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The Convergent and Discriminant Validity of Procedural Justice and Police Legitimacy: An Empirical Test of Core Theoretical Propositions

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ABSTRACT

Purpose: Procedural justice and police legitimacy have been recognized as important antecedents to people's willingness to cooperate with police officers and obey the law. What existing literature lacks, however, is a thorough psychometric examination of procedural justice and police legitimacy with respect to convergent and discriminant validity.
Methods: The present study employs confirmatory factor analysis to examine convergent and discriminant validity and ordinary least squares regression to assess whether revised scales operate similarly to ones used in past research.
Results: Results suggest that the legitimacy construct is not internally consistent and that one of its subscales loads with the procedural justice items to form a single scale composed of both procedural justice and legitimacy items. Regression analyses indicate that the modified measures operate similarly to traditional ones.
Conclusion: It is urged that researchers pursue the theoretical and empirical development of procedural justice and police legitimacy in order to further the study of the normative model of policing.

Introduction

Procedural justice and police legitimacy have become buzz words in the scholarly literature on policing, and for good reason. A steadily-growing body of research shows that citizens' trust in police, willingness to obey officer commands, and general penchant for adhering to the law are shaped, in part, by the belief that police officers extend high-quality treatment to the people with whom they have contact (e.g., Engel, 2005; Reisig, Bratton, & Gertz, 2007; Sunshine & Tyler, 2003; Tyler, 2006; Tyler & Huo, 2002; Tyler & Wakslak, 2004). The way that officers treat people during direct encounters conveys information to members of the public about their social worth—good treatment sends the message that they are valued members of society, while shoddy treatment implies that they have no social merit (see Tyler, 1997). When individuals feel that society accepts them, they are more likely to obey society's rules (Tyler, 1997, 2006); hence, enhanced police legitimacy results in greater compliance with the criminal law (e.g., Murphy, Tyler, & Curtis, 2009; Sunshine & Tyler, 2003).

The procedural justice theory of policing contains four core elements, two that can be viewed as attitudinal (perceptions of procedural justice and police legitimacy) and two that are behavioral (cooperation with police and compliance with the law). Research, however, has yet to fully explore the underlying characteristics and dimensions of the two attitude-based constructs; that is, the psychometric properties of procedural justice and police legitimacy have not been extensively examined. It has typically been assumed that these two phenomena are distinct from one another and are linked together in a sequential fashion whereby procedural justice influences legitimacy. Implicit within this formula are the premises that: (1) Procedural justice and police legitimacy are each unidimensional constructs (i.e., they possess convergent validity); and (2) Both constructs are independent from one another (i.e., they possess discriminant validity).

The convergent and discriminant validity of these constructs merits scrutiny for two reasons. First, the studies of the outcomes of process-based policing are outpacing the research on the social psychological foundations from which these outcomes are thought to flow. It may well be that these constructs are internally consistent and externally distinct, but empirical testing should be conducted before this assumption is accepted as true. Second, existing research offers reason to question the level of convergent and/or discriminant validity present within and between these constructs. As will be detailed later, the two constructs typically manifest strong connections to one another—thus suggesting low discriminant validity—and some prior studies have called the internal consistency of the legitimacy construct into question (Reisig et al., 2007; Tyler, 2006; Tyler & Huo, 2002). These findings warrant further investigation.

The present study is a test of the assumptions of convergent validity within and discriminant validity between procedural justice and police legitimacy. The current endeavor employed self-report survey

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data from a sample of urban university students and a confirmatory factor analytic framework to answer two questions: (1) Are procedural justice and police legitimacy each internally consistent; that is, do they demonstrate convergent validity?; and (2) Are they separable from one another; that is, does discriminant validity appear to be present? The goal was to gain a greater understanding of the psychometric properties of these two constructs.

The antecedents of cooperation and compliance: Procedural justice and police legitimacy

There are, generally speaking, two judgments that people make about the fairness and quality of their experiences with public authority figures such as police: outcome-based assessments and process-based assessments (Thibaut & Walker, 1978; Tyler & Folger, 1980). Both are psychological in nature; that is, they revolve around people's *perceptions* of fairness rather than any objectively-measured fairness index (Murphy, 2008; Piquero, Gomez-Smith, & Langton, 2004; Thibaut & Walker, 1978; Wolfe, 2011). They are related, yet distinct, aspects of people's perceptions of justice during encounters with authority figures.

Outcome-based satisfaction refers to the favorability of the disposition that a person receives at the end of an encounter (e.g., being issued a verbal warning rather than a traffic ticket), while process-based satisfaction (aka, "procedural justice") is a person's approval of the method by which a decision-maker arrived at an outcome. A large portion of people's satisfaction with final outcomes is based on their evaluations of the amount of input they had during the process (Thibaut & Walker, 1978) and the extent to which the decision-maker considered their side of the conflict before arriving at a conclusion (Tyler, 1984). While outcome-based judgments certainly matter in citizens' formation of global attitudes about and satisfaction with agencies of formal control (Murphy, 2009; Myrstol & Hawk-Tourtelot, 2011), procedural judgments are a stronger and more consistent predictor (Sunshine & Tyler, 2003; Tyler & Folger, 1984), particularly in police-citizen contacts that are officer-initiated (Murphy, 2009). It is clear that *how* an authority figure treats a citizen during a personal encounter is as important as *what* the ultimate outcome of that encounter is (Engel, 2005; Sunshine & Tyler, 2003; Tyler & Fagan, 2008).

There has been inconsistency in the specific survey items used to measure procedural justice in policing, but this construct is generally theorized to be a composite of two subconstructs: *quality of treatment* and *quality of decision making* (Reisig et al., 2007; Tyler, 2006). Quality of treatment involves people's assessments about whether and to what extent they believe police treat citizens with dignity and respect. Quality of decision making refers to people's perceptions of police as reaching decisions based on facts, law, and reason rather than on their personal whims. Together, respectful treatment and fair decision-making are thought to form procedural justice.

The importance of procedural justice is that it promotes the belief that police posses legitimate authority to enforce the law and are worthy of being obeyed. This supposition has borne out in empirical studies using survey methods (Hinds & Murphy, 2007; Sunshine & Tyler, 2003; Tyler, 2006; Tyler & Fagan, 2008; Tyler & Huo, 2002; Tyler & Wakslak, 2004) and in those employing systematic social observations of officer-citizen encounters, though the effect in practice may be dependent upon a variety of situational factors in addition to officer actions (Dai, Frank, & Sun, 2011). Procedural justice sparks perceived legitimacy in a way that stereotypical police activities like arrest and coercion do not. It is not enough for the public to view the police as competent in their role as law enforcers—citizens must believe that officers possess the *moral right* to enforce the law, as evidenced by officers' exercise of self-restraint, prudence, and respectfulness (Tyler, 2004, 2006; see also Skogan & Frydl, 2004). Personal or vicarious experiences with police misconduct can leave individuals with the impression that the police are bullies, are simply out to harass people, or—in extreme cases—are naught but antisocial deviants adorned with accountability-deflection badges (Gau & Brunson, 2010; Skolnick & Fyfe, 1993).

Police legitimacy, like procedural justice, is theorized to be an overarching construct that encompasses smaller subconstructs. The subconstructs of legitimacy are *trust* and *perceived obligation to obey* (Reisig et al., 2007; Tyler, 2006). Trust in police is typically measured using survey items that tap into respondents' beliefs that police respect citizens' rights and make decisions that are good for the local community. Perceived obligation to obey is the belief that it is wrong for citizens to defy officers. These two subconstructs are, theoretically, convergent with one another and distinct from the two subconstructs that make up procedural justice. As outlined above and described in more detail later, this assumption formed the groundwork for the present study.

The ultimate reason that procedural justice and police legitimacy are consequential is that they work in tandem to produce compliant behavior among the populace. Police legitimacy enhances people's willingness to obey the criminal law and its authorized enforcers. Securing widespread compliance with formal rules of conduct is a daunting task for police. There are two ways they can go about executing this responsibility. First, they can attempt to garner *instrumental compliance*, which is a deterrence-based form of obedience premised upon police officers' state-sanctioned authorization to investigate, arrest, and—when necessary—use force against law-breakers. Under an instrumental compliance model, people obey police commands and follow the law because they fear apprehension and punishment. The instrumental approach is likely somewhat effective at inducing compliance (Nagin, 1998), but deterrence via the threat of formal sanctions has proven to be a weak method of securing widespread legal conformity (Pratt & Cullen, 2005). Coercion can, moreover, have the unintended ramification of actually increasing rebellious behavior by alienating those who are subject to formal sanctions and severing their commitment to mainstream society (Unnever, Colvin, & Cullen, 2004; Sherman, 1993). Even those persons who are deferent and submissive while in officers' presence may immediately resume their miscreant activities as soon as the officers are out of sight (Mastrofski, Snipes, & Supina, 1996; Tyler, 2004). Police agencies do not have the resources to monitor every citizen all the time, nor would such surveillance be socially desirable even were it feasible.

Instead of an instrumental approach to behavioral regulation, then, democratic governments must rely on large-scale voluntary compliance. *Normative compliance* stands in contrast to the instrumental model in holding that people internalize a perceived obligation to obey the law when they feel that the law is just and moral (Tyler, 2004, 2006; Tyler & Huo, 2002). Normative compliance comprises two domains: *cooperation* with police and *compliance* with the law in general. Citizen cooperation is vital to police work—officers spend a considerable amount of their on-duty time attempting to correct misbehaving individuals by requesting or ordering them to cease their disruptive actions. Cooperation is more likely when officer legitimacy is high (Mastrofski et al., 1996; McCluskey, Mastrofski, & Parks, 1999; Reisig et al., 2007; see also Dai et al., 2011). Officers who lack the necessary means for encouraging voluntary cooperation must rely more heavily on threats, coercion, and force to gain or maintain control during encounters with citizens (Mastrofski et al., 1996; McCluskey et al., 1999). This jeopardizes officer and citizen safety, increases officers' overall workload, and impedes the effective allocation of police resources (McCluskey et al., 1999; Tyler, 2006).

Compliance with criminal and civil laws is the other behavioral consequence of police legitimacy. Legitimacy has been linked to law-breaking behavior at the individual (Murphy, 2005; Murphy et al., 2009; Paternoster, Brame, Bachman, & Sherman, 1997; Reisig et al., 2007) and aggregate (Kane, 2005) levels. It also prompts citizens to be more willing to collaborate with police and to offer information about crimes and suspects, thus making legitimacy a fulcrum of both crime control and the coproduction element of community policing (Reisig, 2007; Tyler & Fagan, 2008) and homeland security at the local level (Tyler, Schulhofer, & Huq, 2010; see also Schulhofer,

Tyler, & Huq, 2011). Legitimacy can be a powerful tool that makes police more efficient and effective.

In sum, there is considerable empirical support for the theorized link between procedural justice and police legitimacy, and between police legitimacy and cooperation and compliance (e.g., Hinds & Murphy, 2007; Murphy, 2009; Murphy et al., 2009; Reisig et al., 2007; Sunshine & Tyler, 2003; Tyler, 2006; Tyler & Huo, 2002). What is missing, however, is a thorough treatment of the constructs of procedural justice and legitimacy themselves; that is, there is an assumption endemic to the procedural justice theory framework that these two domains are unidimensional in and of themselves and are also conceptually and empirically distinct from one another. While this may be the case, it is necessary to demonstrate the veracity of this assumption. Researchers such as Maguire and Johnson (2010) and Reisig et al. (2007) have noted the paucity of attention paid to the measurement properties of attitudes toward the police in general, and procedural justice and police legitimacy in particular. There is noted content overlap between many of the items (Maguire & Johnson, 2010) and existing studies raise questions about the interitem relationship within and between these constructs. The next section defines convergent and discriminant validity and discusses reasons for suspecting that procedural justice and police legitimacy may suffer from deficiencies in one or both of these measurement properties.

Measuring procedural justice and police legitimacy: Issues of convergent and discriminant validity

Procedural justice and police legitimacy scales are typically constructed on the basis of some combination of correlations, alpha coefficients, and/or exploratory factor analyses (Reisig et al., 2007). All of these analyses are important, useful prologues to more advanced statistical tests, but the problem in this body of research is that these tests are used as analytic ends in and of themselves rather than as precursors to more rigorous procedures. A pressing problem facing existing procedural justice and police legitimacy scales is the absence of rigorous examinations ensuring convergent and discriminant validity within and among these constructs, respectively. These are two essential properties of any methodologically-sound latent construct (Bollen, 1989).

Convergent validity refers to the internal consistency of a set of items. It is a measure of the strength of the relationships between the items that are predicted to represent a single latent construct (Brown, 2006). A given set of items theorized to represent a construct must: (1) Be strongly related to one another; and (2) Represent one and only one factor. High interitem correlations, alpha coefficients, and factor loadings are good indicators of convergent validity, but they have shortcomings that make them less-than-ideal measures. Cronbach's alpha is one of the most common methods that researchers employ to demonstrate the coherence of scales; however, this statistic does not demonstrate unidimensionality (Cortina, 1993; Schmitt, 1996), so a high alpha is no assurance that a particular scale taps one and only one latent construct. Exploratory factor analyses (EFAs) can speak to the dimensionality issue (Kim & Mueller, 1978), but as discussed in more detail below, they do not permit hypothesis testing and do not provide measures of the overall quality of proposed factor structures (Gau, 2010a).

Discriminant validity involves the relationship between a particular latent construct and others of a similar nature (Brown, 2006). Discriminant validity is present when the correlations *among* manifest indicators of a single construct are greater than the correlations *between* those items and the items representing other latent factors (Bollen, 1989; Kline, 2005). In other words, while a set of manifest variables theorized to represent a single latent factor should hang together as a unit, each variable should also be clearly separable from indicators of other factors. Additionally, between-factor correlations should be small enough such that the inference can be soundly drawn that the factors are distinct constructs rather than different facets of a larger latent variable (Gau & Pratt, 2008; Kline, 2005).

Convergent and discriminant validity matter greatly to any psychological construct. It is a particularly pressing issue with respect to the theory of procedural justice because, as described above, procedural justice and police legitimacy are thought to each be composed of two subconstructs. Ideally, the two subconstructs from each construct would exude convergent validity with one another and discriminant validity from the other two. It is unknown at this point, due to an absence of empirical testing, whether or not this is the case.

There is reason to suspect that procedural justice and police legitimacy might suffer from a lack of discriminant and/or convergent validity. The concern regarding discriminant validity arises from the consistent and usually strong relationship between the two constructs. Table 1 contains a list of bivariate correlations and multiple regression betas reported by some of the major studies that have tested for a relationship between procedural justice (measured as "quality of treatment" and "quality of decision-making") and police legitimacy (measured as "trust in police" and "perceived obligation to obey police"). Those studies using alternative measurement strategies—and there are several—are excluded from the table in order to standardize the results somewhat. As can be seen, correlations and standardized regression coefficients range from moderate to very strong.

Some researchers have noted the high correlations between their procedural justice and police legitimacy measures and have probed for discriminant validity. Hinds and Murphy (2007) conducted an EFA and found that the legitimacy and procedural justice items loaded on two separate factors. Reisig et al. (2007) did extensive EFA testing and correlational analyses to identify and eliminate items that appeared to be part of both constructs in an effort to reduce content overlap. When entering the final scales into regression models, they assessed variance inflation factors and tolerances for multicollinearity; they ultimately concluded that discriminant validity had been reasonably established.

The convergent validity of the legitimacy construct has also been called into question. Tyler (2006) noted that the correlation between trust and obligation was small ($r = .26$, p. 47). He initially combined the two subscales to form a single legitimacy index, but upon entering them into the model separately, he found that perceived obligation to obey predicted compliance much better than support did. Reisig et al. (2007) also argued for separation after finding that institutional trust predicted cooperation and compliance while perceived obligation to obey did not.[1] This result was opposite that arrived at by Tyler (2006) and reinforced the need for more development of the measurement properties of legitimacy. The discrepant predictive capacities of these two subscales hint that they are independent of one another rather than being two components of a single concept. Another point of note is the low loading that perceived obligation to obey evinced in Tyler and Huo's (2002) study. A structural equation model using Chicago panel data (p. 81) showed loadings between .27 and .36 for the obligation to obey item; by contrast, the trust item loaded on legitimacy between .85 and .90.

While not speaking directly to the issue of convergent or discriminant validity, Tyler's (2006) bivariate correlation matrix (p. 228) cast further doubt about the connection between trust and perceived

Table 1
Relationships between Procedural Justice and Police Legitimacy in Past Studies

Study	*Bivariate Correlation*	*Multiple Regression Beta(s)*
Hinds and Murphy (2007)	.51	.35
Reisig et al. (2007)	.73; .65*	.55
Sunshine and Tyler (2003)	N/A	.74; .44; .35
Tyler (2006)	N/A	.22; .31; .27
Tyler and Huo (2002)	N/A	.20†

* The correlation between these scales fell when the authors dropped items that appeared to cross-load.

† The impact of procedural justice on police legitimacy was indirect. The total effect was computed by multiplying the two path coefficients .90 and .22.

obligation to obey and each of these scale's relationship with the constituent subscales of procedural justice. (It is worth noting that Tyler's measurement of these concepts differed from many other studies on this subject, including the present one.) Obligation to obey correlated with procedural justice's fairness scale at .07 (ns) and with the treatment quality scale at .13 ($p<.01$); support for the police, by contrast, correlated with fairness and treatment quality at .13 ($p<.01$) and .32 ($p<.001$), respectively. The varying strengths of these correlations, including the absence of a correlation in one instance, raise questions about the strength and nature of the relationship between the different elements of procedural justice and police legitimacy.

To sum up, some prior studies have broached the issue of convergent and discriminant validity, but more testing is needed in order to establish that: (1) Each internally consistent; and (2) Clearly separable from one another. These questions are best answered using confirmatory factor analysis (CFA), a structural equation modeling (SEM) technique that allows researchers to propose theory-driven factor structures and then determine how closely those proposed models reproduce the pattern of observed covariances among the variables under examination. The loadings and eigenvalues offered by exploratory factor analyses are informative, but EFAs do not assess total model fit or between-factor correlations. Confirmatory factor analysis, by contrast, allows researchers to specify *a priori* models, to assess how well each hypothesized model matches the underlying covariances in the data, and to compare the relative fits of competing models to determine which one appears to be a better representation of the data (Gau, 2010a). As a result of its ability to perform these functions, CFA is a mainstay for empirically testing theoretical predictions about convergent and discriminant validity (Bollen, 1989; Brown, 2006; Kline, 2005).

Current focus

The present study tested the convergent and discriminant validity of the two concepts that have been demonstrated to be important antecedents of compliance behavior: procedural justice and police legitimacy. No published studies of procedural justice or police legitimacy have employed CFA to assess the psychometric properties of these two latent variables.[2] Some key work has been done by Reisig et al. (2007) and this issue should continue to be examined. The present research takes a step in that direction. The results had two potential outcomes, both of which had implications for procedural justice theory. Results showing that both types of validity were present would validate the psychometric strength of these constructs; on the other hand, apparent problems with one or both constructs would serve as a cautionary note for scholars and, hopefully, a springboard for future research on the topic.

Methodology

Data

The data used in this study come from self-report surveys that were distributed to students at a large, urban university in Southern California. While student samples have limitations, they are useful and evidence suggests that results of studies using student samples are generalizable to non-student populations (Wiecko, 2010). Important studies in the area of procedural justice and police legitimacy have employed student samples (Piquero et al., 2004; Wolfe, 2011). Casper, Tyler, and Fisher (1988), moreover, compared results they obtained from an analysis of felony defendants to those previous researchers had uncovered using students and discovered that the two sample types produced the same basic conclusions regarding the importance of procedural justice. This lends credence to the use of student samples in this type of research, though replication of the present study on a probability sample is advisable.

Survey instruments were distributed in multiple classes taught by multiple instructors across the span of three quarters in an effort to gather a sample that was diverse and of reasonable size. Care was taken to ensure that each participant completed only one questionnaire. Most surveys were administered in class during regularly-scheduled meeting times in order to reduce self-selection effects. The final sample ($N=210$) was 61.2 percent female, 49.8 percent Latino, 26.3 percent white, and 11.0 percent black, with a mean age of 24.8 years (median = 23). The sample bore substantial demographic similarity to the entire university, with the only difference being an overrepresentation of Latinos (who make up 40 percent of the university student body) and a slightly higher median age relative to the university as a whole (university median = 21). Whites and blacks were represented proportionately, as were women and men.

Variables

The variables were selected on the basis of prior studies of procedural justice and police legitimacy (e.g., Murphy et al., 2009; Reisig et al., 2007; Sunshine & Tyler, 2003; Tyler, 2006; Tyler & Huo, 2002; Tyler & Wakslak, 2004), with particular emphasis placed on using variables endorsed by Reisig et al. (2007) after their in-depth analysis of factor loadings, interitem correlations, and multicollinearity that led them to retain certain variables and drop others. All variables were measured on six-point Likert-type scales ranging from "strongly agree" to "strongly disagree" and were reverse coded so that higher numerical values meant more of the characteristic being assessed. Table 2 contains a

Table 2
Procedural Justice and Police Legitimacy Items and Principal Component Analysis Factor Loadings

Construct	*Item*	*Loading: Two Factors*		*Loading: One Factor*	
		Component 1	*Component 2*	*Component 1*	*Component 2*
Procedural Justice ($\alpha=.919$)					
Quality of treatment	1. Police in my community treat people with dignity and respect	.905		.882	.153
	2. Police in my community treat people fairly	.934		.903	.221
	3. Police in my community take time to listen to people	.891		.856	.106
Quality of decision-making	4. Police in my community explain their decisions to people they deal with	.841		.781	.340
	5. Police in my community make decisions based on facts and the law and not on their own personal opinions	.777		.729	.184
Police Legitimacy ($\alpha=.806$)					
Trust in Police	6. People's basic rights are well-protected by the police in my community	.848		.847	.146
	7. The police can be trusted to make decisions that are right for my community	.887		.863	.094
	8. Most police officers in my community do their jobs well	.922		.901	.067
	9. The police in my community are generally honest	.859		.816	.123
Obligation to Obey	10. You should accept police officers' decisions even if you think they are wrong	.222	.768	.258	.775
	11. When the police issue a formal order, you should do what they say even if you disagree with it	.096	.758	.113	.759
	12. Disobeying the police is seldom justified	.074	.643	.042	.646

full variable list. SPSS was used for univariate analyses and for multiple regression, and the structural equation modeling program Mplus was employed for the CFA.

Analytic strategy

A core technique in studies seeking greater understanding of factor structures is to posit multiple potential models and pit those different formulations against one another. In CFAs and all other types of structural equation models, "good fit" is not tantamount to "best fit." It would be fallacious to conclude on the basis of a single CFA that a particular well-fitting model is the best or only possible model because it could well be that another, unanalyzed model would fit as well or even better. The overarching purpose of the current analysis, therefore, was to find the model that did three things: (1) Provided a good *absolute* fit to the data; (2) Provided the best *relative* fit to the data as compared to the other models; and (3) Contained as few parameters as possible (i.e., was as parsimonious as possible in light of the fit indices). It was decided *a priori* that the model conforming to all three requirements would be the one that was accepted. That model would then be entered into a regression predicting cooperation with police and compliance with the law.

To achieve this goal, multiple analytical stages were needed. First, three theoretically-driven models were specified on the basis of prior research and current objectives. Each model is described below, along with the hypothesis the model represented:

- *Model 1: Four-factor solution.* The first model was the most complex and portrayed each of the four subconstructs as distinct. Hypothesis: Convergent validity is present within each subconstruct, but not within the larger constructs of procedural justice and police legitimacy; that is, the four subcomponents display complete discriminant validity from each other.
- *Model 2: Two-factor solution.* Here, each subconstruct was situated within its larger construct. This is the formulation of these concepts that is most often used in the research and it was therefore deemed important to put this standard construction to the test. Hypothesis: Procedural justice and police legitimacy display a balance between convergent and discriminant validity.
- *Model 3: One-factor solution.* The third theory-driven model was a one-factor solution wherein all items were hypothesized to be indicators of just a single latent factor. If discriminant validity is utterly lacking, then procedural justice and police legitimacy are actually two parcels of a single construct. Hypothesis: There is no discriminant validity between procedural justice and police legitimacy; they are the same thing.

The second step in the analysis was to evaluate each estimated model according to fit indices, factor loadings, between-factor correlations, and modification indices. The final stage of the CFA portion of the analysis involved the construction of a data-driven model that permitted the observed covariances present in the data to guide the form and shape of a new factor structure. This model was compared to the three theory-driven models in order to decide—based on the three aforementioned criteria—which one would be taken as the final formulation and used in the regression analyses.

Results

To keep the current results consistent with the strategies generally employed by researchers in this area of study, exploratory factor analyses (EFAs; principal components analysis with varimax rotation), Cronbach's alphas, and correlations were computed as initial tests for convergent and discriminant validity. The correlations between the four subconstructs are in Appendix A. The full list of items, loadings, and alphas is located in Table 2. Exploratory factor analyses were conducted for procedural justice and police legitimacy separately (these results appear under the "Two Factors" heading) and for all 12 of the items ("One Factor" heading).

It can be seen in Table 2 that the three items measuring perceived obligation to obey consistently loaded disparately relative to the other items. This was true whether procedural justice and legitimacy were treated as two separate constructs or as a single factor. While curious in light of the theorized unidemensionality of police legitimacy, these results were not unprecedented and mirrored Tyler's (2006) and Reisig et al.'s (2007) findings (described above). In both of these studies, the legitimacy construct displayed a tendency to break into its two constituent item sets, thus suggesting the existence of multidimensionality within legitimacy. At the EFA stage, then, the current data behaved similarly to those used in existing studies that have addressed this matter.

Prior to being entered into Mplus, two "housekeeping" tasks were completed. First, the data were checked for normality. Two variables had skew values of just over 1.0 and one had a kurtosis value of slightly less than −1.0. This is not an alarming level of nonnormality and was addressed by using robust maximum likelihood estimation (Byrne, 2012). Second, the proposed models were assessed for identification. Model identification is the method of determining degrees of freedom in SEM and is based on a comparison between the number of nonredundant elements in the variance/covariance matrix and the number of free parameters in the model. Models must be overidentified (i.e., have positive degrees of freedom or, in other words, more nonredundant elements than free parameters) in order to produce a unique solution. Models that are just identified (i.e., have no degrees of freedom) will run but are worthless for theory-testing because the solution is not unique and fit will be perfect every time. The presence of more parameters than nonredundant elements results in underidentified models that have negative degrees of freedom and cannot be estimated. This comparison between the variance/covariance matrix and the free parameters is not a guarantee of model identification—identification is a persistent and intractable issue in SEM—but it is a good first step and is likely sufficient for present purposes because the models here contain none of the features that often cause identification problems (e.g., nonrecursive paths; see Bollen, 1989).

The number of nonredundant elements is computed as $v(v+1)/2$, where v = the number of manifest variables in the analysis. With the 12 variables used here, there were 78 elements, which exceeded the number of free parameters in every model. Identification was considered to have been established and the analyses proceeded to the estimation and evaluation stages.

Model fit was evaluated using the chi-square goodness-of-fit test, comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR). No fit index is, by itself, fully indicative of model fit; SEM models must be evaluated holistically using a multiple presentation method. The CFI is normed and ranges from 0 to 1.0, with values equal to or greater than .950 being considered quite good (Hu & Bentler, 1999) and values between .900 and .949 being considered possibly acceptable, depending on the values of the other indices. The RMSEA and SRMR are measures of error and, therefore, will be close to zero when a model provides a good fit to the data. RMSEA values should be .05 and less for very good models and between .06 and .10 for acceptable models. The SRMR should be .06 or less (Hu & Bentler, 1998, 1999). Table 3 contains the results for the three hypothesized models.

Table 3
CFA Results for the One- Two- and Four-Factor Hypothesized Models

Model	*MLM* χ^2	*df*	*CFI*	*RMSEA*	*SRMR*	*Loading Range*	*Between-Factor Correlation(s)*
Four-Factor	60.698ns	48	.985	.046	.031	.388 - .952	.408 - .949
Two-Factor	106.823*	53	.938	.090	.063	.172 - .947	.943
One-Factor	120.245*	54	.923	.099	.061	.177 - .935	N/A

* $p < .001$.

The four-factor model yielded mixed results with regard to fit and quality. Looking at just the fit indices, one would be tempted to conclude that the model was good; however, the loadings and between-factor correlations bespoke of serious problems in the structure. The lowest loading (.388) belonged to the item "Disobeying the police is seldom justified." This variable was one of the three indicators of perceived obligation to obey. To examine the extent to which this item may have been exerting a deleterious impact on the model, it was dropped and fit was reassessed; the χ^2 became statistically significant at $p<.05$, the CFI dropped to .978, the RMSEA rose to .062, and the SRMR rose to .032. These values were still within acceptable limits, but the changes nonetheless implied that excluding this low-loading variable was not a viable method of improving the four-factor model.

The biggest problem with the four-factor model was that several of the factors correlated very strongly with one another. Factors representing related constructs should be moderately correlated with each other, but extremely high correlations (generally speaking, correlations above .85; Gau & Pratt, 2008; Kline, 2005) indicate a lack of discriminant validity. Here, the highest between-factor correlations were .949 (quality of treatment with quality of decision making), .925 (quality of treatment with trust), and .932 (quality of decision making with trust). The only factor that did not correlate dramatically with the others was obligation to obey—correlations between this factor and the others ranged from .408 to .586. As was foreshadowed by the correlations and EFA run prior to the CFA, as well as by the works of Tyler (2006) and Reisig et al. (2007), perceived obligation to obey seemed to stand out from its three counterparts.

The two-factor model results were the next to be examined. The model χ^2 was statistically significant, but this statistic's sensitivity to sample size militates against reaching any conclusions on that basis alone. The CFI, RMSEA, and SRMR were borderline-to-unacceptable, though, so in conjunction with the significant χ^2, it was decided that this was a substandard model. Several low factor loadings were also observed and, not surprisingly given the emergent results thus far, they were all among legitimacy's manifest indicators of perceived obligation to obey (loadings = .386, .242, and .172). These items simply did not converge with the other legitimacy variables, all of which had loadings of at least .814. Police legitimacy, therefore, demonstrated a lack of convergent validity insofar as trust and obligation to obey appeared to be independent constructs.

The procedural justice construct, by contrast, evinced uniformly high loadings (lowest = .704). The problem, however, with the two-factor solution was that once again, an unacceptably strong correlation (r = .943) emerged between the two factors. Discriminant validity was not present. To sum up the two-factor model, then: (1) Legitimacy lacked convergent validity; (2) Procedural justice enjoyed convergent validity; and (3) The two constructs failed to display discriminant validity. This model was rejected.

A one-factor solution was attempted as a means of addressing the discriminant validity issue. All four fit indices conveyed the message that this was not a good model, and the problem again seemed to lie with the perceived obligation to obey items, all of which loaded poorly-to-modestly on the single construct (loadings = .177, .257, .409). Omitting these items from the factor caused the CFI to jump to .957, the RMSEA to drop to .094, and the SRMR to decline to .028, which implied a noteworthy improvement in fit without these items; however, obligation to obey is too central to established procedural justice theorizing (e.g., Tyler, 2006) to be summarily tossed into the dustbin on the basis of one contradictory finding. Further analysis was warranted.

To that end, the final model was a data-driven one based on the conclusions derived from the three theory-based models presented above. It was determined that the most promising factor structure would be a two-factor solution wherein the first factor contained the procedural justice items and trust items and the second factor represented perceived obligation to obey. The results are displayed in Table 4.

Table 4
Fit Indices for Two-Factor Data-Driven Model

MLR χ^2	*df*	*CFI*	*RMSEA*	*SRMR*	*Loading Range*	*Between-Factor Correlation*
89.544*	53	.958	.075	.036	.369 - .934	.460

* $p<.01$.

This model was considered the best of the four because it met the three *a priori* strictures outlined above. First, its absolute fit was acceptable. Second, it fared well in fit relative to the other three models. The only model that provided a better fit to the data was the four-factor model, but that model was rejected on grounds of low factor loadings and high between-factor correlations. This last model was the only one that fit the data well *and* displayed reasonable convergent and discriminant validity, albeit convergent validity was somewhat questionable among the obligation to obey items due to the .369 factor loading for the item "Disobeying the police is seldom justified." This item was consistently the lowest-loading in the entire variable set. Omitting it from final model or from any of the other models, however, did not substantively alter model fit, so it was retained.[3] Lastly, this model was reasonably parsimonious. It was not the simplest model—that label goes to the one-factor solution that was considered and rejected—but a two-factor solution is well within reasonable complexity limits.

The final step in the analysis was to conduct ordinary least squares (OLS) regression analyses[4] to test the predictive capacity of the new formulations of procedural justice and police legitimacy. As aforementioned, legitimacy engenders cooperation with police commands and compliance with the law. Citizens who obey the law out of respect for it—rather than merely out of fear of being caught and punished for wrongdoing—self-regulate and thereby enhance public safety, bolster police effectiveness by freeing officers to focus on serious problems (Tyler, 2004), and pose less of a threat to individual officers during face-to-face contacts.

The data set contained six-point Likert-type items measuring respondents' cooperation with police and five-point questions asking them about their compliance behavior. These items were entered into a two-factor CFA to test for convergent and discriminant validity. A full list of items, CFA factor loadings, and fit indices is located in Appendix B. The two-factor model fit the data very well as indicated by the fit indices and high factor loadings for most of the items,[5] and the modest between-factor correlation (r = .461) manifested an adequate level of discriminant validity between the latent variables. For purposes of OLS, the scales were constructed using weighted factor scores to allow higher-loading items to exert greater influence. Table 5 contains descriptive statistics for all variables used in the regression.

Table 5
Descriptive Statistics for all Variables in OLS Regression (N = 210)

Variable	*Minimum – Maximum*	*Mean (sd)*
Procedural justice*	−2.35 – 1.56	.00 (1.00)
Obligation to obey	−2.58 – 2.12	.00 (1.00)
Cooperation	−3.60 – 1.09	.00 (1.00)
Compliance	−6.79 – 1.25	.00 (1.00)
Age	19 – 63	24.80 (6.17)
Male	0 – 1	.39 (n/a)
White	0 – 1	.26 (n/a)
Black	0 – 1	.11 (n/a)
Latino	0 – 1	.50 (n/a)
Asian	0 – 1	.03 (n/a)
Other	0 – 1	.11 (n/a)
Household income	1 (≤ $19,000) – 8 (≥ $80,000)	median = 3.00
Number times arrested in life	0 – 13	.29 (1.09)
Number of contacts with police in past 6 mos.	0 – 25	1.10 (2.21)

* Modified scale containing quality of treatment, quality of decision making, and trust. All scales are standardized.

The procedural justice, cooperation, and obligation to obey scales were all normally distributed; however, the compliance scale was skewed to the left, a product of respondents' tendency to report high levels of compliance. No transformations succeeded in normalizing the scale. To ensure that ordinary least squares (OLS) regression would not produce misleading results, the scale was divided into quartiles and put through an ordinal regression. The results were nearly identical to those produced using OLS, with the sole exception being that "number of times arrested" went from marginally significant to nonsignificant. (The ordinal regression had a Nagelkerke R^2 of .135. Obligation to obey's coefficient was .477 [SE = .147; $p<.01$] and its Wald statistic was 10.561. Age was significant at the .05 level [coefficient = .054, SE = .023, Wald = 5.680]. See also Endnote 3). For simplicity, then, the OLS coefficients were selected to be presented here.

Prior to running the regression analyses, a correlation matrix was examined. None of the correlations were high enough to suggest that multicollinearity might be a problem. Three OLS models were then estimated with obligation to obey, compliance with police, and cooperation with the law as outcome variables. The variance inflation factors, tolerances, and condition indices were sufficiently low, high, and low (respectively) so that it was clear that multicollinearity was absent. Table 6 contains the results of these three analyses.

The new procedural justice scale (containing the traditional subscales of quality of treatment and quality of decision making plus the legitimacy subscale of trust) was a significant and strong predictor of obligation to obey ($\beta = .282$). This result comported with prior studies' findings that procedural justice affects people's beliefs that the police deserve deference and obedience (e.g., Murphy, 2009; Sunshine & Tyler, 2003; Tyler, 2006; Tyler & Wakslak, 2004). The methodological "take-away point" from this is that moving the trust subscale out of legitimacy and entering it into the procedural justice scale did not alter the results—procedural justice still generated a sense of obligatory obedience. This is not to say that the trust construct is meaningless, but it does indicate the need for further theoretical and empirical development to better define this concept. The legitimacy construct, too, warrants further examination, given that one of its subscales (trust) seems to be a better *predictor* of the other (obligation to obey) than fellow member of a common factor.

The second two regression analyses tested the effects of perceived obligation to obey on cooperation and compliance, respectively. Consistent with many, though not all, prior studies, obligation to obey significantly predicted both of these behavioral outcomes (Sunshine & Tyler, 2003; Tyler, 2006; Tyler & Huo, 2002; but see Reisig et al., 2007). There was a positive association between respondents' beliefs in the propriety of abiding by police and their willingness to assist officers and to adhere to the law ($\beta = .283$ and .287. respectively). An important caveat to the predictive capacity of obligation to obey was that this scale explained just 6.8 percent of the variance in cooperation and 7.0 percent of that in compliance. This also comports with existing studies. Tyler (2006) found that legitimacy (measured as a composite of institutional support and obligation to obey, though obligation to obey was found in subsequent analyses to be the driving force within this scale) was a statistically significant predictor of compliance but explained just 5 percent of the variance in compliance when legitimacy was the sole predictor and just 2 percent net of controls. It should be noted, then, that obligation to obey appears to be a useful but not definitive precursor to cooperation and compliance.

Table 6
Ordinary Least Squares Regression Results

	Outcome Variable					
	Obligation to Obey		*Cooperation*		*Compliance*	
Predictor	b (SE)	β	b (SE)	β	b (SE)	β
Procedural justice	.297** (.102)	.282	–	–	–	–
Obligation to obey	–	–	.280*** (.071)	.283	.293*** (.076)	.287
Age	.015 (.015)	-.085	.020 (.011)	.125	.025* (.012)	.157
Male	.352 (.202)	.162	-.010 (.147)	-.005	-.104 (.156)	-.050
Black	-.744 (.373)	-.199	-.256 (.255)	-.080	-.024 (.268)	-.007
Latino	-.327 (.226)	-.155	-.233 (.170)	-.118	-.102 (.179)	-.050
Asian	−1.623* (.713)	-.201	.382 (.412)	.066	-.271 (.433)	-.046
Other	-.484 (.350)	-.135	-.301 (.253)	-.092	.114 (.266)	.034
Income	-.006 (.036)	-.014	.032 (.025)	.086	-.013 (.027)	-.034
Arrests	.022 (.142)	.013	-.250* (.114)	-.151	-.238† (.121)	-.140
Contacts	.001 (.034)	.002	.035 (.030)	.081	.008 (.032)	.017
Constant	-.140 (.459)		-.429 (.333)		-.447 (.351)	
	F = 3.716***		F = 4.035***		F = 2.879**	
	N = 115		N = 198		N = 196	
	R^2 = .263		R^2 = .177		R^2 = .135	

* $p<.05$ ** $p<.01$ *** $p<.001$ †$p=.05$.

Discussion

The purpose of this study was to examine the convergent and discriminant validity of procedural justice and police legitimacy. Prior research has indicated that procedural justice predicts police legitimacy, which in turn affects cooperation and compliance. Procedural justice and police legitimacy are subjective, psychological judgments about perceived fairness (Murphy, 2008; Piquero et al., 2004; Wolfe, 2011) and although it has been argued that they are distinct from one another, little attention has been paid to testing this assumption. The present study was an attempt to open a dialogue regarding the psychometric properties of these constructs. Two main conclusions flow from this analysis.

First, it was noted at the outset that Tyler and Huo (2002), Tyler (2006), and Reisig et al. (2007) all provided evidence suggesting that the perceived obligation to obey subsconstruct was problematic to the larger construct of police legitimacy. The present study affirmed that obligation to obey does not fit in the same factor with trust in the police. The confirmatory factor analyses showed that obligation to obey was a construct all of its own and that although it was related to trust, it did not converge with it to form legitimacy. The first and most pressing conclusion flowing from this analysis, then, is that the content of the police legitimacy construct should be revisited. More work needs to be done to figure out whether it is justifiable to continue treating trust and obligation as part of the same factor or whether, as this and some prior work suggest, the two "subconstructs" are actually constructs of their own and should be treated as such.

The second primary conclusion refers to the absence of discriminant validity between the trust subconstruct of legitimacy and the two subconstructs of procedural justice (quality of treatment and quality of decision making). For procedural justice and police legitimacy to be unique from one another, the items measuring legitimacy must have been moderately associated with but clearly distinguishable from those tapping procedural justice. The tendency for trust to load with the procedural justice items violated this requirement. The data-driven model taken as the best of the four CFA models analyzed here indicated that obligation to obey formed one factor and the remaining three subconstructs formed another. This suggests that, in contrast to prior studies, procedural justice contains quality

of treatment, quality of decision-making, and trust, with obligation to obey operating in isolation.

When plugged into regression analyses predicting cooperation with police and compliance with the law, the modified version of procedural justice and the now-independent obligation to obey scale behaved identically to their respective conventional versions. Procedural justice predicted perceived obligation to obey, and obligation to obey was significantly and positively related to cooperation and compliance. This is consistent with existing research using the traditional procedural justice and police legitimacy scales (Murphy et al., 2009; Sunshine & Tyler, 2003; Tyler, 2006; Tyler & Huo, 2002). The fact that the predictive sequence of these concepts was not disrupted by the alterations made to both procedural justice (which gained a subconsruct) and police legitimacy (which lost one) points strongly toward the need for further psychometric testing to determine just what, exactly, procedural justice and police legitimacy *are* and, just as importantly, *are not*.

It is exceedingly difficult to devise valid measures for constructs that exist only in people's minds and can be colored by things like past experiences and personal characteristics (Murphy, 2008; Piquero et al., 2004; Wolfe, 2011). The customary strategy for assessing convergent validity is the multitrait-multimethod approach whereby different aspects of a construct are measured using different techniques to determine if items tapping a certain trait coalesce even when measured using different modalities. This strategy could be a viable approach to the study of procedural justice in police-citizen encounters if trained observers could rate the quality of interactions and then interview citizens later to gather information about their perceptions. This would be very labor-intensive and may ultimately fall short because if justice is in the eye of the beholder, then even trained observers with standardized coding sheets may be making largely-subjective judgments. Such a research design would, nonetheless, yield insight into the level of coincidence between observers' and citizen/suspects' perceptions of procedural fairness.

Qualitative methods could also be used as a basis for scale development. It is clear from existing research that although people's personal and vicarious experiences with police do affect their overarching attitudes toward this institution of control (Brunson, 2007; Gau & Brunson, 2010), preexisting attitudes about the institution also affect people's perceptions of officers' words and actions during personal encounters (Brandl, Frank, Worden, & Bynum, 1994; Gau, 2010b; Rosenbaum et al., 2005; Tyler, 2006). Sometimes these preexisting attitudes derive not from individual experiences but from the cultural norms into which children are socialized (Brunson & Weitzer, 2011). It would be worth asking people in an open-ended or semi-structured fashion just what it is about police encounters that they perceive as being fair or unfair and why they feel this way. Scholars should seek a better grasp on: (1) The preexisting beliefs, attitudes, and biases that shape citizens' interpretations of their personal encounters with police; (2) The personal characteristics of people—such as race or ethnicity (Lee, Steinberg, & Piquero, 2010), affect intensity (Murphy, 2008), self-control (Piquero et al., 2004), or socioeconomic status (Weitzer, 1999)—that may be related to their fairness perceptions; (3) The impact of cultural norms on the personal values of individuals within that culture (Brunson & Weitzer, 2011); and (3) Precisely what beliefs and attitudes about the institution of policing are affected by fairness judgments and why. This approach would produce suggestions for items that procedural justice and police legitimacy questionnaires should contain. Subsequent survey-based quantitative studies could test the validity and reliability of the items/concepts generated by the qualitative data.

Survey methodology can also be used, though it would take a concerted effort to avoid the folly of permitting the data to drive the theory rather than vice versa. A comprehensive instrument containing a wide variety of the procedural justice and legitimacy items that have been used in existing studies could be administered and extensive data analysis could be done to determine what items seem to load with which other ones and what the common themes are that unite certain groups of items. Once a set of items has been decided upon, the study could be replicated with a new sample to determine if the same items operate in the same fashion that they did in the first study. If they did, support would be offered for whatever item sets and factor structure emerged in the first study; if they did not, new sets and structures could be recorded and a third administration conducted.

Finally, researchers in this area should start using confirmatory factor analysis as a matter of routine. Factor structure should not be taken as a given or be demonstrated using methods like exploratory factor analyses, correlations, and Cronbach's alpha tests. Structural equation modeling software is widely available, user-friendly, and increasingly sophisticated (Gau, 2010a), so it is hard to argue against a policy of institutionalizing CFA as a standard component of procedural justice and police legitimacy analyses.

The present study has limitations. This was a student sample and not a terribly large one; moreover, while the sample matched the university demographically, it did not mirror the demographic composition of society at large. Community, state, or national data should be collected so that the present analyses can be replicated on a more representative sample. Another issue that should be addressed is the way in which the procedural justice-police legitimacy factor structure and predictive sequence may vary across racial and gender groups. Researchers should conduct subsample analyses to tease out the differences and similarities between various segments of the population. Finally, the effect of preexisting attitudes toward police and toward the law in general should be incorporated into research of this sort. Preliminary evidence suggests that people's beliefs in the legitimacy of the criminal law overall may impact the way in which the procedural justice-police legitimacy link manifests in their minds (Murphy et al., 2009).

In conclusion, procedural justice is a vital component of policing and has the potential to make a very real impact on public policy in the form of improved law-abidance and suppressed crime rates. Police officers' behavior can affect citizens' willingness to adhere to the law both at the individual level (Gau & Brunson, 2010) and in the aggregate (Kane, 2005). Moreover, it is a form of compliance encouragement that requires no drastic infusion of money or other resources, and it can actually help cash-strapped police agencies conserve resources (Schulhofer et al., 2011; Tyler, 2004). Procedural justice possesses much potential, but that potential cannot be maximized without meticulous attention to just what it is in police-citizen encounters that encourages citizens to obey the law. It is a concept worthy of continued study.

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Appendix A. Correlations between Procedural Justice and Police Legitimacy Subscales

	1	2	3	4
1. Procedural Justice: Quality of Treatment	1.000			
2. Procedural Justice: Quality of Decision-Making	.786*	1.000		
3. Legitimacy: Trust in Police	.862*	.789*	1.000	
4. Legitimacy: Obligation to Obey	.377*	.433*	.346*	1.000

* $p<.01$.

Appendix B. Confirmatory Factor Analysis Loadings and Fit Indices for Cooperation and Compliance (Two-Factor Model)

Scale and Items	Loading
Cooperation	
I would call the police to report a crime in my neighborhood	.960
I would call the police to report suspicious activity in my neighborhood	.823
I would call the police if I had information about a suspected criminal	.728
I would call the police to report a traffic accident in my neighborhood	.435
Compliance	
How often do you follow laws about where to park your car?	.514
How often do you litter? (reverse-coded)	.569
How often do you follow traffic laws?	.388
How often do you follow laws prohibiting excessive noise?	.491
How often do you follow laws against drug use?	.659
How often do you take small items from stores without paying? (reverse-coded)	.961
CFI = .967; RMSEA = .073; SRMR = .081; χ^2 = 41.880 ($p < .01$) df = 20; between-factor r = .461	

Notes

1. Reisig et al. (2007) found that when trust and obligation to obey were combined to form a single scale, this scale did predict cooperation and compliance. When they disaggregated the scale into two measures, however, only trust was associated with the two outcomes and obligation to obey was nonsignificant.

2. Structural equation modeling with latent variables has been employed by some prior researchers (e.g., Tyler & Wakslak, 2004), but not with the specific intent of assessing the psychometric properties of procedural justice and/or police legitimacy. These studies skip measurement analyses and proceed directly to structural tests. This procedure is not advisable because of the possibility that the measurement model is flawed and that the structural model will therefore also be suboptimal (Byrne, 2012).

3. It is possible that the wording of this item threw respondents off. In the future, researchers may consider a simpler phrasing, such as "Generally speaking, people should do what the police tell them to do."

4. Ordinary least squares regression was selected over the alternative option of running the full models in SEM because the sample size was modest and the SEM models employing both latent and manifest variables required that substantial numbers of parameters be estimated (e.g., direct paths, variances, disturbances, intercepts). The possibility that the parameter estimates could be unstable due to the sample size could not be ignored and OLS was thus chosen as the method to be used. SEM models were run nonetheless, however, and the results were substantively identical to those produced by OLS. The SEM models were also run with all variables specified as categorical to account for the skew present in these scales, and the results did not change.

5. The item "How often do you follow traffic laws?" had a loading of only .388, but deleting this item produced only a minute increase in the CFI and actually increased the RMSEA, so the item was retained for this analysis.

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