GENERAL STRAIN THEORY: ADDITIONAL EVIDENCE USING CROSS-CULTURAL DATA*

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Data from random samples of residents in major cities of Russia, Ukraine, and Greece are employed to test hypotheses about linkages among objective strain, subjective strain, anger, and criminal probability specified in general strain theory (GST). In addition, the potential conditioning effects of religiosity and self-control on the strain/criminal probability relationship are investigated. Results show more challenge than support for GST. In particular, all supportive results are for the Ukrainian sample with the Greek and Russian samples providing little confirmation to the study's hypotheses. Although analyses show some support for the basic premises of GST, using a measure of subjective strain does not improve results, and self-control and religiosity do not seem to condition the effects of strain on criminal probability. Overall, the findings point to contextual specificity of GST as currently formulated and suggest the need for further theorizing.

General strain theory (GST) (Agnew, 1992, 2001, 2006) elaborates notions of strain set forth by Merton (1938, 1968). However, unlike

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Merton's account, which, at least in its earlier formulation, is most appropriate for explaining differences among social units in rates of crime and deviance, GST focuses on individuals (Merton, 1995: 9). According to the theory, people faced with adverse conditions experience a variety of negative emotions, which in turn prompt adaptive behaviors or other responses designed to alleviate strain or the negative emotion associated with it. Under certain conditions, some of those adaptive responses are likely to take the form of criminal or delinquent behavior. Overall, GST goes substantially beyond traditional anomie theory by expanding the list of strains that potentially lead to offending, adding a mediating link of negative emotions, specifying conditions potentially affecting a person's choice of coping strategies, and recently, differentiating between objective and subjective strains (Agnew, 2001).

Our goals in this article are threefold. First, we explore the generality of the basic causal process of GST using adult crime data from three different countries—Russia, Ukraine, and Greece. Second, we add to the limited literature concerning theoretical interlinkages among all of the central variables of GST—objective strain, subjective strain, negative emotions, and crime. Third, we examine the conditioning effects on the strain–crime link of two inclusive variables—self-control and religiosity—each of which incorporates aspects of several specific contingencies cataloged by Agnew (1992).

STRAIN IN GREECE, UKRAINE, AND RUSSIA

The extent to which a person responds to strain with criminal behavior may be influenced by the general degree of strain that people in the social context are experiencing as well as the overall degree of criminal behavior that is occurring. The countries in our study were selected, in part, because they potentially differ in overall strain and criminal behavior.

After some political turmoil in the late 1960s to early 1970s, Greece became the most politically and economically stable country in southeastern Europe. A member of the European Union since 1981, Greece is relatively affluent and has the longest history of democracy in the region (Karamanlis, 2000). In 2004, it ranked 24th on the Human Development Index, which is a measure of education, literacy, life expectancy, employment, and standards of living presented in the Human Development Report by the United Nations (UN) (United Nations Development Programme, 2006). Despite a slight increase in crime rates in the late 1990s, Greece remains one of the safest countries in Europe (Barclay and Tavares, 2003). General quality-of-life markers suggest that Greece is similar to other Western countries where most GST research has been conducted. Thus, one would expect the theory to perform in Greece at least as

well as it does in the U.S.-based studies. Russia and Ukraine, however, have endured drastic political and economic transformations in the past 16 years.

Aside from the instability in the political sphere since the collapse of the Soviet Union in 1991, Ukrainians and Russians have faced multiple challenges at the economic and social levels. It is hardly surprising that the indicators of economic development provided by the UN for Russia and Ukraine are dramatically different from the figures reported for Greece (see appendix A for more information on socioeconomic differences across the three countries). Compared with Greece, both countries have significantly higher rates of infant mortality, lower indices of human development, and poor health care. It is also estimated that between 1989 and 1999, the Ukrainian and Russian crime rates more than doubled (Foglesong and Solomon, 2001; Russian Ministry of the Interior, 2001). Many observers think that unsatisfactory health care, high rates of unemployment and poverty, uncertainty about the future, and moral anomie are likely contributors to increased strain and a surge in crime rates in both Russia (Kim and Pridemore, 2005a, 2005b) and Ukraine (Foglesong and Solomon, 2001). In its original (Agnew, 1992) and revised (Agnew, 2001, 2006) versions, GST contends that strain may be particularly criminogenic if it is long term, repeated, and from numerous sources. The constant need to deal with negative experiences may exhaust one's legitimate coping resources, which makes criminal alternatives more attractive. Furthermore, theorizing about the applicability of GST to foreign contexts, Agnew notes that economic strains are especially potent in producing criminal outcomes (Agnew, 2006: 167). Hence, GST may find especially strong support in Russia and Ukraine, particularly if Agnew's arguments about cumulativity in strain are valid. However, routinely encountered strains may lose their criminogenic effect as individuals learn to accommodate to chronically straining circumstances (see Bolger et al., 1989, and Marco and Suls, 1993, for discussion on chronic stress and habituation, as well as Junger and Polder, 1992, on unemployment and crime). If so, we may find less than normal support for GST in Russia and Ukraine. In other words, relationships between strain and crime in contexts laden with strain may be weaker than in Greece where strains are more likely to be intermittent.

THE CURRENT STATE OF THE THEORY

GST interprets offending as a response to straining conditions, which Agnew (1992) defines as being treated in undesirable ways. Types of strain include 1) loss of positively valued stimuli, 2) experiencing negative stimuli, and 3) failing to achieve desired goals. Such strains are said to trigger

negative emotions, ranging from anger to depression and anxiety, which in turn prompt attempts to alleviate those negative emotions and/or strains associated with them. Choosing criminal or noncriminal coping strategies, as well as the specific forms of coping, is theoretically linked with several individual and contextual conditions (Agnew, 1992, 2001, 2006).

The main premises of the theory have been extensively tested (examples: Aseltine, Gore, and Gordon, 2000; Capowich, Mazerolle, and Piquero, 2001; Hoffmann and Miller, 1998; Langton and Piquero, 2007; Paternoster and Mazerolle, 1994; Tittle, Broidy, and Gertz, 2008). Research confirms associations between strain and negative emotions (Bao, Haas, and Pi, 2004; Brezina, 1996, 1998; Broidy, 2001) as well as between strain and misbehavior (Agnew and White, 1992; Aseltine, Gore, and Gordon, 2000; Baron, 2004; Brezina, 1996; Capowich, Mazerolle, and Piquero, 2001; Hoffmann and Miller, 1998; Mazerolle and Piquero, 1997; Mazerolle, Piquero, and Capowich, 2003; Paternoster and Mazerolle, 1994; Piquero and Sealock, 2000). In addition, the strain–crime link tends to hold in both longitudinal (Agnew and White, 1992; Aseltine, Gore, and Gordon, 2000; Brezina, 1998) and cross-sectional studies (Baron, 2004; Hutchinson, Patchin, and May, 2005; Mazerolle, Piquero, and Capowich, 2003).

However, contrary to the causal chain specified by the theory, associations between strain and crime often persist even with negative emotions held constant (Baron, 2004; Hoffmann and Miller, 1998; Mazerolle and Piquero, 1998; Mazerolle, Piquero, and Capowich, 2003), and some studies report little or no statistical association between negative affect and crime (Aseltine, Gore, and Gordon, 2000; Mazerolle et al., 2000; Piquero and Sealock, 2000; Tittle, Broidy, and Gertz, 2008). Thus, strain may directly impact criminal behavior, bypassing negative emotion altogether.

One of the most important aspects of GST is its specification of several contingencies under which the effects of strain are expected to be stronger or weaker. Studies that investigate the conditional influence of factors theorized to blunt or exacerbate strain effects have been mixed (for example, Agnew and White, 1992; Aseltine, Gore, and Gordon, 2000; Bao, Haas, and Pi, 2007; Hoffmann and Miller, 1998; Jang and Johnson, 2003, 2005; Mazerolle et al., 2000; Moon and Morash, 2004). Not all theorized conditions have been investigated, however, and the body of evidence concerning any given one that has been studied is too sparse to permit strong conclusions. Among the conditional variables, those that seem to encompass and reflect features of many specific contingencies mentioned by Agnew (1992, 1996) also seem to be particularly relevant. Such variables include comprehensive personality characteristics like self-control and the negative emotionality/low constraint syndrome (Agnew et al., 2002). Insisting on the conceptual separation between self-control and the trait of

negative emotionality/low constraint, Agnew et al. (2002: 48) acknowledge that both personality characteristics may condition strain effects in a similar manner. The reason such inclusive personality dimensions may be particularly important is because they seem to encompass at least four of the specific contingencies identified by Agnew (1992) as relevant to whether strain leads to crime—identities, coping resources, constraints on criminal response, and dispositions. Thus, a strained person who has high self-control should less often turn to unconventional coping because such a person is likely to think of himself/herself as a conformist, has more ability to cope conventionally, recognizes and interprets potential costs associated with misbehavior, and has less disposition for turning toward crime. In addition, such a person is probably less irritable and is, therefore, less likely to perceive certain conditions as stressful (Agnew et al., 2002). However, firm conclusions about such overarching personality traits require additional testing (Caspi et al., 1994; Mazerolle and Maahs, 2000; Mazerolle et al., 2000; Paternoster and Mazerolle, 1994; Peter, LaGrange, and Silverman, 2003).

Although mentioned only briefly by Agnew (2006: 91), religiosity is another comprehensive, inclusive variable that may be of particular import as a moderator (Jang and Johnson, 2003, 2005; Piquero and Sealock, 2000). It incorporates the specific contingencies of initial goals/values, conventional social support, environmental constraints on criminal coping, and individual dispositions isolated separately by Agnew (1992). Consequently, a strained person who is also high in religiosity has less chance of coping criminally because he/she likely shares conforming goals and thinks of himself/herself as a moral being, has a conventional support group to lean on, faces various constraints on opportunity for crime, is more likely to face informal sanctions within a conforming network, and is probably less disposed to criminal options. Supporting this assumption, much evidence points to the strong preventative effect of religiosity on criminal behavior (examples: Baier and Wright, 2001; Johnson et al., 2000; Junger and Polder, 1993; Tittle and Welch, 1983; but see Giordano et al., 2008), and religion has been theorized to have a significant multifaceted effect on the relationship between stress and psychological well-being (Ano and Vasconcelles, 2005; Maltby and Day, 2003; Utsey et al., 2008).

In addition, religiosity may also affect individual appraisals of objectively straining situations, supply resources to facilitate other coping strategies, or be a coping strategy on its own (Gall et al., 2005; see also Pargament, 1997). Furthermore, if the emotional reaction to strain or particular methods of coping with strain can be habitual (Marco and Suls, 1993), then religion may be one channel through which such habitual responses are learned. Yet, only limited research concerning this potential contingency in strain theory has been conducted (for example, Agnew and

White, 1992; Baron, 2004; Hoffmann and Miller, 1998; Paternoster and Mazerolle, 1994).

In recent work, Agnew (2001) distinguishes between objective and subjective strains and calls for empirical investigation of effects of the conditions *presumed* to be disliked by most people (objective strains), relative to individuals' perceptions of certain events as unpleasant or harmful (subjective strains). Although some overlap between objective and subjective strains is expected, things commonly perceived as stressful may not always translate into subjective strain. According to Agnew, the subjective evaluation of negative relationships as adverse or nonadverse is shaped by a variety of factors, which may include prior experiences, availability of social support, and certain individual traits like negative emotionality (Agnew et al., 2002; Dohrenwend, 1998; Lazarus, 1999; Thoits, 1995).

Although closely associated with negative emotional response, subjective strain is nevertheless conceptually distinct from the affective states it may engender. For instance, the appraisal of the same kind of event as stressful may anger one individual but bring fear or anxiety to another (Agnew, 2001: 322). Thus, assessment of the relationship between presumed objective strains and misbehavior without regard for the variation in individual sensitivity to various types of stressors may potentially underestimate the strength of the relationship between strain and crime. Indeed, in the only existing study of the criminogenic effects of subjective strains relative to objectively straining conditions, Froggio and Agnew (2007) found fairly strong support for the modified GST argument.

To be most useful, GST should be generally applicable cross-culturally, among different population groups, and in explaining many kinds of deviant acts. However, it has been tested mainly among youth or college students, and tests have covered a limited number of deviant acts (Agnew and White, 1992; Bao, Haas, and Pi, 2004, 2007; Capowich, Mazerolle, and Piquero, 2001; Froggio and Agnew, 2007; Mazerolle and Piquero, 1998; Moon, Blurton, and McClusky, 2008; Morash and Moon, 2007; Piquero and Sealock, 2000; but see Jang and Johnson, 2003; Langton and Piquero, 2007). Moreover, the range of international contexts within which it has been applied is narrow. We are aware of only five tests of GST in non-Western contexts, all of which use samples of Asian children (Maxwell, 2001) or youth (Bao, Haas, and Pi, 2004, 2007; Moon and Morash, 2004; Moon, Blurton, and McClusky, 2008).

Overall, the evidence supporting GST is uneven; it is greater for the general relationship between strain and crime than for the specifications of internal processes and conditions. Furthermore, the demonstration of its generality is limited.

We offer additional information relevant to GST. The data permit assessment of the applicability of the theory to wider contexts and to criminal probabilities of adults. Furthermore, we investigate the relative import of objective and subjective strains as well as the conditioning influences of religiosity and self-control on the relationship between strain and crime.

HYPOTHESES

Recent versions of GST call for investigation of subjective strains (Agnew, 2001: 322) although a focus on subjective strains does not deny the explanatory power of objective straining conditions on misbehavior, which accumulated research has shown. Therefore, we expect both objective and subjective straining conditions to be indirectly associated with criminal coping through elevated negative emotional states, although the strength of such associations may be modest. However, clarifications of GST made by Agnew (2001, 2006) suggest that objective strain predicts negative emotions mainly when experienced as stressful by the individual. Therefore, in the new reading of the theory, subjective stress becomes a connecting link between straining conditions and crime, although it may itself be associated to some extent with the conditions that most people find stressing. In addition, even if individual perception of stress does not mediate the association between objective straining conditions and negative emotions, it should enhance the effects of objective strains on negative emotions and criminal behavior.

Finally, certain characteristics of individuals that encompass within themselves several specific contingencies mentioned by Agnew (1992, 2006) should serve as important moderators of the strain/crime relationship for both objective and subjective strains. Two such inclusive constructs are self-control and religiosity. If they are critical in affecting the likelihood of stress leading to misbehavior, there should be some interaction between each of them and the strain theory variables in producing criminal probability. Specifically, strain should have more effect on criminal probability when either self-control or religiosity is low.

Based on the above reasoning, we can state five specific hypotheses to be tested:

Hypothesis 1: Potentially straining (objective) conditions are positively associated with violence and theft probabilities, and such associations are mediated by negative emotions.

Hypothesis 2. Subjective strain is positively associated with violence and theft probabilities, and such associations are mediated by negative emotions.

Hypothesis 3. There is a positive interaction between objective strain and subjective strain in predicting violence and theft probabilities.

Hypothesis 4. There is a positive interaction between low self-control and objective strain as well as between low self-control and subjective strain in predicting violence and theft probabilities.

Hypothesis 5. There is a negative interaction between religiosity and objective strain as well as between religiosity and subjective strain in predicting violence and theft probabilities.

THE STUDY

DATA

Data are from random household surveys of adults aged 18 years or older in Lviv, Ukraine; Nizhni Novgorod, Russia; and Athens, Greece. The data were collected in the fall of 2006 by professional survey organizations in each of the three countries: OPINION in Greece; NISOTS, Sociological Research Laboratory, in Russia; and SOCIOINFORM in Ukraine. The two-stage sampling procedure included a random selection of street routes within each city with a random selection of apartments or houses. Following standard survey procedures, initial oversampling was used to permit random replacement of targeted respondents who could not be interviewed (because of the absence of an eligible member, inability to schedule an interview within the allotted number of call backs, and refusal) in generating the desired sample of 500 each in Russia and Ukraine and 400 in Greece. In total, 1,400 face-to-face interviews were conducted. The adult (age 18 years or older) member of the household with the most recent birthday was interviewed. In all three countries, about 70 percent of the final samples were random replacements; this is somewhat similar to such surveys in the United States (see, for example, Latimore, Tittle, and Grasmick, 2006, and Tittle, Ward, and Grasmick, 2003a, 2004, concerning the Oklahoma City survey).

Although most questions in the survey were posed by interviewers using flash cards to indicate response possibilities, answers to especially sensitive questions about misbehavior were provided on simple questionnaires filled out away from the interviewer, sealed in envelops identified only by interview number, and handed to the interviewer. All respondents received small monetary incentives for participation in the survey.[1]

1. The questions were initially written in English and pretested on a few English-speaking adults in the United States. As a next step, all items were translated into the respective languages (Russian, Ukrainian, and Greek); then linguists fluent in these languages as well as in English performed reverse translations into English.

Although the main data requirement for testing GST is sufficient variation in the independent variables to permit prediction of the dependent variables, it is also desirable to generalize the results to the populations of the three cities. To help assess representativeness, we compared various demographic characteristics of our samples to such characteristics for the population areas that encompass each of the three cities, as reported by local census organizations. The official demographic figures in two instances cover units larger (perhaps comparable with metropolitan areas) than the cities themselves. Nevertheless, comparisons revealed only two deviations: The Ukrainian sample appeared to overrepresent females, whereas the Greek sample appeared to underrepresent those over age 60 years.

To ascertain the potential effects of those biases on the results, we conducted analyses separately for females in Ukraine and for those over age 60 years in Greece. Although reduction in the sample sizes in these subgroup analyses necessarily affected significance tests, the pattern of results for these two subgroups was similar to the whole sample in both instances. Therefore, the potential biases seemed to be minimal.

VARIABLES

Strain Theory

"Objective" Strain. GST identifies three general categories of potentially straining conditions: removal of positively valued stimuli, exposure to negatively valued stimuli, and failure to achieve personally valued goals. We report results for a general strain measure composed of six indicators of strain that represent those three generic categories: three for frequency of failure to achieve valued goals, two for frequency of experiencing negative stimuli, and one for frequency of removal of positively valued stimuli.

Although GST might be expected to perform better when measures of strain are more specific, we attempt to test it using general categories of strain for two reasons. First, although accumulated research based mainly on U.S. samples suggests that some specific straining events or conditions are more likely to be crime provoking than others (Agnew, 2006: 54–55), those same conditions might not be the most straining or most crime provoking in other countries, particularly in Eastern Europe. For example, marital problems, work experiences, criminal victimization, being the

After resolving any discrepancies, the instruments in the respective local languages were pretested on native speakers in Athens, Lviv, and Nizhni Novgorod. Adjustments were made on the basis of the pretests to make the finally administered instruments as understandable and comparable as possible.

objects of prejudice and discrimination, and being homeless may be particularly relevant to U.S. adults, but such things as problems with the government, accommodation to a new capitalist spirit, or decline of community cohesion may be more straining and/or crime inducing in Russia and Ukraine. Because currently no body of research on strain is available in Greece, Russia, or Ukraine to parallel such research in the United States, we could not predict ahead of time specifically what might or might not be straining to the people in the three countries at issue without extensive prior research devoted to discovering relevant strains. In the absence of such knowledge, had we guessed about relevant specific straining events and conditions or had we used only questions about those conditions or events derived from research in the West, we might well have either missed some specific strains that are especially relevant in one or another of the three countries being investigated or overemphasized ones that are less important. Either of these would have disadvantaged the theory.

Second, even if we could have imagined an inventory of all or most of the events and conditions that might be straining in the three societies, measuring them, along with the other things needed for a test of GST, in a single survey would have been impractical. This is especially true if, as Agnew suggests (2006: 53), the degree to which potential strains are unjust, high in magnitude, associated with low social control, and create an incentive or pressure for crime were taken into account for each. Therefore, for a basic test in a comparative framework, employing generic categories of types of strain [albeit with examples of strains deemed criminogenic among adults being mentioned to respondents (Agnew, 2006: 55)] seemed more appropriate.

The exact wording of the items used for measuring strain is presented in appendix B. Response categories ranged from "very often" (5) to "never" (1). Note that we are attempting to measure the frequency of strain the respondent was experiencing at the "present time" in his or her life. Logically, contemporaneous strain is more likely to affect criminal probability than strain experienced far in the past, unless it has accumulated or remained constant over time.

Although we directed the respondents' attention to their current life circumstances, asking their perceptions of the frequency of strains being experienced may have provoked some to think about experiences over some indefinite, although recent, time frame. However, we introduced the subject to respondents by specifying three periods for a recall: lifetime, past 2 years, and the present time or "now." Because of the obvious differences among these time frames, it seems likely that in answering, despite some possible intraindividual variation in reference points, respondents reported on their more recent stressful experiences.

We focus mainly on a composite measure of general strain by incorporating frequencies of the major types of potentially adverse conditions rather than on the magnitude of any specific type of strain. This choice was based on Agnew's (1992, 2006) contention that constant or cumulative strain is more potent in producing crime than specific kinds of strain. However, we also checked our results using separate indices of each of the three types of strain. We note in the text any instances where differences between the general measure and the specific measures are found.

Using the principal components technique, we ascertained that in all three countries, the six items formed a single factor by the usual criteria of a sole eigenvalue greater than 1. Then, we constructed composite factor-based scales for each country by multiplying factor coefficients by *z* scores and summing. Two alternative methods of scale construction—simple summing of items and summing of *z* scores for items—produced similar results. The internal reliability for this construct is .90 for Greece, .76 for Russia, and .78 for Ukraine. In forming strain type-specific measures to check on results from our general measure, we summed *z* scores to produce the specific scale for experiencing negative events, but we used a factor-based approach to form the scale relevant to goal achievement. Table 1 reports descriptive statistics for these and all other measures used in the analyses.

Substantial variation of responses for these six items is observed for all three samples, which makes it theoretically possible for them to account for other variables in the causal chain of GST. For example, respondents who indicated recent failures to achieve various types of valued goals ranged from 28 to 32 percent in Greece, 18 to 28 percent in Russia, and 20 to 24 percent in Ukraine. Overall, about 25 percent of Greek respondents, 11 percent of Russians, and 14 percent of Ukrainians reported recently losing things or people they valued; 18 to 21 percent of Greeks, 17 to 20 percent of Russians, and 14 to 17 percent of Ukrainians estimated a relatively high frequency of negative events and conditions.

"Subjective" Strain. Agnew (2001: 322) suggests that subjective strain consists of the personal evaluation of conditions as adverse, and that this evaluation is conceptually distinct from a negative emotional response to that condition. We assume that adverse evaluation implies that the person actually feels discomfort, stress, or pressure associated with various circumstances. Therefore, we asked respondents generally about the degree of stress or pressure they were experiencing in their lives "now" (at the present time), immediately after having asked them about those objective conditions. The exact wording of the item is included in appendix B. Response options ranged from "no stress" (1) to "the most stress" (5). We assume that having just answered questions about objective conditions, the

Table 1. Descriptive Statistics for Variables in the Analysis[a]

	Greece (N = 400)			Ukraine (N = 500)			Russia (N = 500)		
	Range	**Mean**	**SD**	**Range**	**Mean**	**SD**	**Range**	**Mean**	**SD**
Loss of positive stimuli (z score)	–.90–.3.67	.00	1.00	–.58–4.74	.00	1.00	–.51–4.26	.00	1.00
Negative events (z score composite)	–1.68–5.34	.00	1.81	–1.26–7.10	.00	1.64	–1.34–6.31	.00	1.65
Failed goals (factor based)	–1.21–3.05	.00	1.00	–0.97–3.55	.00	1.00	–.85–3.74	.00	1.00
Accumulated (general) strain (factor based)	–1.19–2.58	.00	1.00	–1.03–4.05	.00	1.00	–.99–4.23	.00	1.00
Subjective strain	1–5	2.88	.98	1–5	1.92	1.02	1–5	2.01	1.12
Anger	1–5	2.35	1.00	1–5	1.78	1.16	1–5	1.28	.73
Projected violence (factor based)	–.42–5.33	.00	1.00	–.88–2.22	.00	1.00	–.72–3.34	.00	1.00
Projected theft (factor based)	–.33–4.93	.00	1.00	–.92–1.75	.00	1.00	–.63–2.86	.00	1.00
Past theft (factor based)	–.32–6.18	.00	1.00	–.75–2.47	.00	1.00	–.50–3.88	.00	1.00
Past violence (factor based)	–.39–5.61	.00	1.00	–.82–2.91	.00	1.00	–.69–3.61	.00	1.00
Gender	0–1	.50	.50	0–1	.62	.49	0–1	.54	.49
Age	18–85	43	15.98	17–86	43	17.32	18–84	46	17.22
Religiosity (5 years ago)	1–5	3.19	1.09	1–5	3.06	0.95	1–5	2.54	1.08
Low self-control	–2.69–2.04	.00	1.00	–3.14–2.00	.00	1.00	–3.28–2.58	.00	1.00

ABBREVIATION: SD = standard deviation.

[a]Missing values (not exceeding 1.5 percent for each question) were imputed using an expectation-maximization algorithm.

respondents were thinking about those conditions in assessing their current feelings of stress. However, we cannot be certain that they did, so the effects of subjective strain may be somewhat underestimated.

One third of the Greeks, 70 percent of Russians, and 75 percent of Ukrainians report low stress; moderate stress was indicated by 44 percent of Greeks, 20 percent of Russians, and 17 percent of Ukrainians; and the percentage of respondents under maximum stress is 23 percent, 11 percent, and 8 percent for Greece, Russia, and Ukraine, respectively.

Anger. Although the range of potentially criminogenic negative emotions produced by strain may be broad, anger is thought to be especially important in leading to illegitimate coping (Agnew, 1992, 2006). As a result, most scholars who investigated general strain hypotheses have separated the effects of anger from the effects of other negative emotions and have concentrated mainly on it (Brezina, 1996, 1998; Broidy, 2001; Mazerolle and Piquero, 1998; Piquero and Sealock, 2000). We follow that general practice and focus on anger as a potential master negative emotion. Respondents were asked to estimate "how frequently they had recently experienced anger" in response to the [straining] conditions listed earlier. The response options ranged from "very often" to "never" with higher scores assigned to a higher frequency of experiencing this emotional state. These scores, like those of subjective strain, basically are distributed normally, so we use the raw scores as our measure of anger. Again, we concern ourselves with frequency rather than with intensity or magnitude of emotion, because GST implies that regular, constant, or cumulative anger should have more effect in producing criminal outcomes than episodic anger even if such infrequent emotion is intense.

Criminal Probability. The reported results are based on future projections of six criminal acts—three concerning different forms of violence and three concerning different magnitudes of theft (approximately equal to $5 or less, between $5 and $50, and $50 or more, but amounts were expressed in local currency)—under the proviso that individuals "have a strong desire and have the opportunity" to do each of them (the exact items are included in appendix B). Responses were in five categories and were combined so that higher scores indicate greater criminal probability. Cronbach's alpha coefficients for the theft construct are .91 in Ukraine, .90 in Greece, and .83 in Russia; the coefficients for violence are .84 for Ukraine, .68 for Russia, and .74 for Greece.

One of the kinds of violence being tapped concerns "hitting someone on purpose in an emotional outburst." Our general purpose in asking respondents to imagine having a strong desire and opportunity when they judged likely criminal outcomes was to neutralize variations in inherent attraction

to criminal behavior and in opportunity, which is desirable for assessing hypotheses from many theories of crime. However, the specific item about violence in an emotional outburst may contain a bias for testing strain theory. When a respondent projects a probability of violence in an emotional outburst, he or she may be anticipating some emotions theoretically attributable to strain. Thus, the dependent variable contains elements of the independent variable, which leads to the possibility of an artificially high predictive coefficient. To make sure this is not occurring, we performed the analysis again using an alternative two-item measure of projected violence and, separately, the one on emotional outburst. The substantive pattern of results did not change, so we feel confident that a possible tautology bias is not responsible for those of our findings that are favorable to strain theory.

As is typical with criminal behavior, which is always a relatively rare event, the data are skewed. To reduce that skew, the first three options (from "very likely" to "likely, to some extent") were collapsed, which left a 3-point continua from 1 ("absolutely unlikely") to 3 ("likely, to some extent"). We also conducted the analyses using natural logged projections but found similar patterns of results. Items in each set (violence and theft) were combined in three alternative ways. First, because the two sets of three items qualified as separate, single factors, one type of measure was created by multiplying factor coefficients by z scores and summing to create scales with a mean of 0 and a standard deviation of 1. Second, for the theft and violence items, respectively, we summed the collapsed scores to create summed indices that ranged from 3 to 9. Third, we summed the z scores for the items in each set. Because the overall substantive results are similar for all three measures, we report only those results using the factor-based scales.

Respondents also reported the frequency with which they had committed each of the six offenses within the past 5 years, with five response options from "never" to "very often." These responses, too, are skewed, so they are handled the same as the future projections. We employ these reports of past crime as control variables in all models to capture any effects of prior conditions that we cannot measure. However, we also conducted the analyses excluding this control from past crime and found similar patterns of results; of course, the coefficients are slightly larger because past crime and future projections of crime are correlated, probably as a result of being reflections of the same underlying domain of criminality. It is important to note, however, that by including both measures in the equations, with future crime as the dependent variable and past crime as a control for many unmeasured antecedent variables, our test of GST concerns predictions of change over a relatively short period of time and is

therefore especially stringent. In addition, because both measures are in the equations, the R^2 values for the models are deceptively large.

Finally, we experimented with general crime scales (one for future projections and one for past reports) as dependent variables. However, because the general measures do not produce any substantial differences in findings, the results using them are not reported in this article (the results are available from the authors).

The measures of criminal probability show substantial variation in each of the three countries, which makes it possible for strain and its associated concepts to perform as theorized. For example, the single item projecting some chance of hitting someone in an emotional outburst elicited positive responses from about 23 percent of the Greeks, 45 percent of the Russians, and 51 percent of the Ukrainians. As might be expected, a somewhat lower percent of respondents (ranging from 6 percent in Greece to 19 percent in Russia to 34 percent in Ukraine) projected physically harming another person on purpose. Finally, 12 percent of Greeks, 34 percent of Russians, and 56 percent of Ukrainians indicated they could take something that does not belong to them worth $5 or less, with slightly lower reported probabilities (about 10 percent and 7 percent of Greek respondents, 24 percent and 18 percent of Russians, and 45 percent and 37 percent of Ukrainians, respectively) of taking something worth more than $5 but less than $50 or more than $50. Of course, the scales and indices based on combinations of these individual items show even more variability (see table 1).

One noteworthy observation concerns the relatively high rates of admitted and projected criminal behavior, especially violence, among the Russian and Ukrainian respondents compared with the Greeks and with participants in surveys in other parts of the world. Yet, these figures are consistent with other evidence. According to the Seventh United Nations Survey on Crime Trends and the Operations of Criminal Justice Systems (United Nations Office on Drugs and Crime, 2000), the homicide rates in Russia and Ukraine are approximately 20 and 10 per 100,000 population, respectively, whereas the comparable Greek rate is close to 1. Furthermore, elevated levels of violence in Russia have been confirmed by other studies (Gilinskiy, 2006: Pridemore, 2003, 2005; Pridemore and Chamlin, 2006; Tittle and Botchkovar, 2005a, 2005b) as have such rates in Ukraine (Kostenko, 1999–2000). Not only do our survey results conform to patterns suggested by other data sources, but also their magnitude suggests that the Russian and Ukrainian respondents were not intimidated by fear of nonanonymity or anticipation of possible governmental consequences that some might imagine.

This is not to say that these self-reported and projected offenses are completely accurate. As with any respondent-generated measures of

unflattering or threatening information, some error is endemic, due to fearful withholding of information, memory loss, or telescoping, and in some cases, due to exaggeration (Hser, Anglin, and Chou, 1992; Mosher, Miethe, and Phillips, 2002; O'Malley, Bachman, and Johnston, 1983). However, substantial research confirms reasonable validity of respondent reports drawn from well-crafted surveys (examples: Hindelang, Hirschi, and Weis, 1981; Petersilia, 1978; Thornberry and Krohn, 2000; but see Junger-Tas and Haen-Marshall, 1999). And the level of disclosure here suggests that these data are at least as good as those in the typical household survey.

Of course, some may grant the validity of self-reports but question behavioral projections, which we use in our reported results. Although behavioral projections (which some call "intentions") have become more popular in recent years (examples: Grasmick and Bursik, 1990; Hay, 2001; Piquero and Paternoster, 1998; Tittle and Botchkovar, 2005a, 2005b), research that certifies their accuracy as reflectors of what people actually will do is much less extensive than that confirming the relative accuracy of reports of past misconduct. Nevertheless, many studies do show a reasonably strong correlation between projected conduct and what people actually end up doing (examples: Albarracin et al., 2001; Green, 1989; Murray and Erickson, 1987; Pogarsky, 2004), and in almost all surveys in which past reports and future projections are collected, including this one, they are related to a fairly high degree and usually show the same general patterns of results when used as dependent variables.

Our choice to report results from future projections, while controlling for measures of past crime, is driven by two potential advantages. First, projections are more correctly ordered temporally (future behavior) in relation to the independent variables (current strain and current negative emotion), and second, measures based on future projections usually show greater reliability, as they do here. However, as a check, we also conducted the analyses using strains experienced 2 years before and over the respondent's whole lifetime as predictors of the measures of past crime. The results, which can be obtained on request, show only a few minor differences in the predictive power of theoretically relevant variables. Therefore, the advantages of self-projections of criminal probability seem to outweigh the disadvantages.

Contingencies. Although Agnew (1992, 2006) catalogs many conditions that influence whether strain actually leads to crime, we focus on two specific strains because they are inclusive constructs incorporating within themselves many specific potential moderators mentioned by Agnew. The

role of these two variables as interactants with strain variables in producing crime is tested to assess their mitigating effects.

Religiosity. Respondents estimated their religiosity currently and 5 years earlier, using five response categories from (5) "very religious" to (1) "not religious at all." Because being religious for an extended period of time can be associated with learning of coping routines, which has not yet occurred among new converts, using the past measure of religiosity seems more in keeping with the thrust of GST. Nevertheless, correlations between reported religiosity at the two time points are extremely high (.97 in Greece, .90 in Russia, and .88 in Ukraine), which suggests that the degree of religiosity does not change much. In view of these two considerations, we elected to use the reports of religiosity 5 years previously as our measure. But as a precaution, we repeated the analyses with the measure of current religiosity and found no differences in results.

Self-Control. In examining the potential contingent effect of self-control on the strain/crime relationship, we use the widely employed cognitive scale developed by Grasmick et al. (1993) based on 23 items, but we elicit responses in five rather than four categories. Measures based on these items have been objects of much discussion and criticism, with many, including Gottfredson and Hirschi (1990) themselves, advocating behavioral rather than cognitive indicators (examples: Arneklev, Grasmick, and Bursik, 1999; Cochran et al., 1998; Piquero and Bouffard, 2007; Tittle and Botchkovar, 2005a, 2005b; Tittle, Ward, and Grasmick, 2003b, 2004; Vazsonyi et al., 2001). Nevertheless, cognitive-based measures have become the most accepted means for tapping self-control because they are usually more reliable and less subject to accusations of tautology than are the behavioral measures (some behavioral measures include acts of force or fraud as indicators of low self-control, which are then used to predict other measures of force or fraud). Moreover, most research using both cognitive and behavioral measures reports similar results.

Scoring the Grasmick et al. (1993) items also has become somewhat controversial, with some researchers calling into question the common practice of using principle components factor analysis to confirm their coherence while providing a means for creating a composite, item-weighted scale. A preferred method uses confirmatory factor analysis incorporated within a measurement model of a larger structural equation to estimate the effects of self-control and other relevant variables (Greenberg, 2000; Hayduk and Glaser, 2000; Mulaik and Millsap, 2000). However, such a strategy requires that the conditions for reliable simultaneous equation estimation of a model incorporating reciprocal effects must be

met. Because we lack time-ordered data and sufficient instrumental variables to generate reliable estimates, we follow standard practice.

Even though factor analytic justifications for the items in the Greek and Ukrainian samples are similar to those found previously, the items behave differently in the Russian sample. Whereas differences in the magnitudes of the first and second eigenvalues are usually large, justifying a one-factor interpretation (Nunnally and Bernstein, 1994: 482–4), in the Russian data, that difference is small. Nevertheless, to conduct comparative analyses, we combined the items in each of the three countries by multiplying the factor coefficients by *z* scores and summing. Scoring of the raw items conforms to the approach used originally by Grasmick et al. (1993), with high scores reflecting degree of *low* self-control. Consequently, we expect to observe positive associations between this scale variable and criminal projection. To make sure that departure from psychometric standards does not affect our results, we also summed the raw items in each sample but found that results were similar to those using the factor-based scales. Alphas for the items in the three countries are .89 (Greece), .81 (Ukraine), and .75 (Russia). Table 1 reports descriptive statistics.

Control Variables

In all analyses, we include three control variables: self-reported prior criminal behavior, age, and gender. Typically, all have been shown to predict criminal probability and may potentially affect the likelihood of experiencing subjective stress and negative emotions.

Prior Criminal Behavior. As noted, we introduce into the predictive equations the scales/indices of previous violence and theft to help control for relevant unmeasured antecedent variables and to make sure a few high crime-prone individuals do not distort the results (Moffitt, 1993; Piquero and Tibbets, 1996). Past misbehavior could also lead to greater strain and heightened negative emotional reaction (De Coster, 2005; Kim et al., 2003). Because we analyzed current strain, it should, if the theory is correct, provide reasonable predictions of criminal projections that are above and beyond past criminal admissions.

Age and Gender. Age and gender are usually good predictors of criminal probability, but they may also be associated with sensitivity to straining conditions and the likelihood of negative emotions (Thomsen et al., 2005). Therefore, a fair test of strain theory must neutralize age and gender influences by including them in the predictive equations. Respondents' age was recorded as year of birth, whereas the gender variable is coded as "0" for males and "1" for females.

ANALYTIC STRATEGIES

The models for strain and crime are estimated separately for the Greek, Russian, and Ukrainian data using ordinary least-squares (OLS) regression.[2] We started with the traditional model comprising strain and negative emotions and then moved to more complex models with subjective strain. In addition, we tested the effects of interactive terms (objective and subjective strain × religiosity and objective and subjective strain × self-control) in predicting the crime probabilities. Because the three moderating variables used in this study (subjective strain, religiosity, and self-control) may also theoretically condition relationships between objective strain and negative emotions and between negative emotions and criminal probability, we estimated models with these alternative interactions but found virtually no differences from the models that we report here. To avoid potential multicollinearity in the analyses, where the interaction terms are included, all predictor variables were centered (Aiken and West, 1991). In addition, variance inflation factors were examined for all models to make sure they fell within acceptable ranges.

Several approaches and statistics are available for assessing the theorized mediations in GST. The oldest and simplest (Kendall and Lazarsfeld, 1950), which is often called the "elaboration" method, examines a statistically significant predictive coefficient that involves an independent (for example, strain) and a dependent variable (criminal probability) after including the presumed intervening, or mediating, variable in the equation. If the original significant coefficient that reflects the association between the independent and the dependent variable becomes 0 (nonsignificant) with the inclusion of the intervening/mediating variable, then presumably that intervening variable represents a channel through which the independent variable produces its effect on the dependent variable (it mediates the original relationship).

2. Because strain theory implies a causal sequence of relationships, it would have been desirable to develop and estimate a structural equation model to reflect those interrelationships. However in this case, such a model also implies several potential reciprocal relationships, which in turn necessitates the inclusion of many instrumental variables to achieve identification and generate unique estimates. Unfortunately, our data set does not include enough instrumental variables to identify a model that would include all potential feedbacks. However, using the maximum likelihood estimation procedures of the structural equation-modeling program AMOS, we did perform the same series of one-way causation analyses implied by the OLS whose results are reported. Those analyses produced the same substantive patterns as the OLS. In addition, we performed the analyses for the whole data set using dummy variables for the countries. The findings are similar to the findings from the country-specific analyses and, therefore, are not reported in this article.

However, many more precise methods exist to estimate the degree to which an intervening/mediating variable accounts for the association between an independent variable and some outcome. The popular Baron and Kenny (1986) approach provides a set of (four) conditions necessary to test mediation but suggests no statistical procedure linking these conditions together (MacKinnon et al., 2002: 87). In a simulation comparison of the various methods by MacKinnon et al. (2002), none were shown to be clearly superior in minimizing both type 1 and type 2 errors, although some performed much better than others. Therefore, using the results of the MacKinnon et al. study as a guide, we selected two of the better methods (those that came closest to minimizing both types of errors). The Freedman and Schatzkin (1992) approach is one method that provides a test of statistical significance for the reduction in a predictive coefficient produced by introduction of an intervening variable. The second method is the Sobel (1982) approach, which estimates the statistical significance of the effect of the intervening variable using a product of coefficients. In addition, we employ the Preacher and Hayes (2004, 2009) test, which appeared subsequent to the MacKinnon et al. simulation. It is based on bootstrapped confidence intervals, which the advocates contend provide less biased estimates of indirect effects.

Note that mediation is not an issue when a basic predictive coefficient involving a theoretical independent (such as strain) and dependent (such as criminal probability) variable is not statistically significant prior to the introduction of a potential mediator, because in such an instance, there is nothing to mediate. In addition, tests of mediation can be interpreted correctly only if the variables involved can be reasonably assumed to be accurately causally ordered. In the current instance, we assume that the time ordering implied by GST is correctly reflected in our measurement, and we test for mediation only in those instances in which a strain variable successfully predicts a given dependent variable, such as negative emotion or criminal probability. Appendix C reports the results of the three tests in those instances in which mediation is an issue.

RESULTS

Hypothesis 1: The Basic Strain Model

Bivariate correlations between the general objective strain measure and criminal probabilities (table 2) are significant in only half of the instances [violence in Russia (.10) and Ukraine (.19), and theft in Ukraine (.18)], which raises initial concerns about the accuracy of GST, at least when considering objective strain (experiencing conditions most people find stressful). This concern is strengthened by the figures in table 3 bearing on the basic strain model. Note, first, that only in the Ukrainian sample is the

Table 2. Bivariate Correlations among Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13
1. Age	Gr													
	Rus													
	Ukr													
2. Female	Gr	−.02												
	Rus	**.10***												
	Ukr	**.15***												
3. Low self-control	Gr	**−.30***	**−.10***											
	Rus	**−.25***	**−.13***											
	Ukr	**−.23***	**−.18***											
4. Religiosity	Gr	**.27***	**.17***	−.05										
	Rus	.07	**.17***	−.08										
	Ukr	**.10***	**.17***	−.23										
5. General strain	Gr	**.10***	.05	**.30***	**.21***									
	Rus	−.01	.07	**.13***	.05									
	Ukr	.01	**.11***	**.17***	−.07									
6. Negative events	Gr	.09	.00	**.30***	**.14***	**.88***								
	Rus	**.15***	.08	−.00	.08	**.72***								
	Ukr	**.18***	**.12***	**.14***	−.14*	**.75***								
7. Blocked goals	Gr	.07	.08	**.27***	**.24***	**.93***	**.68***							
	Rus	**−.11***	.03	**.17***	.03	**.91***	**.41***							
	Ukr	−.07	.08	**.16***	−.02	**.92***	**.48***							

Table 2. Bivariate Correlations among Variables (cont.)

		1	2	3	4	5	6	7	8	9	10	11	12	13
8. Past theft	Gr	**–.27***	.02	**.22***	–.07	.07	.07	**.07***						
	Rus	**–.22***	**–.18***	**.25***	**–.09***	.04	–.08	.08						
	Ukr	**–.20***	**–.19***	**.33***	**–.18***	**.15***	.07	**.15***						
9. Past violence	Gr	**–.15***	–.03	**.21***	–.06	–.07	–.08	–.05	**.19***					
	Rus	**–.25***	**–.32***	**.36***	–.04	.09	.01	**.10***	**.44***					
	Ukr	**–.29***	**–.22***	**.40***	**–.25***	**.11***	–.07	**.11***	**.34***					
10. Future theft	Gr	**–.27***	.02	**.24***	**–.10***	.06	.05	**.07***	**.83***	**.18***				
	Rus	**–.19***	**–.22***	**.25***	–.06	.07	–.05	**.10***	**.68***	**.36***				
	Ukr	**–.25***	–.14*	.36*	–.13*	.18*	.08	**.19***	**.79***	**.33***				
11. Future violence	Gr	**–.18***	–.08	**.28***	**–.11***	–.02	–.01	–.02	.03	**.81***	**.25***			
	Rus	**–.25***	**–.18***	**.36***	–.03	**.10***	–.01	.13*	**.36***	**.66***	**.47***			
	Ukr	**–.30***	**–.22***	**.41***	**–.21***	**.19***	**.13***	**.19***	**.35***	**.70***	**.10***			
12. Loss of valued things	Gr	**.12***	.02	**.20***	**.12***	**.81***	**.70***	**.63***	.07	–.08	.02	–.01		
	Rus	.06	.07	.04	–.01	**.54***	**.36***	**.31***	.04	.07	.08	.05		
	Ukr	–.02	.04	.06	–.04	**.59***	**.38***	**.38***	**.12***	.06	**.26***	**.10***		
13. Anger	Gr	–.04	–.00	**.28***	**.11***	**.36***	**.34***	**.34***	.04	–.01	.05	–.01	**.22***	
	Rus	–.03	**.10***	**.19***	.00	**.11***	.08	**.12***	.05	.08	.01	.08	.00	
	Ukr	.00	.05	**.42***	**–.09***	**.35***	**.30***	**.31***	**.32***	**.23***	.14	**.26***	.19*	
14. Subjective strain	Gr	.02	**.10***	.05	**.11***	**.24***	**.23***	**.24***	**–.22***	–.08	.08	–.07	**.10***	**.49***
	Rus	.04	**.15***	.04	.03	**.37***	**.41***	**.25***	–.05	.02	–.01	.01	**.21***	**.29***
	Ukr	.06	**.14***	**.22***	–.03	**.35***	**.33***	**.29***	**.12***	**.18***	**.18***	**.14***	**.22***	**.57***

*$p < .05$ (two-tailed).

general measure of objective strain significantly related to the crime measures when age, gender, and prior crime are controlled (model 1). In that instance, however, the strain/crime association is partially mediated by anger (see appendix C) in the case of violence and is fully mediated in the case of theft (model 3). Furthermore, results for the specific measures of different kinds of strain (not shown here[3]) show essentially the same pattern. Thus, these results challenge the basic strain model in its application to two of the three countries being studied here.

Hypothesis 2: The Modified Strain Model

Contrary to expectations, a subjective strain measure does not improve the results in favor of GST. Subjective stress appears to be statistically associated with criminal probability only in Ukraine (see table 2 as well as model 1 in table 4). In that instance, as indicated by all three tests of mediation (see appendix C), anger mediates the subjective strain/criminal probability association and reduces it from a significant .08 for violence to an insignificant .02 and from a significant .09 for theft to an insignificant .03. Overall, the results suggest that the strain model, whether strain is conceived as objective or subjective, has only limited applicability in two of the three countries studied. It may still be true, however, that the model is more adequate if objective and subjective strains are considered simultaneously in interaction or with subjective strains being considered as a mediator between objective strain and criminal probability.

Hypothesis 3: Subjective Strain Mediation and Interaction

The coefficients in models 1 and 2 of table 5 concern potential mediation of an objective strain/criminal probability association produced by subjective strain, whereas model 3 of table 5 reports coefficients relevant to whether objective and subjective strains interact in their effects on criminal probability. Because previous analysis revealed that objective strain is significantly associated with the criminal probability measures only in Ukraine, potential mediation can occur only in that sample. However, considering model 2 of table 5, we observe only limited evidence of mediation. With subjective strain in the equations, the significant coefficient of

3. Overall, the effects of specific measures of types of strain are almost identical to the effects of the general strain measure on theft and violence in all three countries. In Ukraine, however, the general strain measure is slightly more likely to be statistically significant than the specific measures. In particular, theft is significantly associated with failure to achieve valued goals, whereas violence is predicted by exposure to negative events as well as by failed goals.

Table 3. Standardized Regression Coefficients Relevant to Traditional Strain Model Predicting Violence and Theft in Three Countries, Using General Objective Strain

	Greece (N = 400)						Russia (N = 500)						Ukraine (N = 500)					
	Violence			Theft			Violence			Theft			Violence			Theft		
	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model	Model
Variables	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Objective strain	.05		.06	–.01		.01	.04		.04	.05		.05	.13*		.10*	.07*		.03
Anger		.00	–.02		.00	–.01		.03	.02		–.01	–.01		.13*	.09*		.12*	.11*
Female	–.06*	–.06*	–.06*	.00	.00	.00	–.04	–.04	–.05*	–.10*	–.09*	–.10*	–.07*	–.07*	–.08*	.01	.00	.00
Age	–.06*	–.06*	–.06*	–.05	–.05	–.06	–.09*	–.09*	–.09	–.03	–.03	–.03	–.10*	–.11*	–.11*	–.10*	–.11*	–.11*
Past violence	.81*	.80*	.81*				.63*	.63*	.63*				.64*	.62*	.62*			
Past theft				.81*	.81*	.81*				.65*	.66*	.65*				.76*	.73*	.73*
R	.67	.67	.67	.68	.68	.68	.45	.45	.45	.47	.47	.47	.51	.51	.52	.64	.65	.65

*$p < .05$ (two-tailed).

Table 4. Standardized Regression Coefficients Relevant to Modified Strain Model Predicting Violence and Theft in Three Countries, Using Subjective Strain

	Greece (N = 400)						Russia (N = 500)						Ukraine (N = 500)					
	Violence			Theft			Violence			Theft			Violence			Theft		
Variables	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Subjective strain	.00		.00	.05		.07*	.01		.00	.04		.04	.08*		.02	.09*		.03
Anger		.00	.00		.00	–.04		.03	.03		–.01	–.02		.13*	.12*		.12*	.10*
Female	–.06*	.06*	–.06*	.00	.00	–.01	–.04	–.04	–.04	–.10*	–.09*	–.10*	–.07*	–.07*	–.07*	.00	.00	.00
Age	–.06*	–.06*	–.06*	–.06	–.05	–.06*	–.09*	–.09*	–.08*	–.03	–.03	–.03	–.11*	–.11*	–.11*	–.11*	–.11*	–.11*
Past violence	.80*	.80*	.80*				.63*	.63*	.63*				.64*	.62*	.62*			
Past theft				.81*	.81*	.81*				.66*	.66*	.66*				.76*	.73*	.73*
R	.67	.67	.67	.68	.68	.68	.44	.45	.44	.47	.47	.47	.50	.51	.51	.64	.65	.65

*$p < .05$ (two-tailed).

.07 for theft is reduced below significance to .04, which indicates a statistically significant reduction. No mediation was found in the violence equation (appendix C).

Similarly, very limited evidence exists of a hypothesized positive interaction between the measures of objective and subjective strain in predicting criminal probability. Only in one of six instances is that interaction term significantly associated with criminal probability (for theft in Greece); this result was repeated for the specific measure of failure to achieve valued goals (results not shown here but available from the authors). Other interactions that involve the two types of strain are either insignificant or predictive in the wrong direction.

Therefore, substituting subjective strain for objective strain fails to improve the performance of strain theory, and including subjective strain as a mediator or interactor does not seem to improve the results significantly.

Hypotheses 4 and 5: Self-Control and Religiosity as Moderators of Strain–Crime Link

It remains to be determined whether the relationship between objective strain or subjective strain and crime is moderated by self-control or religiosity. As can be observed from table 5 (models 4 and 5), with the exception of theft models in Greece and Russia, low self-control is positively associated with crime in all three countries. However, in no instance is the interaction term for self-control $\times$ strain significant, either for objective or subjective strain. This finding indicates that the influence of strain on criminal probability is unaffected by the person's degree of self-control (results for the subjective strain $\times$ self-control interaction terms are not reported here but can be requested).

The findings that bear on the interaction between strain and religiosity also provide very little support for strain theory. Results in table 5 (models 6 and 7) indicate that, keeping the effects of strain and control variables constant, religiosity has no significant association with criminal probability in any of the three countries. Moreover, religiosity inhibits the effects of strain on crime only in 2 of 12 instances (interactions of subjective strain and religiosity not shown), both of which involved theft in Russia. Similar results characterize the interaction terms concerning specific indicators of strain. Therefore, we find that strain, whether examined in its objective or subjective form, does not generally interact with religiosity in predicting crime probability, and its interactive impact is limited to the case of theft in Russia.

Table 5. Standardized Regression Coefficients Representing General Objective Strain and its Interactions with Subjective Strain, Religiosity, and Self-Control in Predicting Violence and Theft in Three Countries

A. Greece (N = 400)

	Violence							Theft						
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Objective strain	.05	.05	.05	.01	.01	.06	.05	–.01	–.01	–.01	–.01	–.02	.01	.01
Subjective strain		–.01	–.01						.05	.07*				
Low self-control				.10*	.10*						.06	.06		
Religiosity						–.05	–.05						–.03	–.03
Subjective strain × objective strain			.02							.07*				
Low self-control × objective strain					.01							.01		
Religiosity × objective strain							.01							.01
Female	–.06*	–.06*	–.06*	–.05	–.05	–.05	–.05	.00	.00	–.01	.01	.01	.01	.01
Age	–.06*	–.06*	–.06*	–.03	–.03	–.05	–.05	–.05	–.05	–.05	–.04	–.04	–.05	.04
Past violence	.81*	.81*	.81*	.78*	.79	.81*	.81*							
Past theft								.81*	.81*	.81*	.80*	.80*	.81*	.81*
R	.67	.67	.67	.68	.67	.67	.67	.68	.68	.69	.68	.68	.68	.68

B. Russia (N = 500)

	Violence							Theft						
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Objective strain	.04	.05	.05	.03	.01	.04	.03	.05	.04	.04	.04	.04	.05	.02
Subjective strain		–.01	–.01						.02	.02				
Low self-control				.13*	.10*						.06	.06		
Religiosity						.00	.00						.02	.01
Subjective strain × objective strain			–.02							–.01				
Low self-control × objective strain					.01							.00		
Religiosity × objective strain							–.04							–.10*
Female	–.04	–.04	–.04	–.04	–.04	–.04	–.04	–.10*	–.10*	–.10*	.09*	–.09*	.10*	–.10*
Age	–.09*	–.09*	–.08*	–.07	–.06	–.09*	–.09*	–.03	–.03	–.03	–.02	.02	–.03	–.03
Past violence	.63*	.63*	.63*	.59*	.59*	.63*	.62*							
Past theft								.65*	.65*	.65*	.64*	.64*	.65*	.65*
R	.45	.45	.44	.46	.46	.45	.45	.45	.47	.47	.47	.48	.47	.48

C. Ukraine (N = 500)

	Violence							Theft						
Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Objective strain	.13*	.12*	.13*	.11*	.12*	.13*	.13*	.07*	.04	.06	.05*	.06*	.07*	.07*
Subjective strain		.04	.05						.08*	.08*				
Low self-control				.11*	.12*						.08*	.08*		
Religiosity						–.01	–.01						.02	.02
Subjective strain × objective strain			–.04							–.04				
Low self-control × objective strain					–.02							–.02		
Religiosity × objective strain							–.05							.01
Female	–.07*	–.08*	–.08*	–.06	.06	–.07*	–.08*	.01	.00	.00	.02	.02	.01	.01
Age	–.10*	–.11*	–.11*	–.09*	.09*	–.10*	–.11*	–.10*	–.11*	–.11*	.09*	–.09*	–.10*	.10*
Past violence	.64*	.63*	.63*	.60*	.60*	.63*	.63*							
Past theft								.76*	.75*	.75*	.74*	.74*	.77*	.77*
R	.51	.52	.52	.52	.52	.51	.52	.64	.64	.64	.64	.64	.64	.64

*$p < .05$ (two-tailed).

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SUMMARY AND DISCUSSION

The findings provide mixed support for GST as the theory fails almost completely in Greece and Russia and receives moderate support in Ukraine. We expected that strain and other relevant variables would help to predict criminal probability in all three countries observed here, at least to the extent that has been revealed in U.S. and Asian studies. However, our data suggest that objective strain, either by itself or through other elements of the strain–crime causal link, does not seem to provide any explanation of individual involvement in violence or theft among the Greek and Russian respondents. This result is particularly surprising in the case of Russia because one might speculate that widespread adverse conditions like those that prevail in Ukraine and Russia might make individual strain particularly potent as an instigator of criminal behavior. Moreover, incorporating subjective strain as a primary explanatory variable or as a mediator or interactant, as suggested in recent refinements of the theory, makes little difference.

We speculate that the overall weakness of GST revealed in our analyses may be because it is a highly conditionalized theory requiring more focused testing than we provide. Our study measures and takes into account two contingencies, religiosity and self-control, thought to affect the degree to which strain influences criminal probability, and finds that they do not seem to make much difference. However, it is possible that strain theory will not be broadly supported until researchers accommodate, simultaneously, all or most conditions that Agnew (2006) indicates may affect individual and societal variation in coping with strain or its consequent emotions.

Still, our results may signal the need for revision and extension of GST to link conditioning factors specifically to cultural variations. As implied by Agnew (2006), strain does seem to operate differently in various contexts. Although the lack of predictive power of strain in Greece—the context so similar to other Western nations—is intriguing, even more interesting is the dramatic incongruence of the Russian and Ukrainian results. Although both Russian and Ukrainian societies seem laden with strain, only among the Ukrainians do we observe responses to strain that even approach the ways specified by Agnew's argument. One possible reason may be variations in cultural scripts about how people should view life's challenges and about how they should respond to adversity. As Agnew (1992, 2006) and other researchers (Harnish, Aseltine, and Gore, 2000; Pearlin, 1989) suggest, individuals may develop preferred, perhaps habitual, methods of coping. If so, then those coping habits may be rooted in expectations shared by most people in specific locales. Hence, Russians may be more accustomed than Ukrainians to blaming themselves for

problems. They may also be more apt to use alcohol or other noncriminal strategies to cope with strain, or they may share a notion that individuals ought to be active in seeking solutions to problems. Ukrainians, however, may be more likely to externalize negative emotions, including through criminal activities. Consistent with an assumption of cultural variability in patterns of coping, a surprisingly high percent of the Greek respondents, despite overall social, economic, and governmental advantages, still report that they have recently experienced strain. Yet, those strains do not seem to result in greater criminal behavior, either individually or collectively. In fact, the Greeks report much lower criminal probability than do respondents in the other two countries, and this lower criminality is confirmed by other data sources, which possibly is because Greeks generally share expectations that people must deal with perceived hardships in conventional ways. However, it is also possible that perceptions of various life events as adverse may be culturally scripted as well. If so, the finding of higher strain experienced by Greeks relative to Russians and Ukrainians may be the product of cultural norms. More explicit theorizing about such cultural norms might permit the theory to operate more effectively.

We hasten to note that these ideas about cultural variation are not conclusions indicated by the analyses themselves. Instead they are speculations sparked by the reality of our overall results suggesting that strain effects may be contingent on social context. Clearly, if such cross-cultural variations are confirmed in future research, additional theorizing about conditions under which strain matters must be undertaken.

CAVEATS

Despite the careful steps we took to increase the validity and reliability of our data, the findings should still be interpreted with caution. One potential problem may be a tendency for respondents to exaggerate or withhold sensitive information. After all, the data are from countries generally unaccustomed to surveys in which they report intimate details about their behaviors that might be damaging to their reputations if widely known. Russia and Ukraine, in particular, have histories of oppressive governments. We attempted to allay fears by using privately self-administered questionnaires for particularly sensitive information, but it is still possible that some respondents might not have been convinced that elicited information would be kept confidential. Interestingly enough, however, in the two countries where lack of anonymity would seem most likely to have been most threatening, the levels of reported and projected crime are exceptionally high, which suggests that fear of exposure may not have been as potent as Western observers might imagine.

Another limitation may be our measures of the strain theory concepts. There is reason to imagine that specific straining events or conditions are more relevant than general categories of strain (Agnew, 2006). However, for the practical reasons specified earlier, our measures are based on categorical types of strain rather than on specific straining events or conditions. Moreover, in the case of subjective strain and anger, we use single items to tap the relevant concepts, and in other instances, we use scales composed only of a few items. Perhaps results with more elaborate or appropriate measures would be different. However, the fact that our measures in many instances seem to work as theoretically specified in Ukraine suggests that measurement failures may not be responsible for the overall unfavorable results.

Third, the measures of projected criminal probability may raise some doubts about the results. Strain theory does not assume much cognition on the part of actors. Instead, it implies behavior that is often unthinking as a result of frustration or emotion-driven problem solving. Although costs of misbehavior may be appreciated and understood, anger and other negative emotions can "override" such reasoning. Therefore, it may be unrealistic to imagine that strained individuals can accurately estimate what they will do in the future or that they can meaningfully "intend" to commit various criminal acts in response to their strain. Although this concern is reasonable, two aspects of the study suggest that using projections as a dependent variable is not responsible for the negative results. First, the patterns of findings are the same predicting self-reports of crime in the past 5 years from strain experienced over a lifetime as for predicting future projections from currently experienced strain. Presumably, strain would have a much less distorting effect on individuals' ability to report what they have done than on their ability to project what they might do. Second, the results provide some support for strain theory in Ukraine, even with the future projections as the dependent variable. It would seem that if strain makes accurate projections of future criminal probability difficult, it would have been reflected in similar findings in all three countries.

Fourth, although we tried to take into account the actual time ordering of the variables, our assumptions about some time sequences could be incorrect. Our analysis assumes that objective strain is causally prior to subjective strain and the other variables in the chain, with anger being properly sequenced relative to criminal projections. Although those assumptions are the ones implied by GST, they may be incorrect. For instance, negative emotions and subjective strain may actually precede objective strains and thereby help to create those strains or perhaps to lead the respondent to interpret the conditions as being present. If such were true, of course, it would contradict the theory and may perhaps call into question even the results in Ukraine that seem to support the theory.

Practically speaking, however, if improper time sequences were in fact at work, it would not have large effects on our overall conclusions. In those numerous instances in which neither strain nor negative emotions predict criminal probability, causal ordering of the variables is irrelevant.

Fifth, although strain theory would be most useful if it applied to all individuals, it may actually be more appropriate for those younger and more crime prone. After all, although Agnew's (2006) formulation extends Merton's (1938) anomie theory, it grew mainly from research and theorizing about delinquency and youthful misbehavior. To check out the possibility that the theory might work better for those closer to subjects in most of the research Agnew draws on, we conducted a subanalysis for the total sample of young males, aged 18–24 years. However, the results proved no more supportive than those for samples that included all ages and both genders.

Finally, our test is especially strict and conservative. Because we control for past crime while trying to predict future criminal probability from strain measures, we are essentially requiring the strain variables to explain change in criminal probability over a relatively short period of time rather than testing effects on absolute levels of criminal probability. In view of that, it may be remarkable that strain theory performs as well as it does in Ukraine. Some favorable findings under these strict test conditions certainly suggest that the theory deserves more attention.

CONCLUSIONS

Using data from random samples of Russian, Ukrainian, and Greek respondents, we tested hypotheses about linkages among objective strain, subjective strain, anger, and criminal probability specified by GST. We also investigated the conditioning effects of religiosity and self-control on each link of the causal mechanism specified by GST. Findings indicate limited support for the theory, with all supportive results being among the Ukrainian sample. Moreover, using a measure of subjective strain generally does not improve the predictive ability of strain, whereas self-control and religiosity do not seem to condition the effects of strain on criminal probability in any of the three countries we examined. Overall, our results suggest that the effects of strain on behavioral outcomes are context specific, perhaps mandating additional theorizing about the conditions under which strain helps explain criminal behavior.

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Appendix A. Countries' Sociodemographic Characteristics

Key Variables	Greece	Russia	Ukraine
Human development index	0.92	0.79	0.77
Infant mortality rates (per 1,000 live births)	6.0	15.0	12.0
Health-care expenditures per capita	9%	3%	3%
Life expectancy (in years)			
Male	75	59	62
Female	80	72	74

Appendix B. Measures of Objective Strain, Subjective Strain, and Criminal Probability/Self-Reported Criminal Behavior Used in Analyses

Objective strain (for each of the following situations, please indicate how frequently you are experiencing it now)	1. Failing to achieve some goal that is important to you (such as career achievement or level of income) 2. Failing to achieve some goal that, because of hard work, an agreement, or principles of justice, you deserve to achieve (such as getting a promotion at work or graduating from college) 3. Something you highly valued is lost to you (such as a close relationship, a person who died, or a job was lost) 4. Bad things have been happening to you (such as being a victim of a crime, becoming seriously ill, or getting in conflict with a friend, partner, or family member) 5. Experiencing bad conditions (such as poverty, injustice, or unhappiness) 6. Not doing as well at things as some other people (such as not having gotten what others got, or not having performed as well as others)
Subjective strain (please indicate how frequently you are experiencing it now)	Feeling stressed or pressured
Criminal projections (how likely would you be to commit each of the following acts if you had a strong desire or need and the opportunity to do it?)	1. Take money or property from others worth less than $5 2. Take money or property from others worth more than $5 but less than $50 3. Take money or property from others worth $50 or more 4. Hit another person on purpose in an emotional outburst 5. Physically harm another person on purpose 6. Use violence or threat of violence to accomplish some personal goal

Appendix C. Results of Three Statistical Tests of Mediation Effects on the General Strain/Crime and Subjective Strain/Crime Relationships in Ukraine

	Violence Index			Property Offending Index		
	Preacher-Hayes Bootstrap CI	**Sobel *z***	**Freedman-Schatzkin *t***	**Preacher-Hayes Bootstrap CI**	**Sobel *z***	**Freedman-Schatzkin *t***
Objective strain/anger	0.001–0.077*	4.20*	2.53*	0.018–0.052*	5.58*	3.37*
Subjective strain/anger	0.011–0.118*	4.91*	2.88*	0.019–0.095*	6.71*	3.03*
Objective strain/subjective strain	–0.010–0.043	1.71	1.10	0.009–0.048*	2.58*	2.47*

ABBREVIATION: CI = confidence interval.
*$p < .05$ (two-tailed)