.27***	−.32**	−.14*	−.08	4
Experience	EES		−.29***	−.20***	−.19*	−.26***	−.30***	9
	External contingency focus		.27***	.27***	.36***	.13**	.12	10
			.33***	.33***	.48***	.16***	.11*	11
			.27***	.28***	.46***	.10*	.00	12
	Global self-esteem		−.28***	−.26***	−.33	−.15***	−.12	10
			−.34***	−.32***	−.42***	−.18**	−.15**	11
			−.24***	−.22***	−.29***	−.12**	−.09	12
	ICU		.52***	.51***	.47***,a	.26**	.20**,a	8
	ADI	Emotional	.26**	.34***	.34***,a	.04	−.03a	8
	EMS	Poor emotion skills	.12*	.16**	.27*	.02	−.05	4
		Concealment	.00	.01	.06	−.02	−.10	4

Note. Correlations are Pearson (zero-order). Std. Coefficient = Standardized pathways from SEM. SEM fit indices are in Supplementary material H and Figures are displayed in Supplementary material I. Datasets are: 1 = Lee and Ashton (2005); 2 = Ashton et al. (2000), 3 = Austin et al. (2007 Dataset 1); 4 = Austin et al. (2007 Dataset 2); 5 = Láng and Birkás (2014); 6 = Láng (2015a); 7 = Birkás et al. (2015), 8 = Lau and Marsee (2013), 9 = Sellbom et al. (2012); 10 = Williams (1994a); 11 = Williams (1994b); 12 = Williams (1995); 13 = Bizumic and Fung (2016); 14 = Gunnthorsdottir et al. (2002). PCS = Peer conflict scale, FACES = Family adaptability and cohesion evaluation scales IV, CATS = Childhood abuse and trauma scale, IPPA = Inventory of parent and peer attachment, EQ = emotional quotient, MSCEIT = Mayer-Salovey-Caruso Emotional Intelligence Test, EES = Emotional empathy scale, ICU = Inventory of Callous-Unemotional traits, ADI = abbreviated dysregulation inventory, EMS = emotional manipulation inventory. Comm. = Communication. Given the number of analyses inflating Type-I error rates, any inferences based on $p > .001$ should be made with caution.
[a] These were estimated using semipartial correlations, as opposed to SEM parameters, given the inadequate power for SEM estimates.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

Meta-analysis found no significant effect of age on any aspect of Machiavellianism, supporting Hypothesis 3. (This is not evidence for no effect/the null, as might be obtained through the Bayesian framework or Two One-Sided Tests.) Our and previous findings (e.g., Barlett & Barlett, 2015; Rawwas & Singhapakdi, 1998; Vitell et al., 1991) might be indicative of random measurement error surrounding a true null effect. However, several datasets (Austin et al., 2007, Dataset 2; Personality Testing, 2015; Sellbom et al., 2012) did have significant negative effects of age on Machiavellian tactics (see Supplementary material E.2). Interestingly, Machiavellian tactics, but not views, decreased with age in the correctional inmate sample (Sellbom et al., 2012). Older inmates appear less likely than younger inmates to

endorse interpersonal exploitation despite similar misanthropy.

In contrast, regression suggested a significant negative trend across the entire age range, in contrast to Sutton and Keogh's (2001) positive effect for lack of faith in human nature, but somewhat aligned with Mudrack's (1989) finding for a negative effect after late 30s. When evaluating results of both meta-analysis and regression, it is likely that endorsing Machiavellian tactics decreases with age, especially when considering the meta-analytic CI only just excluded zero [−0.27, −0.02]. Additionally, researchers should investigate additional moderators to clarify this relationship, given the substantial heterogeneity in estimates.

Strength of Machiavellianism in students differed across national

Table 5
Personality and behavior components of the nomological network: Pearson correlations and SEM pathways.

Domain	Scale	Subscale	Machiavellianism					Dataset
			TDM-IV	Views		Tactics		
			Zero-order	Zero-order	SEM Std. Coefficient	Zero-order	SEM Std. Coefficient	Dataset
Personality								
Broad	Big Five	Conscientiousness	−.32***	−.28***	−.36*	−.27***	.02	1
			−.21**	−.10	.10	−.26***	−.41*	3
			−.25***	−.13*	−.11	−.27***	−.33***	4
			−.31***	−.16**	−.06	−.36***	−.50***	9
		Agreeableness	−.41***	−.31***	−.19	−.40***	−.47**	1
			−.47***	−.47***	−.64***	−.27***	.00	3
			−.40***	−.34***	−.35**	−.27***	−.33***	4
			−.44***	−.29***	−.30**	−.42***	−.48***	9
		Neuroticism	.08	.10	.26	.02	−.22	1
			.16*	.22**	.52**	.02	−.27	3
			.12*	.13*	.20*	.05	.00	4
			.09	.10*	.18	.03	−.01	9
		Extraversion	−.02	−.04	−.06	−.02	−.02	1
			−.05	−.15*	−.44**	.08	.36*	3
			−.12*	−.15**	−.24**	−.02	.10	4
			−.10*	−.11*	−.14	−.04	−.04	9
		Openness	−.04	−.03	.00	−.03	−.04	1
			.09	.07	.01	.08	.08	3
			−.07	−.15	−.06	−.02	−.05	4
			−.15**	−.11*	−.07	−.13**	−.21**	9
	HEXACO	Honesty	−.54***	−.47***	−.44**	−.43***	−.39**	1
		Conscientiousness	−.29***	−.25**	−.20	−.23**	−.13	1
		Agreeableness	−.15	−.14	−.21	−.11	.02	1
		Neuroticism	.24**	.17*	.13	−.27***	−.53**	1
		Openness	−.20*	−.23**	−.39*	−.08	.16	1
		Extraversion	−.02	−.04	.00	.01	−.09	1
Psychopathy	PPI (total)		.52***	.34***	.31**	.51***	.51***	9
		F-D (PPI-I)	.04	−.01	−.06	.09*	.10	9
		I-AS (PPI-II)	.53***	.37***	.39**	.47***	.44***	9
		Cold (PPI-III)	.24***	.09	−.06	.33***	.49***	9
	LSRP		.59***	.43***	.71***	.52***	.24***	9
			.64***	.64***	.47*	.39***	.50***	13
		Primary	.67***	.63***	.62***	.47***	.33**	1
			.65***	.58***	.72***	.52***	.23**	2
			.59***	.43***	.70***	.51***	.27***	9
			.65***	.64***	.49**	.39***	.55***	13
		Secondary	.37***	.26***	.54**	.32***	.12	9
			.41***	.41***	.35*	.25***	.33***	13
APSD		Narcissism subscale	.45***	.40***	.35***,a	.29*	.24**,a	8
Narcissism	HSNS		.30***	.33***	.41***	.14**	−.01	13
	NPI		.17*	.20*	.25	.05	−.02	1
			.16***	.12**	.10	.14**	.13	9
Behavior								
Self-report	EMS	EM	.35***	.26***	.28**	.27***	.26**	4
	SPSRQ		.23**	.21*	.21**,a	.11	.09a	7
		Punishment	.00	.05	.06a	−.08	−.08a	7
		Reward	.34***	.24**	.22**,a	.27**	.25**,a	7
	SRD		.38***	.37***	.33***,a	.21*	.15a	8
	ADI	Behavioral	.15	.19*	.23**,a	−.02	−.03a	8
Behavior	Prisoner's D.		.19***	.20***	.23*	.11*	.05	13
	Iowa	Deck selection	.22	.15	.15a	.17	.16a	7
		Money earnt	−.32*	−.14	−.13a	−.33*	−.33**,a	7

Note. Correlations are zero-order (Pearson). Std. Coefficient = Standardized pathways from SEM. SEM fit indices are in Supplementary material H and Figures are displayed in Supplementary material I. Datasets are: 1 = Lee and Ashton (2005); 2 = Ashton et al. (2000), 3 = Austin et al. (2007 Dataset 1); 4 = Austin et al. (2007 Dataset 2); 5 = Láng and Birkás (2014); 6 = Láng (2015a); 7 = Birkás et al. (2015), 8 = Lau and Marsee (2013), 9 = Sellbom et al. (2012); 10 = Williams (1994a); 11 = Williams (1994b); 12 = Williams (1995); 13 = Bizumic and Fung (2016); 14 = Gunnthorsdottir et al. (2002). Results from trust game are in the Results section. PPI = Psychopathic personality inventory, PPI-I = Fearless-dominance, PPI-II = Impulsive-antisociality, PPI-III = Coldheartedness, LSRP = Levenson's Self-Report Psychopathy scale, HSNS = Hypersensitive narcissism scale, NPI = Narcissistic personality inventory, APSD = Antisocial process screening device, EMS = Emotional manipulation scale. SPSRQ = Sensitivity to punishment-Sensitivity to reward scale, SRD = Self-report delinquency, ADI = Abbreviated dysregulation inventory. Given the number of analyses inflating Type-I error rates, any inferences based on p > .001 should be made with caution.

a These were estimated using semipartial correlations, as opposed to SEM parameters, given the inadequate power for SEM estimates.

* p < .05.
** p < .01.
*** p < .001.

cultures. The Hungarian undergraduates were the most Machiavellian overall, equating to a difference in adjusted means of 0.47 [0.34, 0.61] compared to US participants. This effect was due to substantially higher Machiavellian views among Hungarians. In contrast, Australian students endorsed Machiavellian tactics the most, with US participants the least. Little work investigates national cultural differences in Machiavellianism, outside organizational culture; thus culture is neglected in major reviews (i.e., Fehr et al., 1992; Jones & Paulhus, 2009). Our analyses are clearly limited by including only a handful of nationalities and estimating several national cultures from a single sample. Further, students are not prototypical of their national culture, nor are these samples immune from substantial heterogeneity (e.g., international students). However, we established a groundwork for future cross-cultural research and, along with gender and age, the foundation of the nomological network. Although cross-cultural research regularly conceptualizes culture at the national level, future work could identify variation between more homogenous cultural groups (such as Anglo-Australians, Latino Americans, etc.).

Overall patterns of convergent and discriminant correlations across multiple estimates (where possible) and measures provided the epistemic basis for more confident conclusions to be drawn regarding Machiavellianism's nomological network. Overall, correlations and SEM parameters were relatively consistent. Machiavellian views emerged as having the strongest association with emotionality and behavior consistent with previous research (Monaghan et al., 2016), with similar relationships in the personality and developmental domains to the tactics subscale.

Machiavellianism appears rooted in maladaptive childhood experiences, in line with Hypothesis 4. Early experiences of inadequate and chaotic family units, peer conflict, and trauma/abuse may foster schemas and maladaptive attachment styles associated with higher levels of Machiavellianism. These may underlie beliefs that others are untrustworthy and deceitful, poor emotional regulation and detachment, and empathy deficits (Láng, 2015b; Láng & Birkás, 2014, 2015; Monaghan et al., 2016; Wastell & Booth, 2003). Early experiences may instill beliefs that trusting others is naïve and interpersonal exploitation is an adaptive defense against difficult experiences (Láng & Lénárd, 2015). Substantial variance remains unexplained given that these relationships and estimates of genetic influence (Siwy-Hudowska & Pilch, 2014; Vernon et al., 2008) are only modest. Therefore, individuals may also learn that Machiavellian behavior is successful and normative, or experience parental role-modelling of misanthropy and exploitative behaviors (Kraut & Price, 1976; Siwy-Hudowska & Pilch, 2014).

Machiavellian views related strongly to poor emotional regulation and EI, supporting Hypothesis 5 and previous associations between Machiavellianism and internalizing psychopathology (Monaghan et al., 2016). Interestingly, the tactics dimension associated with callous unemotionality (yet to a lesser extent than views did) and poorer empathy, with minimal relations to emotionality. The overall pattern of results elucidates conceptual issues with Machiavellianism and emotionality/impulsivity. Coherent with the portrayal of a Machiavellian as cool and calm (Christie & Geis, 1970), one can endorse Machiavellian tactics with minimal emotionality, psychopathology, and dysregulation. In fact, Machiavellian tactics associated with higher performance on tasks of emotional intelligence (MSCEIT), as opposed to self-report estimates.

The location of Machiavellianism within broader personality trait constellations supported Hypothesis 6 along with the respective subhypotheses. Machiavellianism associated strongly with low agreeableness and honesty-humility, and higher levels of primary and secondary psychopathy. At the latent trait level, Machiavellian views captured the neurotic and narcissistic constructs, reflecting the emotionality domain, whereas tactics reflected the coldheartedness and impulsive-antisociality psychopathy dimensions along with lower levels of conscientiousness. This differentiation, however, was not universal throughout the datasets and analyses. Machiavellian tactics appear to

be in a similar position within a nomological network of psychopathy, consistent with previous nomological investigations suggesting differentiation only within the impulsivity/risk-taking domains (Vize, Lynam, Collison, & Miller, 2016). This begs the question of whether these personality traits are shared among what we consider "psychopathy" and "Machiavellianism" (Glenn & Sellbom, 2015; Miller, Hyatt, Maples-Keller, Carter, & Lynam, 2016), particularly considering associations with manipulation and exploitation, conscientiousness, and dominance. Machiavellianism diverges from psychopathy (at least conceptually) given stronger influences from the environment as opposed to genetics (Vernon et al., 2008) and motivations in cynicism, distrust, and an "ends justify the means" mentality.

Behavioral associates of Machiavellianism largely did not support Hypothesis 7. Both dimensions associated with emotional manipulation and reward sensitivity, and not with sensitivity to punishment. The views dimension associated with behavioral dysregulation, delinquency, and defection in the prisoner's dilemma. In contrast, tactics associated significantly with less money earnt in the Iowa gambling task, suggesting insensitivity to emotional risk cues which resulted in favoring short-term rewards. Nonetheless, neither subscale associated with trust or exploitation in the trust game, contrary to previous experimental work (Christie & Geis, 1970). This raises conceptual issues given Machiavellian tactics axiomatically align with playing the dominant strategy, and views with distrust (Sakalaki et al., 2007; Wilson et al., 1998). Absence of effect likely resulted from the small sample sizes and associated power, given that our analytical method differed from the original paper (Gunnthorsdottir et al., 2002) – which found 72.2% of participants characterized as high in Machiavellianism exploited their partner. Ongoing work is needed to clarify this relationship by replicating these findings in larger samples, which have more power to detect effects.

4.1. Limitations and conclusions

We utilized multiple datasets and meta-analytic tools to investigate the views and tactics dimensions, in contrast to conducting a meta-analysis. Systematic meta-analytic protocols are hindered by dataset sharing even among open access journals with explicit data-sharing policies (Savage & Vickers, 2009; Vanpaemel, Vermorgen, Deriemaecker, & Storms, 2015; Wicherts, Borsboom, Kats, & Molenaar, 2006). Limited data access also resulted in an over-reliance on self-reports and under-powered experimental samples for our selected analyses. We also limited our analyses given a plethora of possible investigations such as mediation and moderation, differential associations between dark triad variables, and multivariate regression-based meta-analyses (including views and tactics in the same model). We were also unable to investigate idiosyncratic findings within each dataset, such as effects of gender reported by Láng and Birkás (2015) and by Lau and Marsee (2013).

Finally, our analyses of culture utilized appropriate datasets using *post-hoc* methodology. Therefore, we were unable to design the study to identify factors that contribute to variations in Machiavellianism across cultures, such as current political climate, environmental and familial factors, or Hofstede's dimensions of cultural differences. Given the variation in our current analyses, these appear important avenues for future research.

The response rate from researchers to share data (30% of contacted research teams shared data) was not surprising in light of similar requests for data-sharing. For example, Vanpaemel et al. (2015) received 38% of 394 data-sharing requests from researchers publishing in top journals. Although encouraging that research teams are sharing data, we urge researchers to more readily store data in online open source databases (Centre for Open Science, 2017). This will facilitate stronger meta-analytic studies, increasing the reliability of findings amidst current replication issues.

Despite the TDM-IV's robustness, it remains based in the Mach-IV

and inherits issues with wording, reliability, potential method factor bias (within the TDM-IV subscales), and conceptualization – with many researchers suggesting the time is right for a new measure. This measure should capture two dimensions, use modern scale construction techniques, and build upon the current theory and nomological network. The current nomological network can be used to derive the theoretical basis and criterion validity expectations for such as scale.

Treating Machiavellian views and tactics as independent dimensions influences theory and assessment substantially, given their different associations, causes, and consequences. We also provide an avenue for ongoing work into the conceptual issues within the dark triad, with the dimensional approach helping to clarify issues raised in recent meta-analyses (Muris, Merckelbach, Otgaar, & Meijer, 2017). Future research should identify the nature of the interplay between each dimension and their role in the higher-order Machiavellianism construct. For example, studies should investigate whether Machiavellian views develop to rationalize one's exploitative behavior, or whether tactics develop as a by-product of a pessimistic, fearful, and distrusting view of humanity (acting selfishly is thus normative and defensive). Overall, this study facilitates a wealth of possible future theoretical and empirical insights into Machiavellianism.

Appendix A. Supplementary material

Supplementary material to this article can be found online at https://doi.org/10.1016/j.paid.2018.03.047.

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