

# The Dynamic Relationship between Personality Stability and Political Attitudes\*

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## **Abstract**

Researchers frequently claim that personality traits, measured using the Ten Item Personality Inventory (TIPI) battery, affect Americans' political attitudes and behaviors. Such studies often depend on two key assumptions: personality measurements display stability over time and pre-date political behaviors of interest. In this paper we employ new panel survey data to test these assumptions. First, we find modest levels of TIPI variability over time. Second, we associate an individual's self-reported personality not only with socioeconomic and demographic characteristics, but also, and more concerning, variability in her political attitudes. While the stability of the TIPI instrument is encouraging, the association between politics and the TIPI instrument suggests that TIPI may vary in response to political events.

# 1 Introduction

Social scientific narratives of political behavior consist of various pre-existing characteristics that affect an individual's decision-making processes. This idea of temporal dependence is present in many studies of political phenomena. For instance, previous analyses have found that socialization predates party identification (Campbell, Converse, Miller, & Stokes 1960), economic conditions predate evaluations of the president (MacKuen, Erikson, & Stimson 1992), and information about candidates or issues predates vote choice (Lupia 1994). Each of these antecedent or "pre-treatment" variables helps, at least in part, to explain the resulting political behavior. Due to the considerable number of endogeneity issues in social science research, it can be quite difficult to identify true causes of behavior.<sup>1</sup> Therefore, scholars have, over time, winnowed the field of variables to those that are the most fundamental and exogenous to political behavior. Chief among these variables is personality, which scholars have argued is exogenous, in that it originates prior to individual behavior.<sup>2</sup> As such, many political scientists have turned to studying personality – a stable, latent trait of the individual – and how it influences political attitudes and behavior (Carney, Jost, Gosling, & Potter 2008; Gerber, Huber, Doherty, & Dowling 2011, 2012b, 2013; Gerber, Huber, Doherty, Dowling, & Ha 2010; Mondak & Halperin 2008).

In doing so, scholars regularly use different quantified measures of personality to explain citizens' political attitudes (Carney et al. 2008; Gerber et al. 2010; Mondak & Halperin 2008), strength of partisan attachments (Gerber et al. 2012b), U.S. state legislators' behavior (Dietrich, Lasley, Mondak, Rempel, & Turner 2012), presidential approval (Mondak & Halperin 2008), and other political phenomena in the U.S. and comparative contexts (Caprara, Barbaranelli, & Zimbardo 2002; Gerber, Huber, Doherty, Dowling, Raso, & Ha 2011; Ha, Kim, & Jo 2013). These studies most frequently rely upon a survey instrument referred to as the Ten Item Personality Inven-

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<sup>1</sup>For example, does an individual's ideology cause them to choose certain media sources, or do the media sources influence the individual's ideology (Stroud 2008)?

<sup>2</sup>As a fundamental and intrinsic characteristic, personality has been labeled "the psychology of individual differences" (Wiggins 1996). Gerber, Huber, Doherty, & Dowling (2011) note that research outside political science has drawn associations between personality and alcohol use (Mezquita, Stewart, & Ruipérez 2010), physical fitness (Rhodes & Smith 2006), cholesterol (Sutin et al. 2010), and overall health (Goodwin & Friedman 2006). Whether political attitudes and behaviors are stable or fluid over time greatly impacts our ability to understand and predict variations in the political world. Scholars have long been concerned with the stability and durability of many political phenomena, including partisan identification (e.g. Clarke & McCutcheon 2009; Green, Palmquist, & Schickler 2004), policy preferences (Highton 2012), and authoritarianism (Feldman 1988; Goren 2005).

tory (TIPI), which collapses personality into five personality dimensions (the “Big Five”: openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability) (Gosling et al. 2003). Given the frequency of causal claims regarding the relationship between personality and political attitudes, we are concerned with the potential dynamic nature of personality traits. Individual-level stability across the Big Five personality dimensions is of critical importance for research on politics and personality. When arguing that personality consistently influences political behaviors, social scientists implicitly assume that personality is stable across time and does not vary based upon exposure to political phenomena. However, this assumption has not been rigorously tested.

Therefore, this study investigates the stability of the TIPI measurement of personality. We analyze TIPI data from six waves of the nationally-representative American Panel Survey (TAPS) sample taken over the course of almost two years – a uniquely extensive sample for the TIPI personality battery that provides unprecedented precision in evaluating the stability of this personality battery. Our results help adjudicate previous tension in the literature regarding stability and the association between personality and political attitudes. We are not only interested in whether the measurement of individual-level personality varies over time, but also whether variability is associated with particular types of individuals or with political behavior. By analyzing whether political outcomes and individual characteristics affect the TIPI measurement of these five traits, we are effectively evaluating whether the TIPI dimensions are appropriate explanatory variables in understanding how an individual forms and shapes her political responses. If the measurement of an individual’s personality varies over time, then scholars should be more uncertain about the explanatory power of these personality traits, especially as they pertain to TIPI. Additionally, if the measurement of an individual’s personality varies on the basis of political attitudes or opinions (or those covariates which are associated with political attitude and opinion), then it may simply be that the dimensions covered by TIPI are not appropriate tools to explain response to a political world.

Current evidence regarding the stability of personality traits is largely contradictory. On one hand, core personality traits were long thought to be heritable, and therefore rooted in biological causes; once fully matured, an individual would be relatively invariant in her Big Five traits (McCrae & Costa Jr. 1996). Political scientists have suggested the possibility of genetically-driven

political attitudes (Alford, Funk, & Hibbing 2005). Gerber, Huber, Doherty, Dowling and other coauthors (2010, 2011, 2012, 2013) are the most prolific in their attempts to connect individual personality with political attitudes and behavior. Their results suggest that the Big Five personality traits predict partisanship, racial attitudes, and right-wing authoritarianism. Just as nature drives political attitudes through genetic predispositions, so does nature drive personality differences, which “may be linked to virtually all aspects of political behaviour” (Mondak & Halperin 2008). Such a relationship between politics and personality can occur either directly – where attitudes and behavior are an explicit function of personality – or indirectly – where situations or contexts have a conditioning effect on the relationship between personality and political behaviors (Gerber et al. 2010; Mondak & Halperin 2008). Empirically, Gerber, Huber, Doherty, & Dowling (2013), relying on a two-wave national panel survey, find personality to be stable and unaffected by political events. Other research suggests that fully matured individuals can vary in their Big Five personality dimensions, though the changes in adults are smaller in magnitude compared to younger individuals. Research in psychology maintains that socio-environmental and contextual factors influence personality over time (Caspi, Roberts, & Shiner 2005; Srivastava, John, Gosling, & Potter 2003). This situational perspective, where an individual reacts to external circumstances rather than merely relying on a fixed internal disposition (Digman 1990), might pose a problem for reliably measuring personality. Scholars attribute the variation to continued biological maturation and not social or environmental factors (McCrae et al. 2000). Others have argued that events may influence personality directly, or events may cause changes in an individual’s social environment, which, in turn, influences personality (Srivastava et al. 2003).

This article will proceed in three parts: first, we explain how TIPI is typically estimated and discuss our data. Second, we discuss individual-level variability in the TIPI personality measurements from panel survey data provided by a nationally-representative survey, The American Panel Survey (TAPS). Third, we examine how personality variations across panel waves relate to static socio-demographic and political characteristics, as well as dynamic measures of political attitudes and preferences.

## 2 Measuring Personality: the Big-Five Structure and the Ten Item Personality Inventory

Scholarly measurement of personality is dominated by a classification system referred to as the Big-Five – a model that maps an individual’s personality along five dimensions: openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability. The five dimensions are based on a number of “traits” associated with each factor. For example, emotional stability measures an individual’s tendency to feel tense, anxious, rigid or concerned, in contrast to other feelings such as relaxation, calmness, and tolerance to stress (McCrae & John 1992). In other words, the score obtained by a certain individual in each dimension summarizes the presence (or absence) of bipolar elements implied by a broader category.<sup>3</sup>

TIPI is among the most frequently used tools to estimate the Big Five<sup>4</sup> and is based on just two survey items per trait. TIPI survey respondents are asked to indicate the extent to which, along a seven-point scale from “Disagree Strongly” to “Agree Strongly,” the individual feels the traits apply to her. Respondents observe the traits in 10 pairs of adjectives. For example, the extraversion dimension is measured with these contrasting pairs: “extraverted, enthusiastic,” “reserved, quiet.”<sup>5</sup> TIPI is particularly popular because it not only uses few survey items but also arguably demonstrates high levels of reliability and validity.<sup>6</sup> The Big Five factor structure (on which the

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<sup>3</sup>There are other measurements that accomplish similar results, but with much less parsimonious structures that in practice lead to low levels of efficiency and high costs. For example, one of the most important measures, the Cattell system (Cattell & Mead 2008), structures personality around 16 dimensions and 8 sub-dimensions. Indexes like NEP-PIR, NEO-FFI or BFI (Benet-Martínez & John 1998; John & Srivastava 1999; McCrae & Costa Jr. 1996) also aim to measure scores across five traits but are based on a pool of items that ranges in size from 44 to 240. Needless to say, this poses some practical limitations regarding the data collection process, especially when personality assessment is not your exclusive endeavor.

<sup>4</sup>According to Google Scholar, Gosling, Rentfrow, & Swann Jr (2003) have accumulated more than 2,400 citations (as of August 2015) for their paper in which they introduce TIPI as a brief measure of the Big Five traits.

<sup>5</sup>Figure A1 in the Appendix presents the actual battery of questions that TAPS uses to measure personality.

<sup>6</sup>TIPI has been found – in large part – to be a valid abbreviation to the longer instruments. Gerber et al. (2010), who state that TIPI “was designed to [...] achieve high test-retest reliability”, showed that TIPI correlated with the 44-item BFI between 0.65 and 0.87, and with the 240-item NEO PI-R between 0.56 to 0.68. Other research examining the brevity of TIPI by Hofmans, Kuppens, & Allik (2008) suggests that TIPI is a valid alternative to other Big Five instruments, even when translated into another language. Also, one of the most comprehensive previous examinations of the inventory demonstrates its criterion validity and validity to other scales measuring the five factor model with a significant higher number of traits (Gosling et al. 2003). Based on their undergraduate sample with two waves that were approximately six weeks apart, the authors also find evidence for short-term retest reliability. Employing nationally-representative data from six waves that span almost two years, our analysis provides a far more rigorous test of that claim.

method used to build TIPI is based) rests on the assumption of orthogonality between traits, which assumes no correlation among them. Therefore each dimension is generally analyzed separately (Goldberg 1990).

To further illustrate how a TIPI dimension is calculated we present the following example for “extraversion.”<sup>7</sup> Given the seven-point scale, a panelist identifying as 6 for “extraverted, enthusiastic” and a 3 for “reserved, quiet” would receive a score of 5.5 for extraversion, calculated as:

$$\text{Extraversion} = \frac{(\text{Enthusiasm} = 6) + (\text{Reserved} = 3)}{2} = \frac{6 + (8 - 3)}{2} = 5.5 \quad (1)$$

Considering that the values of this index range from 1 to 7, we could identify this individual as having a relatively extraverted personality.

Scholars of personality and politics have found one of the five TIPI dimensions to be of strong statistical and substantive significance in influencing outcome variables: openness to experience has, more consistently than its four fellow personality dimensions, frequently been found to be strongly associated with political phenomena, especially ideology.<sup>8</sup> Table 1 displays some of the findings with regard to openness that have appeared in the top three political science journals over the last half decade. The table reveals, rather unsurprisingly, that higher levels of openness are associated with greater political participation.<sup>9</sup> Still, while being the most consistent and important predictor of political attitudes and actions, the theory underlying openness also suggests a significant potential for volatility or instability. Mondak, Hibbing, Canache, Seligson, & Anderson (2010) suggest that individuals who score higher in openness may be more apt to gather

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<sup>7</sup>Recall that each panelist receives a “score” for each dimension that captures the respondent’s personality in that particular trait. High scores in a given subscale mean that the respondent’s personality is highly defined by the attributes of that block. Each trait’s score is calculated by summing the positive trait with the “inverse” or reversed score of its contrasting negative trait and then dividing the sum by two. The score for the negative trait can be obtained by subtracting the number scored in a particular reversed question from 8.

<sup>8</sup>Indeed, Carney, Jost, Gosling, & Potter (2008, 817) cite 11 articles with statistically significant findings supporting the positive relationship between openness and ideological liberalism. Furthermore, Mondak et al. (2010, 94) estimate 10 models with distinct outcome variables relating to civic engagement. Openness is positive and statistically significant in all 10 models. Extraversion is significant in 6 models, Emotional Stability and Conscientiousness in 5 models each, and Agreeableness in none.

<sup>9</sup>The studies cited in Table 1 are those that utilize the TIPI and were published in one of the following journals between 2010 and mid-2015: *The American Political Science Review*, *American Journal of Political Science*, or *The Journal of Politics*. The articles may include multiple models, some of which have different substantive and statistical findings than those presented in Table 1.

new information. Indeed, Mondak & Halperin (2008) find that increases in openness, which they claim is associated with greater learning behaviors, were associated with higher levels of political knowledge, increased interest in politics, and more frequent political discussions.

[TABLE 1 ABOUT HERE]

All of this is by way of suggesting that openness – a psychological acceptance of complexity and new experiences – may lead to instability of political preferences over time. The willingness to learn, the propensity to gather information, the predilection to discuss politics with others – despite the potential for ideological stubbornness (Mondak & Halperin 2008) – would all seem to strongly imply an instability of preferences. In fact, it almost seems natural to suggest that openness to experience and fluidity or changeability go hand-in-hand. Prior studies have established that liberals tend to be more open, and therefore more rebellious (Carney, Jost, Gosling, & Potter 2008), while also tolerant of unexpected phenomena (Tomkins 1963). Part of that rebelliousness and adaptation speaks directly to the idea of openness; despite ideology and party identification, open individuals are willing to make adjustments in the face of new developments and to integrate new information.

While the studies discussed above might suggest that openness would lead to adaptation and adjustment, one could also imagine that a change in the environment – political or otherwise – could lead to a change in openness. It is not beyond reason to suggest that a devout liberal who is upset with the policies and performance of a conservative Congress might become less open to experiences – that is, less willing to adapt to particular policies. The same might be said of a devout conservative who is displeased with President Obama. In any event, given these theories why we might expect openness to be less stable than its counterparts and the importance of openness as a predictor of political attitudes and behaviors in the existing literature, we proceed with our analyses, where we will give special attention to this TIPI dimension.

### **3 The American Panel Survey Personality Data**

Data for the following analysis are provided by the The American Panel Survey (TAPS). TAPS is a nationally-representative panel survey that conducts an online poll of up to 2,000 adult respondents



monthly.<sup>10</sup> The survey instruments repeat many questions over multiple waves. One such set of questions pertains to TIPI. Panelists answered TIPI questions over six waves (February, June, October 2012; May, September, November 2013). As Table 2 displays, 2,007 of those participating in the panel completed at least two waves of the TIPI battery. Like all panel surveys, attrition occurs, but over one-third (720) of those in our dataset completed each wave in which the personality index was measured. More than half of those in the set responded to at least 5 waves (1,233). We focus on those respondents who completed at least two waves of the TIPI so as to be able to evaluate the stability of their responses. Table 2 offers an overview of the descriptive statistics for the variables included in our analyses.

[TABLE 2 ABOUT HERE]

Previous research finds associations of various factors, both political and non-political, with the development of an individual's personality. Since our interest lies in which traits are associated with stability of common personality measurements, it serves our study well to explore the connections between variables cited in other studies with TIPI variability.

We employ measurements for both *symbolic ideology* and *partisan identification*. We measure the former by allowing panelists to place themselves on a seven point scale ranging from "very liberal" (-3) to "very conservative" (+3). Partisan identification is measured categorically, as Democrat, Republican, and Independent/Other party (this category serves as the baseline in all models). Table 2 demonstrates that our sample's political identifications are similar to national averages. Those identifying as Democrats outnumber Republicans, while the average panelist

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<sup>10</sup>The survey was started in December of 2011 by Knowledge Networks (now GfK Knowledge Networks) for the Weidenbaum Center at Washington University. The sampling frame used to select the 2,000 respondents is the U.S. Postal Service's computerized delivery sequence file (CDSF), which covers around 97% of the physical addresses in all fifty states including P.O. boxes and rural route addresses. This frame is appended with information regarding household residents' names, demographic characteristics of the inhabitants, and landline telephone numbers obtained from other sources such as the U.S. Census files and commercial data bases (e.g. White pages). The respondents are recruited based on a random stratified sample, where Hispanics and young adults between 18 and 24 years of age are slightly oversampled in order to account for their tendency to under-respond to surveys. Through the support of the Weidenbaum Center, those individuals without internet access are provided with a computer and internet access. More technical information about the survey is available at <http://taps.wustl.edu>. At the beginning of each month, members of the panel receive a notification to complete the new survey. Each wave remains open for approximately one month and takes between 15 and 25 minutes to complete. Such breadth of data provides researchers with a unique opportunity to investigate trends and changes at the individual level. For example, if an individual remains active in the panel for two years, TAPS collects over 1,000 variables at 24 different points in time for one individual. Such design invites investigation of individual-level change over both the short- and long-term.

identifies to the conservative side of the symbolic ideological spectrum.

We are also interested in the association between TIPI variability and political behaviors. Consequently, we include a variable that measures panelists' *political interest* on a 4-point scale ("very interested", "somewhat interested", "not very interested", and "not at all interested"). Since higher values indicate lower levels of interest, Table 2 shows that our panelists identify as being very interested in public affairs. Furthermore, evidence exists that the big five traits affect *political knowledge* (Gerber, Huber, Doherty, Dowling, & Ha 2010). To search for such a connection we provide our panelists with a 10-question battery on various topics in American politics. The overall measurement is thus the summed number of questions answered correctly. In this sample, the mean of correct responses is between 6 and 7. We include a measure for *church attendance* (church attendance is measured on a six point scale) since research demonstrates that the frequency of religious observance varies cross-nationally with multiple dimensions of the Big Five (Saroglou 2010). A value of "2.34", as Table 2's corresponding mean displays, represents a level of attendance between biweekly and bimonthly. We control for family status by including dummy variables indicating whether the panelist has *children*, is *divorced*, or changed his status to *wedded* during the course of the panel. We also include other controls upon the recommendations of Gerber and his coauthors (2010): *education*, a dichotomous measure indicating that the panelist is *employed*, *income*, a dichotomous indicator for race (with a value of '1' for *white* panelists and '0' for all others), presence of *children*, *sex*, level of *happiness*, and *age*. Finally, to test potential media effects, we included a dichotomous indicator measuring if the panelist reported watching Fox News (*FNC viewer*).

Our dynamic variables of interest fall into categories of either social or political. For the former, subjects were asked essential biographical information upon entering the panel. At various points in the panel's duration, these questions were re-asked. The traits that are most important include whether the panelist indicated she had experienced a *job loss* (asked in November 2011 and again in November 2012) or changed her marital status (*married* or *divorced*; asked in November 2011 and again in January 2014). Unsurprisingly, the number of panelists experiencing these events is not overwhelming; however, a conspicuous proportion report employment change. Table 2 shows that over ten percent of those with a job in November 2011 are no longer working a year later. Marital status is much more static. Few report entering marriage or experiencing divorce.

In addition to charting personal changes, TAPS regularly surveys its sample's views on political affairs. Each month at least one-half of the panel provide their level of approval on key political actors, such as Congress (*Congressional Approval*) and the President (*Presidential Approval*), on a five-point scale from strongly approve to strongly disapprove. Variables indicating an individual's level of change in perception are measured by taking the variance of the responses over the seven waves that occurred most closely to the instances of gathering TIPI data.<sup>11</sup> Table 2 shows that while changes in approval of elites do occur within the panel, the average variance of such opinions is quite small. The mean value of such a measurement is near zero. Additionally, on average, presidential approval is somewhat more stable than approval of Congress as a whole.

## 4 Is TIPI Stable? Variability and Measurement Error of TIPI Scores

For the present study we calculate TIPI scores for each of the five subscales that the Big-Five structure considers. Typically, scores on the Big-Five dimensions remain disaggregated, particularly when researchers are interested in the different effects each dimension may have on a political variable (e.g. Rammstedt & John 2007). However, we also sum an individual's five subscale scores together to create an overall additive scale.<sup>12</sup> This facilitates the analysis below, while also ensuring the preservation of the maximum available information in TAPS. One of the main questions that drives the present study concerns the assumed stability of personality traits as measured by the TIPI scale. Although other authors have previously looked for an answer to this question, we aim to test their findings and improve our understanding of the TIPI scale's reliability by using a larger panel that will allow a deeper analysis of individual personality change over a much longer time frame.

To begin our analysis, we compute a series of correlations between the subscales and aggregated scale scores across the six waves of TAPS to analyze their level of association over time. To

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<sup>11</sup>Since each panelist answers this question (on average) every other month, individual wave perceptions are pooled over two months to maximize the number of observations.

<sup>12</sup>Accordingly, the aggregated TIPI score would be calculated as:  $Aggregate_{ij} = Openness_{ij} + Conscientiousness_{ij} + Extraversion_{ij} + Agreeableness_{ij} + EmotionalStability_{ij}$ , where the aggregated measure for respondent  $i$  in wave  $j$  equals the sum of the respondent's five subscale scores in that wave.

calculate the volatility of values for a given subscale, we correlate its scores in a certain wave with those observed in each of the remaining waves.<sup>13</sup> Figure 1 displays these correlation coefficients and the the distribution of scores for the different subscales through the six waves under analysis. Correlation coefficients range from 0.56 to 0.74 across all subscales. If we only focus on the aggregated scale we find slightly higher levels, but even those never exceed a correlation coefficient of 0.73. On average, the mean correlation scores for a given subscale across all six waves range from 0.586 (for Openness) to 0.697 (for Extraversion); values that indicate considerable levels of TIPI variability over time that seem far from being perfectly stable.

[FIGURE 1 ABOUT HERE]

However, when testing TIPI stability this way we face a problem inherent to survey analysis: measurement error. This refers to “the inaccuracy with which the underlying attitude is reflected by the survey instrument” (Achen 1975, pp. 1221). Achen called attention to the idea that respondents’ instability can be attributed to certain factors such as context, the vagueness of questions, the amount and clearness of the answers available, etc. Consequently, these elements are part of the volatility of attitudes that will be observed when analyzing panel survey responses through time and should be considered when studying the change and stability of any indicator. Measurement error could have an influence on the findings if the observed volatility (if any) were related to factors independent from the true attitudes of a respondent (context, respondents’ skills, clarity of the survey instrument, etc.).

We account for potential measurement error throughout our analysis in a number of ways. First, the TAPS format itself limits some common sources of measurement error. For example, since TAPS is a self-reported online survey, issues such as interviewer bias or coding mistakes are eliminated. Moreover, by averaging multiple survey items (into the different subscales and when constructing the additive TIPI scale) we are achieving more accurate overall measures by “neutralizing” potential deviations from true attitudes.<sup>14</sup> Most importantly, we implement a method suggested by Ansolabehere et al. (2008) that accounts for measurement error in order to calculate

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<sup>13</sup>Since we do not assume a linear relationship between the subscales at different points in time, we compute Spearman’s rank correlation coefficients rather than Pearson correlation coefficients.

<sup>14</sup>This is one of the techniques suggested in Ansolabehere, Rodden, & Snyder (2008) to minimize measurement error.

“true correlations” between the subscales by estimating parameters of the measurement model.

The standard measurement model applied to our analysis can be defined as:

$$W_{ikm} = X_{im} + e_{ik} \quad (2)$$

where  $W_{ikm}$  represents the observed answers to the  $k$  traits of each subscale  $m$  in wave  $i$ ,  $X_{im}$  the *true* score for a given subscale we intend to measure and  $e_{ikm}$  a random error term. This implies that simple correlations between  $W_{ikm}$  will yield biased results due to the error term.

Since we are interested in the correlation between the “true scores” for each subscale  $X_m$  through  $i$  waves, we use the following formula for each of them:

$$\rho_{X_i, X_j} = \frac{K - 1}{K / \rho_{\bar{W}_i, \bar{W}_j} - 1 / \rho_{W_i, W_j}} \quad \forall i \neq j \quad (3)$$

and,

$$\bar{W}_i = \frac{1}{K} \sum_{k=1}^K W_{ik} \quad (4)$$

$$\frac{1}{\rho_{W_i, W_j}} = \frac{1}{K} \sum_{k=1}^K \frac{1}{\rho_{W_{1k}, W_{2k}}} \quad (5)$$

Table 3 presents both the regular correlation coefficients and the corrected coefficients computed with formula (4). As we can see, once we account for measurement error, the magnitude of the correlations increases and reaches levels that suggest a higher level of stability of the different subscales. In general, there is an increase between 0.10 and 0.22 in the degree of association for any given subscale across the different waves. As before, Openness (and Agreeableness) are the two subscales that exhibit the most variation, whereas Extraversion seems to be the most stable subscale.

[TABLE 3 ABOUT HERE]

As a consequence then, our findings suggest moderate stability of TIPI after accounting for measurement error. We are encouraged by these results. Yet, there are three specific reasons

to be cautious about the general levels of correlation. First, the variables analyzed measure the same object, are worded identically and asked in very similar contexts, all of which should reduce different possible sources of measurement error. Second, we should consider that previous literature regards the phenomenon intended to be measured by the TIPI battery (personality) to be an *extremely* stable trait, especially across short time periods. Third, although the lapses between one survey and another are long enough to allow for changes in respondents' contexts, they can still be defined as relatively short term and will therefore usually not be related to drastic life changes (e.g. childhood to adolescence), that could be argued to significantly influence personality. Consequently, we would expect even higher correlation coefficients than we observe from variables that are truly stable. For example, the correlation coefficients for the variables gender and age, which are both asked upon entry into the TAPS panel and then again in December 2013, are between .92 and .98 – a level of stability over time that TIPI does not reach.<sup>15</sup> This is to say that while TIPI is not perfectly stable, it exhibits a reasonably high degree of stability that allows some confidence in its use. Next, we look at the modest level of individual-level variation that we observe for our TIPI measurements and look for an association between TIPI and political events.

## 5 Estimating the Effects of Political Views on TIPI Traits

After measuring change in TIPI over time, we explicitly model the short-term forces associated with the variability we found. Moreover, we wish to be able to stabilize estimates using well known time-invariant demographic indicators. Thus, our aims require an approach that allows for

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<sup>15</sup>We can also compare these correlations to other variables that are generally considered stable in the political science literature. Although there is an ongoing debate about the volatility of party identification, there exists plenty of evidence in the literature that suggests a high level of stability of this characteristic. Green, Palmquist, & Schickler (2004) analyze different panel surveys over either a year or periods of two years and find that correlations of party identification over time in a given survey range from 0.97 to 0.99. While party identification is generally measured on a 3-point-scale, each TIPI item has 7 possible values. Accordingly, one might suspect that this bigger range of possible answers makes TIPI harder to answer and could lead to more variation. To control for this possibility and make the results more comparable, we conducted an additional set of correlation analyses for which we recoded TIPI responses into 3 categories (original values of 1 and 2 were aggregated into a first category; 3, 4 and 5 into a second one, and 6 and 7 into a third category). Once we recalculated the new TIPI scales, we analyzed the degree of association between waves. The results show lower correlations than those reported with the original coding. Similarly, if we analyze all respondents that answered the 7-point party identification question in the TAPS data at least twice, we get an average correlation of 0.92. These numbers dwarf those found for TIPI and suggest some degree of volatility in personality that has been overlooked until now.

the inclusion of both time-varying and time-invariant covariates.

To accommodate covariates, we fit a hierarchical latent measurement model with both time-invariant ( $\mathbf{Z}_i$ ) and time-varying predictors ( $\mathbf{X}_i$ ):

$$\begin{aligned} y_{it} &= \alpha_i + \rho_{y_t \mathbf{x}_t} \mathbf{X}_{i,t} + \epsilon_{it}, & \epsilon_{it} &\sim N(0, \sigma_{y_t}) \\ \alpha_i &= \mu_\alpha + \gamma_\alpha \mathbf{Z}_i + \zeta_{\alpha i}, & \zeta_{\alpha i} &\sim N(0, \sigma_{\alpha i}). \end{aligned} \quad (6)$$

where  $\rho_{y_t \mathbf{x}_t}$  is a vector of coefficients relating the contemporaneous value of time-varying factors, which are presidential approval and congressional approval. Note that while it is possible to estimate distinct  $\rho_{y_t \mathbf{x}_t}$  for each time wave, we constrain these parameters to be constant across waves to facilitate interpretation. A major difference between this latent measurement, or structural equations (SEM), approach and a more traditional multilevel ordinary least squares estimation relates to the models' error terms,  $\sigma_{y_t}$ . Most hierarchical models of this type would assume that the amount of error in the observed personality trait would remain fixed across time periods. Not wanting to make such a claim with our data, this SEM allows for unique disturbance terms for each time period that TIPI was collected.

In this model, we conceptualize each individual's personality traits as a latent trait that can be measured over time signified by individual-specific intercepts ( $\alpha_i$ ). In other words, each respondent's latent level of their TIPI characteristics is a factor of a matrix of time-invariant characteristics  $\mathbf{Z}_i$ . This individual-level constant term is used to estimate each respondent's observed value of TIPI at any given point,  $y_{it}$ . Additionally, included in this separate level of the SEM is the matrix of time-varying predictors – congressional approval and presidential approval. At the same time, the unique time disturbance measures influence the predicted level of the individual's TIPI measures. In this sense, we are estimating two outcome variables, as will be apparent in the following regression tables.

While the panels derived from TAPS are national probability samples reflecting the general population, our sample in this analysis is a subset of all panelists who have been in the panel. Naturally, TAPS experiences attrition of its subjects, as well as a small degree of item-non-response within surveys. As the model above outlines, our outcome variable is measured at different peri-

ods, leaving it vulnerable to both wave- and item-non-response missingness problems. Were we to employ a traditional multilevel regression, we would necessarily have to impute a large proportion of our cases to maintain a high number of observations. At the same time, we would most likely have to case-wise delete cases due to wave-non-response in the outcome variable; since TIPI traits and our approval measures are collected contemporaneously, nearly all such missingness will prevent us from improving our statistical power through imputation. One major advantage of the hierarchical latent measurement model, however, allows us to create a latent personality measure rather than relying solely on the manifest variable at each point in time. As a result, we do not need to impute for many missing cells in our data matrix. To be clear, we do impute missing cases for covariates with ten multiply imputed data sets using maximum likelihood estimation. Still, this approach allows us to limit the proportion of imputation to 2-3 percent of all cases for our time variant covariates (presidential approval and congressional approval).

Survey studies strive for generalizability through nationally representative samples, but for reasons discussed in the preceding discussion on missingness, maintaining such commensurate proportions to the greater population is difficult for panel analyses. As such, any given wave of our panel may not provide the optimal reflection of the population as a whole. For this reason, we have chosen to estimate the model using bootstrapped standard errors derived from 100 random draws.<sup>16</sup>

[TABLE 4 HERE]

Table 4 presents the results of these models. The first two sections of Table 4 present the effects of our chosen covariates on the two outcome variables outlined in the equation above, the TIPI trait at time  $t$  and each individual's latent value for that trait. First, let us consider what drives the constant value of each panelist. Few differences can be drawn between political Independents (the baseline category) and their partisan counterparts. On all five traits, our model produces no

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<sup>16</sup>We also estimated the models with simple robust standard errors. This approach produced identical coefficient estimates, and statistically indistinguishable standard errors for those estimates. The bootstrapping procedure produces significant improvement in the model fit statistics with respect to the Comparative Fit Index (CFI), although the robust standard error approach produces lower RMSEA values.



significant effects at the 95-percent level between Independents and Republicans or Democrats. Nonetheless, we do find that with respect to conscientiousness, extraversion, and emotional stability estimates for both Democrats and Republicans are oppositely signed, suggesting that the two groups display differing levels of these traits.

Other political variables appear to be heavily associated with these latent measurements. Our model's results suggest that the more symbolically conservative one identifies, the less likely she is to score high on the TIPI measure for openness. That is, liberals tend to be more open than conservatives, which strongly conforms to findings in previous studies. To understand the substantive consequences of this predicted effect, consider the difference between a strong conservative (a value of 7 on a 7-point scale) and a strong liberal (a 1 on the scale). The coefficients in this table indicate that all else equal, the conservative would be almost three-fourths of a whole point on the 7-point openness scale lower than the liberal. Hence, these hypothetical politically opposed panelists display substantively different degrees of openness. Similarly, liberals are slightly more likely to be extraverted. Conversely, conservatives are predicted to display a small, but significantly higher level of conscientiousness. Attentiveness to politics also appears to be highly related to these constant measures of personality. Panelists with higher reported levels of interest in public affairs are predicted to have significantly higher levels of openness, conscientiousness, extraversion, agreeableness, and emotional stability. Once again, substantive effects can be considered quite large. The political interest variable is measured on a 4-point scale, meaning the *ceteris paribus* difference in the openness constant between the most politically attuned individual and the least attuned individual is about .6 on a 7-point scale.<sup>17</sup>

Finally, let us examine the political time varying predictors' relationship with TIPI. The model's results suggest that only the trait of openness moves in concert with changes in politi-

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<sup>17</sup>Additionally, we modeled each personality item with a latent trajectory model (LT). Such a model estimates the overall trend for each panelist's relevant trait. As such, we can investigate whether certain time invariant covariates are related to the overall movement in personality during the period of the study. When examining the individual slopes, we find somewhat encouraging null results. For most individuals, the non-political demographic controls do not influence how one's TIPI responses fluctuate over the panel. In addition to being statistically indistinguishable from zero, many of these figures carry a magnitude in close proximity to zero. Yet, we do find that the only time invariant predictors that are statistically associated with the TIPI slope are political in nature (i.e. Democratic partisanship and political interest).

cal views. That is, we find statistically reliable evidence that as one's views of President Obama improve and those towards Congress abate, they report higher levels of openness. At the same time, the results are not as encouraging for Congressional approval and presidential approval's relationship to the rest of the TIPI battery. It should be noted that the opposite directions of effects between presidential and congressional approval has some face validity. For the period of examination, the White House and Congress are controlled by different parties. Thus, higher affect for one institution should be associated with alternative responses on the TIPI scale.

Since openness possesses the only statistically reliable relationship to time-variant political measures within our empirical results, we shall consider the substantive implications of the effects. Roughly 80 percent of all openness scores fall between 4.5 and 7. When considering the substantive effects of the time variant predictors, it is necessary to put this clustered outcome variable distribution into context. While the difference in predicted openness score between someone who very much likes Congress (a score of 5 on the 5 point scale) and someone who assigns the legislature the lowest possible value (1), is quite low, all else equal, this context indicates that the differences are quite significant. *Ceteris paribus*, the predicted difference between these two panelists on any given wave is roughly .14 points on the seven point scale. This change is in line with our expectation that those who tend to be more liberal leaning will exhibit higher levels of openness.

At the same time, the time varying covariates are highly correlated. A panelist with a positive attitude of Congress is likely to have a diametrically opposed view of President Obama. If we were to flip the perceptions of our hypothetical Americans from our preceding paragraph and combine their effects on the measured openness trait at time  $t$ , we now have a predicted difference of about .25 points. Once again, this gap appears to be quite small, when it is in fact substantial. Remember that nearly 80 percent of all observed values fell between a 2.5 point difference between the maximum and 4.5. Such a distribution implies that our model predicts the difference in openness between two polarized panelists to be about 10 percent of the vast majority of observed values.

To reiterate what was suggested above in the discussion of the TIPI and, more generally, personality measurement, openness to experience has been found, in comparison to the other TIPI dimensions, to be of the utmost substantive importance in predicting political outcome variables such as ideology and political participation (e.g. Carney et al. 2008; Gerber et al. 2010; Mondak et al. 2010). Our model suggests that changes in time variant covariates – presidential and congressional approval – relate to changes in respondents’ self-reported openness levels. While scholars have suggested that openness may be less reliable than other TIPI dimensions (Gosling et al. 2003, 523), we have also provided an argument for why we might expect such a dynamic process: individuals who are open to experience are inherently willing to make adjustments in the face of new developments and to integrate new information. Conversely, it is reasonable to say that new developments, new information, or changes in the environment might influence an individual’s inclination to adapt.

In summary, after showing that individual personality as captured by the TIPI tends to vary significantly when measured repeatedly over time, we also find that it does so in systematic ways. Our analysis shows that both socio-demographic and political variables consistently and significantly affect variation in respondents’ latent levels of TIPI traits. These findings are in line with theoretical expectations in the literature in that liberals are more likely to self-report higher levels of openness than their conservative counterparts. By adding time-variant political variables to the analysis, we provide further support to this line of research: higher affect towards a Democratic president is associated with higher levels of openness, while higher levels of approval towards a conservative dominated legislature are related to lower levels of openness. In this way we demonstrate not only the consistency of our analysis, but also that these theoretical relationships previously examined through static cross-sections move in a dynamic manner.

## 6 Conclusion

The Big Five personality battery is a frequently used tool to quantify personality traits, which in turn are commonly assumed to predate and explain political behavior ranging from attitudes to legislative voting. Just as many scholars before us have been concerned with the stability and fluidity of political attitudes (e.g. Green et al. 2004; Highton 2012), we examine how an individual's personality traits vary across time. Challenging some of the conventional wisdom linking personality and political behavior, we present analyses that warrant a careful reconsideration of the assumption that TIPI predates political attitudes and will not vary in response to political phenomena. First, we find individual personality as captured by the TIPI to vary very modestly over time. This is encouraging. Second, however, we show this variability to be consistently associated with political and social variables, which raises serious doubts about the nature of personality as a factor that predates both socio-demographic and – more importantly – political variables. Especially the trait of Openness, which previous studies have consistently found to be a powerful predictor of political actions and attitudes seems to be problematic.

Our study is unique in that it employs data by The American Panel Survey (TAPS), which allow us to analyze the variability as well various political associations with personality traits not only for one or multiple cross-sections, but for a representative panel of 2,007 respondents that covers six waves between February 2012 and November 2013. Based on this panel data, we show that both socio-demographic and political variables systematically and significantly affect variation in respondent's TIPI scores. Presidential as well as Congress approval are associated with significantly less stability in personality as captured by the TIPI.

Certainly, these findings have numerous substantive implications, many of which are unexamined by the current study. Survey respondents' approval of national office holders can easily be a function of environmental phenomena. World events ranging from economic calamities to natural disasters, from armed conflicts to political scandals may be associated with feelings of cynicism about government. Additionally, several natural waxing and waning processes – be it economic conditions or even seasonal weather patterns – may influence an individual's personality, which

in turn affects their likelihood of voting (especially in primaries and other time-varying elections), willingness to engage in political groups, and the like.

In offering this alternative perspective where personality variations are linked – as psychology literature has suggested – to significant events, we seek to contribute to the esteemed scholarship that has long found personality to be highly stable. Going beyond the substantive implications of our research, it may be the case that scholars' measures of personality are not appropriate tools to explain political behavior. In turn, the results of this study should inspire future research, first, to realize that a single measure of an individual's personality may be an inaccurate snapshot, second, to reconsider the assumption that personality predates political behavior.

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## 7 Tables and Graphs

Table 1: TIPI in Political Science: Statistical Relationships

Study's Author(s)	Openness	Conscientiousness	Extraversion	Agreeableness	Emotional Stability
<b>Mondak et al. (2010) (APSR)</b>					
<i>Outcome Variable: Civic Engagement (Voter Turnout)</i>					
	+***	∅	∅	∅	-***
<b>Gerber et al. (2010) (APSR)</b>					
<i>Outcome Variable: Self-Reported Ideology (Liberalism)</i>					
	+***	-***	-**	∅	-***
<b>Gerber et al. (2012a) (AJPS)</b>					
<i>Outcome Variable: Frequency of Political Discussions with Non-Family, relative to mean (interaction terms)</i>					
	+***	∅	∅	∅	∅
<b>Gerber, Huber, Doherty, Dowling, Raso, &amp; Ha (2011) (JOP)</b>					
<i>Outcome Variable: Campaign Participation</i>					
	+***	-***	+***	∅	+*

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01; ∅= null finding.

Table 2: Descriptive statistics: outcome variable and covariates (without imputation)

	min	max	mean	% missing
Age	18.00	100.00	54.71	1.9
Gender [Female=1]	0.00	1.00	0.52	1.8
Education [in years]	2.00	15.00	11.06	1.3
Income [16 categories]	0.00	15.00	5.62	8.5
White	0.00	1.00	0.73	1.9
FNC Viewer	0.00	1.00	0.22	60.0
Children [at least 1 child in household=1]	0.00	1.00	0.31	15.6
Church Attendance [6 point scale]	0.00	5.00	2.34	10.3
Employment status [Employed=1]	0.00	1.00	0.57	0.7
Happiness [5 point scale]	0.00	4.00	3.06	8.3
Wedded	0.00	1.00	0.02	.9
Divorced	0.00	1.00	0.10	1.5
Symbolic Ideology [High=Conservative, 7 point scale]	-3.00	3.00	0.09	6.5
Political interest [4 point scale]	0.00	3.00	2.16	3.5
Party ID [Democrat=1]	0.00	1.00	0.38	16.9
Party ID [Republican=1]	0.00	1.00	0.25	16.9
Political knowledge [10 question battery]	0.00	10.00	6.52	4.1
Presidential approval variation	0.00	5.33	0.44	0.9
Congress approval variation	0.00	5.33	0.64	2.2

*Note:* Based on respondents that completed at least 2 waves where TIPI questions were included. The dataset covers six waves of The American Panel Survey from February 2012 to November 2013.

Table 3: Comparison of coefficients with and without measurement error correction

<b>Openness</b>					
<i>Correlations with measurement error correction</i>					
<b>Wave 1</b>	0.76	0.69	0.84	0.66	0.80
0.60	<b>Wave 2</b>	0.68	0.71	0.64	0.72
0.57	0.58	<b>Wave 3</b>	0.67	0.66	0.73
0.64	0.59	0.55	<b>Wave 4</b>	0.72	0.80
0.55	0.56	0.56	0.59	<b>Wave 5</b>	0.72
0.62	0.57	0.59	0.62	0.62	<b>Wave 6</b>
<i>Correlation without measurement error correction</i>					

<b>Conscientiousness</b>					
<i>Correlations with measurement error correction</i>					
<b>Wave 1</b>	0.72	0.90	0.95	0.74	0.79
0.54	<b>Wave 2</b>	0.79	0.78	0.71	0.82
0.55	0.57	<b>Wave 3</b>	0.81	0.79	0.80
0.57	0.58	0.61	<b>Wave 4</b>	0.76	0.87
0.60	0.59	0.60	0.64	<b>Wave 5</b>	0.81
0.57	0.57	0.60	0.63	0.65	<b>Wave 6</b>
<i>Correlation without measurement error correction</i>					

<b>Extraversion</b>					
<i>Correlations with measurement error correction</i>					
<b>Wave 1</b>	0.81	0.83	0.84	0.78	0.84
0.68	<b>Wave 2</b>	0.84	0.84	0.82	0.81
0.70	0.69	<b>Wave 3</b>	0.89	0.86	0.87
0.71	0.70	0.74	<b>Wave 4</b>	0.85	0.89
0.67	0.68	0.70	0.70	<b>Wave 5</b>	0.85
0.67	0.67	0.71	0.72	0.70	<b>Wave 6</b>
<i>Correlation without measurement error correction</i>					

<b>Agreeableness</b>					
<i>Correlations with measurement error correction</i>					
<b>Wave 1</b>	0.68	0.73	0.74	0.64	0.71
0.58	<b>Wave 2</b>	0.67	0.73	0.62	0.71
0.58	0.58	<b>Wave 3</b>	0.71	0.67	0.70
0.61	0.58	0.61	<b>Wave 4</b>	0.68	0.71
0.57	0.56	0.61	0.61	<b>Wave 5</b>	0.71
0.60	0.56	0.58	0.62	0.64	<b>Wave 6</b>
<i>Correlation without measurement error correction</i>					

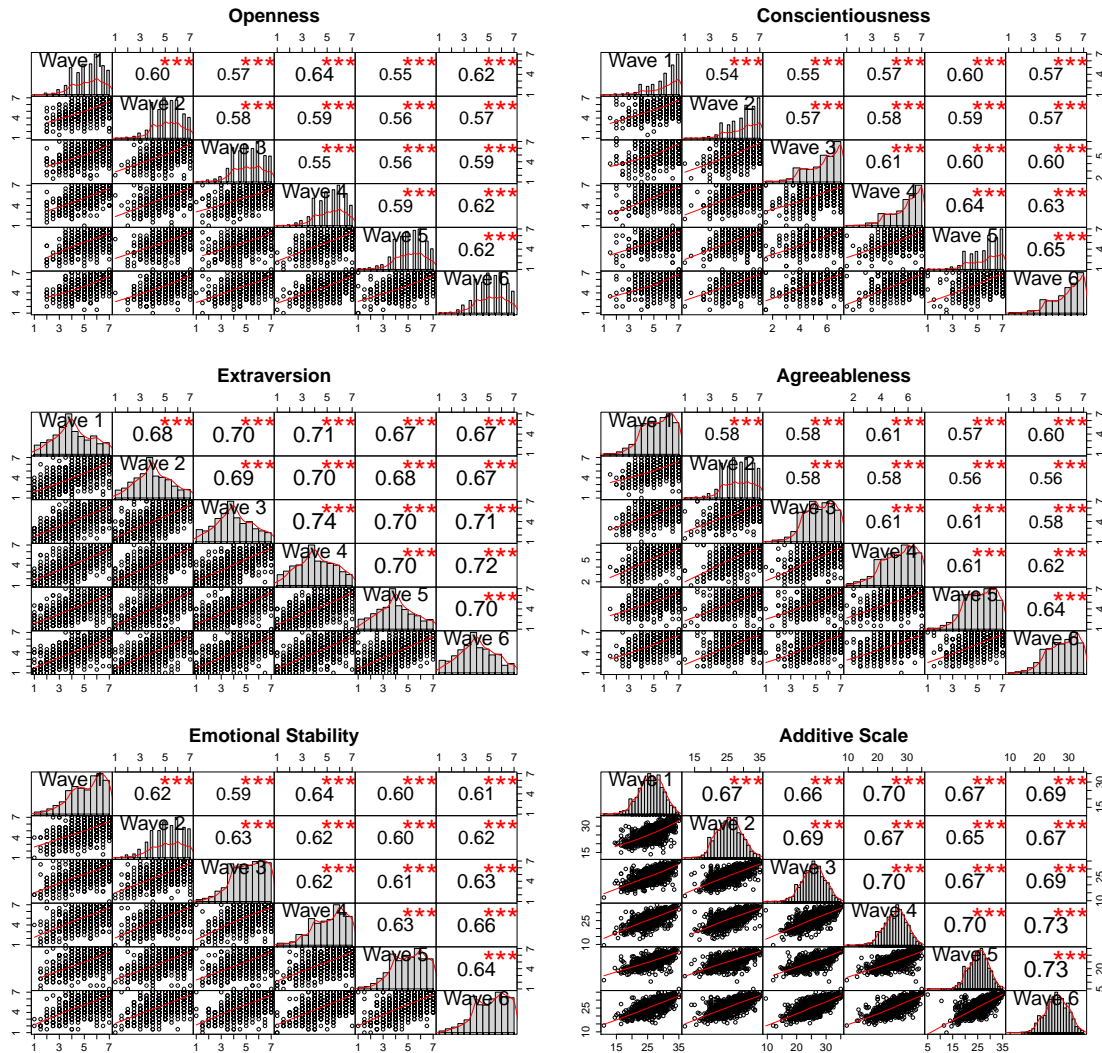
<b>Emotional Stability</b>					
<i>Correlations with measurement error correction</i>					
<b>Wave 1</b>	0.80	0.80	0.82	0.75	0.82
0.62	<b>Wave 2</b>	0.79	0.78	0.74	0.79
0.59	0.63	<b>Wave 3</b>	0.82	0.75	0.82
0.64	0.62	0.62	<b>Wave 4</b>	0.79	0.86
0.60	0.60	0.61	0.63	<b>Wave 5</b>	0.81
0.61	0.62	0.63	0.66	0.64	<b>Wave 6</b>
<i>Correlation without measurement error correction</i>					

Table 4: Determinants of TIPI: Hierarchical Latent Measurement model with time-invariant and time-varying predictors

<i>Time-varying predictors</i>	Openness	Conscientiousness	Extraversion	Agreeableness	Emotional Stability	Scale
Pres. App <sub>t</sub> →TIPI <sub>t</sub>	.029** (.013)	.013 (.013)	.009 (.014)	.012 (.012)	.004 (.014)	.063 (.039)
Cong. App <sub>t</sub> →TIPI <sub>t</sub>	-.034*** (.011)	-.001 (.010)	.006 (.013)	.001 (.012)	.007 (.013)	-.021 (.033)
<i>TIPI Constant</i>						
Intercept	5.432*** (.194)	5.314*** (.192)	4.472*** (.225)	4.484*** (.190)	4.831*** (.217)	24.491*** (.644)
Dem	-.109* (.058)	-.078 (.057)	-.125 (.076)	.013 (.057)	-.121* (.065)	-.421** (.187)
Rep	-.019 (.060)	.075 (.058)	.003 (.082)	.047 (.065)	.104 (.073)	.204 (.214)
Female	.013 (.042)	.138*** (.043)	.201*** (.057)	.464*** (.041)	.018 (.047)	.840*** (.145)
Education	.041*** (.013)	.009 (.013)	-.012 (.016)	.013 (.013)	.020 (.015)	.074* (.044)
Income	-.001 (.007)	.024*** (.007)	.029*** (.009)	-.004 (.007)	.005 (.008)	.052** (.024)
Conservatism	-.108*** (.017)	.035** (.018)	-.087*** (.022)	.010 (.017)	-.016 (.019)	-.170*** (.058)
Happiness	.120*** (.029)	.178*** (.031)	.246*** (.040)	.193*** (.031)	.367*** (.036)	-1.101*** (.103)
Political Interest	.204*** (.027)	.089*** (.028)	.175*** (.036)	.077*** (.028)	.118*** (.032)	0.659*** (.097)
Divorced	-.035 (.073)	-.089 (.073)	-.007 (.089)	-.019 (.067)	.004 (.077)	-.151 (.230)
Children	-.089 (.049)	-.035 (.052)	.032 (.063)	.032 (.050)	-.006 (.059)	-.061 (.174)
Wedded	.042 (.148)	-.140 (.192)	.129 (.186)	.049 (.157)	-.218 (.231)	-.150 (.654)
FNC Viewer	.141* (.080)	-.040 (.073)	.201** (.101)	-.075 (.084)	.069 (.111)	.354 (.308)
Church Attendance	-.023* (.014)	.021 (.014)	.032* (.018)	.051*** (.015)	.029 (.117)	.107** (.050)
Employed	.086* (.046)	.126*** (.047)	.001 (.061)	.046 (.045)	.151*** (.051)	-.415*** (.155)
Age	-.001 (.002)	.006*** (.002)	.001 (.002)	.010*** (.002)	.007*** (.002)	.024*** (.005)
Political Knowledge	-.016 (.011)	-.001 (.011)	-.038*** (.014)	.006 (.011)	.042** (.012)	-.007 (.038)
White	-.203*** (.051)	-.064 (.051)	-.005 (.065)	-.003 (.051)	-.348*** (.058)	-.622*** (.177)
$\sigma^2_\alpha$	.622*** (.023)	.665*** (.027)	1.290*** (.041)	.644*** (.024)	.852*** (.035)	7.950*** (.297)
CFI	.682	.708	.783	.719	.705	.769
RMSEA	.155	.154	.152	.156	.150	.154
$\chi^2$	11177.64	11145.92	10803.92	11393.16	11393.36	11136.37
DOF	228	228	228	228	228	228
<i>N</i>	2007	2007	2007	2007	2007	2007

Note: \*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

Figure 1: Personality Correlation Across Waves (TAPS data)



*Note:* The figure graphs correlations and variances of the different TIPI subscales across the six waves of TAPS data. The diagonal of each graph shows a set of histograms that provide information about the distribution of scores for a given TIPI dimension in a given wave. The lower diagonal of each graph plots the distribution of scores in one wave against the distribution in another wave. The upper diagonal presents Spearman correlation coefficients for the respective relationships and indicates their significance level. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .