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A Multitrait-Multimethod Model for the Measurement of Sensitivity to Reward and Sensitivity to Punishment

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Abstract. It was investigated whether sensitivity to reward and sensitivity to punishment as conceived in Gray's (1991) Reinforcement Sensitivity Theory could be measured by means of a multitrait-multimethod (MTMM) model containing method factors representing situational variance. On the basis of the similarities between sensitivity to reward and punishment with promotion- and prevention-orientation, as discussed in the organizational context, the situational contexts were mainly chosen from school and organization. A total of 347 German participants completed a 58-item questionnaire measuring sensitivity to reward and punishment in the context of the team, of supervisors/instructors, and consumption. Confirmatory factor analysis revealed a factor for sensitivity to reward, for sensitivity to punishment, and three situational context factors (team, supervisor/instructor, and consumption). Thus, the situational variance could be controlled by means of the MTMM design. Moreover, some relations of sensitivity to reward and punishment with educational performance were found.

Keywords: reinforcement sensitivity theory, prevention-orientation, promotion-orientation, MTMM

Introduction

There have been several attempts to develop inventories for the assessment of the dimensions of the Reinforcement Sensitivity Theory (RST) from J.A. Gray (1991, 1994). These developments were related to Gray's (1987) idea that impulsivity and anxiety are more fundamental dimensions than extraversion and neuroticism in the Eysenck system (Eysenck, 1967). Impulsivity is regarded as representing primarily the activity of a neural system, the behavioral approach system (BAS), and anxiety is regarded as representing primarily the activity of the behavioral inhibition system (BIS). The BAS reflects the sensitivity to stimuli representing reward or the relief of punishment, and the BIS reflects sensitivity to stimuli representing punishment or frustrative nonreward (Pickering et al., 1997). In addition, Gray postulated a Fight/Flight System (FFS), which is activated by the presence of unconditioned aversive stimuli. In a recent modification of the RST, the FFS is called Fight-Flight-Freeze System (FFFS) and is responsible for mediating reactions to all aversive stimuli, conditioned and unconditioned (Gray & McNaughton, 2000). It, thus, takes over most of the roles that were previously attributed to the BIS. The BIS is responsible for the inhibition of behavior that might result in a goal conflict between approach and avoidance. As Corr (2004) notes, this modification raises the question of which personality traits now correspond to the FFFS, BAS, and BIS. The aim of the present paper is the development of scales for the RST in an applied setting. In light of the latest changes of the RST, one should be careful with the naming of the scales. It was, therefore, decided to only use the terms "sensitivity to reward" (SR) and "sensitivity to punishment" (SP) for the scales and to leave the question whether SP might be primarily be related to the BIS (as was previously assumed) or to the FFFS (as is currently assumed) open for further research.

Psychometric Measures of Gray's Dimensions

There have been several attempts to develop psychometric measures for the RST, especially for anxiety and im-

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pulsivity. First, measures for impulsivity and anxiety were developed on the basis of Eysenck's extraversion and neuroticism dimension as they are represented in the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975). Subjects were classified in the four quadrants according to their extraversion and neuroticism scores (Patterson, Kosson, & Newman, 1987). One of the first measures that was developed in order to represent the RST dimensions more specifically was the Gray Wilson Personality Questionnaire (GWPQ; Wilson, Barrett, & Gray, 1989). The GWPQ is based on six scales designed to measure individual differences in the BIS, the BAS, and the FFS. The six scales were intended to measure the following behavior tendencies: Passive Avoidance and Extinction (BIS), Active Avoidance and Approach (BAS), and Fight and Flight (FFS). However, the empirical six-factor structure did not correspond exactly to the intended structure (Wilson, Gray, & Barrett, 1990).

Carver and White (1994) presented a four-factor structure that was the basis for the development of the BIS/BAS-scales and contained a scale for the measurement of the BIS-sensitivity and a scale for the measurement of the BAS-sensitivity, which contain the three subscales *Drive, Reward Responsiveness,* and *Fun Seeking*. Carver and White (1994) found that the three BAS factors loaded on a second-order factor representing BAS. Jorm et al. (1999) replicated the four-factor structure in an Australian sample. However, Heubeck, Wilkinson, and Cologon (1998) could not replicate the four-factor structure. The Heubeck et al. (1998) results pointed toward a two-factor structure with one factor representing the BIS sensitivity and another factor representing the BAS sensitivity. The results of Strobel, Beauducel, Debener, and Brocke (2001) were similar. They found only weak evidence for the four-factor structure as it was presented in Carver and White (1994).

One reason for the problems with the development of scales for the BIS- and BAS-sensitivity may be that the RST is closely related to stimuli that represent reward or punishment. There may be a considerable amount of individual differences in the interpretation and the relevance of stimuli. An example given in Torrubia, Ávila, Moltó, and Caseras (2001) is that environmental influences could produce a different level of motivation for money. These individual differences in the interpretation of stimuli as representing reward or punishment may be one reason for problems in the development of optimal scales. Nevertheless, one may ask for rather general events or stimuli and focus on the emotional reactions to the stimuli. This was the strategy chosen by Carver and White (1994). For example, a BIS-item like "I worry about making mistakes" (Carver & White, 1994, p. 323, Table 1) does not specify in which situation the mistakes occur and does not specify the consequences to worry about. The focus is on the worries resulting from the mistakes. The strategy to focus on the emotions instead of specific situations or reactions was successful, since factors representing BIS- and BAS-sensitivity could be established. On the other hand, it was not surprising that Carver and White (1994) found strong correlations of the BIS/BAS-scales with the Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988), which is only based on adjectives. The use of unspecific stimuli leads to a reduction of the situation-specific variance in the items. The missing specificity of the item content may be one reason for the finding that the BIS/BAS scales did not represent the expected relations with Eysenck's extraversion and neuroticism dimension (Heubeck et al., 1998).

Torrubia et al. (2001) developed the Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ) as a measure of Gray's anxiety and impulsivity dimensions. They could establish two factors, one representing the Sensitivity to Punishment (SP) and the other the Sensitivity to Reward (SR). As with the BIS/BAS scales, the stimulus content of the items of the SP was rather unspecific. On the other hand, the items of the SR scale contained more specific rewards (e.g., money, sex, social power, and approval). They assumed that the items containing specific stimuli could be interpreted with less ambiguity.

The Aim of the Present Study

The present study contains a further investigation of the utility of more specific stimuli for the assessment of SP and SR. The main idea of the present study is to treat the specific stimulus variance as method variance within a multitrait-multimethod (MTMM) design (Campbell & Fiske, 1959). This is conceptually close to the approach of van Heck, Perugini, Caprara, and Fröger (1994), even though they formulated their ideas in the framework of the generalizability theory (Cronbach, Gleser, Nanda, & Rajaratnam, 1972). Moreover, the van Heck et al. (1994) study was related to situational variance within the Five-Factor Model of Personality (Costa & McCrae, 1992), whereas the present study investigates situational variance within the RST.

In order to treat the situational variance within the MTMM approach it is necessary to establish factors that represent the situational variance. Therefore, the situational variance must be substantial, and it is important to find domains that may contain relevant stimuli and may, therefore, lead to a substantial amount of situational variance.

A domain leading to a substantial amount of situational variance, which may allow one to establish situational factors, is the workplace and, for younger people, the school or university. It is probably especially important for people whether they receive reward or punishment at their workplace or at school. There is already some evidence for the relevance of the sensitivity to reward and punishment at work. For example, Higgins (1997) proposed a regulatory focus theory that was also discussed in the context of industrial psychology (Brockner & Higgins, 2001). According to Higgins (1997), the nurturance-related focus leads to promotion-orientation, whereas the security-related focus leads to prevention-orientation. Regulatory focus theory suggests that the nature of the emotional consequences of goal attainment/nonattainment may be quite different, depending on whether people are engaged in goal-directed behavior with a promotion or prevention focus. From the description of the promotion-orientation one can derive that it is related to rewarding stimuli, since nurturance-related stimuli should be rewarding in general. Thus, the promotion-orientation should be related to a high sensitivity to reward. The security-related focus has to do with the avoidance of negative stimuli. Thus, the prevention-orientation should be related to the sensitivity to punishment. The parallelism of the motivational or regulatory orientations with the stimulus sensitivities leads to the assumption that different sensitivities to punishment and reward may be important in the organizational and in the instructional contexts.

The parallelism of the trait-oriented RST with the regulatory focus theory explains why the distinction between sensitivity to reward and sensitivity to punishment was expected to be relevant in the organizational context. However, it does not specify different types of rewarding and punishing stimuli. Different stimulus types may be expected on the basis of the following: It may be important whether the rewards or punishments come from colleagues at the same hierarchical level or whether they come from supervisors or instructors. Some individuals may have a special sensitivity to the rewards or punishments related to the team-level, and others may be more sensitive to rewards or punishments coming from supervisors or instructors. This may be an interesting situational variance, which may be captured by corresponding situational factors. In order to enhance the situational variance further it was decided to incorporate nonsocial situations of consumer behavior (e.g., buying something).

To summarize, the structural hypothesis was that it would be possible to measure SR, SP, as well as situational context or method factors for the team, the supervisors or instructors, and in a nonsocial consumer context within a MTMM or facet design.

Method

Sample

The personality questionnaire was administered to 347 German participants (151 females) ranging from 17 to 34 years of age (M = 21.8; SD = 3.63). A small majority (56%; n = 196) of the participants were male. The participants were volunteers recruited from a secondary school in Berlin that comprised all conventional German school levels and from the Free University of Berlin, Germany. The investigation was anonymous, and in order to reduce the tendency toward faking good, the participants were not obliged to give complete demographic information. Therefore, the exact information on the school level was missing for 85 (24%) of the participants. A total of 113 (33%) participants were students, and 21 (6%) of the participants were in classes that lead to a diploma qualifying for university entrance. From the remaining participants, 103 (30%) attended a comprehensive school grade that would not necessarily qualify for university entrance, and 25 (7%) participants were in classes leading to the lowest conventional German school grade. The sample covers a large range of educational levels.

Material: The Work Reinforcement Sensitivity Questionnaire (WRSQ)

The WRSQ was developed in the context of a larger personality test (START-P) that is composed of several scales for the assessment of young individuals who are beginning their professional career (Kersting & Beauducel, in press). START is a German test battery that covers a large range of job relevant abilities, personality characteristics, knowledge, and competencies such as English language competence (START-E; Liepmann, Nettelnstroth, Tartler, & Smolka, 2005).

The WRSQ items were written according to the following scheme: They contain an individual appraisal component (e.g., "I am very unhappy"), a conditioning component with statements pointing to reward, relief from punishment, punishment (e.g., "when I am rejected") or frustrative nonreward (e.g., "when I don't get an expected reward"), and a situational context component (e.g., "in my team," "from my instructor," "when I buy something"). The appraisal components can also contain an indirect appraisal (e.g., "I try to avoid").

The item components were arranged in Table 1 in a way that is similar to a mapping sentence (Guttman & Levy, 1991). A complete mapping sentence would require that each appraisal component is combined with each conditioning component and with each situational

Table 1. Examples for the three-item components.

Appraisal	Conditioning	Situational context
I am very unhappy	to be rejected	team
I am very unhappy	to be rejected	supervisor/instructor
I am very unhappy	not to get back	lost things
It is important for me	to be accepted	team
It is important for me	to be accepted	supervisor/instructor
It is important for me	to get back	lost things

context component. However, this was not possible, because not all combinations would lead to meaningful sentences. For example, it would not make sense to combine "it is important for me" with "to be rejected" and with "by my team." Even when there may be special occasions where such items would make sense, these occasions would be so rare that such items were avoided. Moreover, a complete combination of all the item components would lead to a very large questionnaire with many repetitions.

The distribution of the 58 items on the different components was not equal (see Table 2). Reward and relief from punishment should both activate the BAS, whereas punishment and frustrative nonreward should both activate the BIS (Pickering et al., 1997). It was, therefore, expected that the reward items would load on one factor together with the relief from punishment items, and that the punishment items would load on one factor with the frustrative nonreward items. It should be possible to aggregate the corresponding items containing reward or relief from punishment as well as the corresponding items containing the punishment or frustrative nonreward. Note that each item was entered in one scale representing sensitivity to reward or sensitivity to punishment and in another scale representing the situational context (team, supervisor/instructor, or consumption). The items were presented in form of a six-point rating scale ranging from *complete disagreement* to *complete agreement*.

Table 2. Distribution of the items on the different components.

Reward/punishment	Situational context	No. items	Aggregate label
Reward	team	4	RewTea
Reward	supervisor/instructor	5	RewSup
Reward	consumption	5	RewCon
Relief from punishment	team	3	RpunTea
Relief from punishment	supervisor/instructor	5	RpunSup
Relief from punishment	consumption	5	RpunCon
Punishment	team	7	PunTea
Punishment	supervisor/instructor	7	PunSup
Punishment	consumption	7	PunCon
Frustrative nonreward	team	4	FnonTea
Frustrative nonreward	supervisor/instructor	3	FnonSup
Frustrative nonreward	consumption	3	FnonCon

Note: The aggregate labels were formed according to the item components. Reward by the team = RewTea; Reward by supervisors/instructors = RewSup; Reward from consumption = RewCon; Relief from punishment by the team = RpunTea; Relief from punishment by supervisors/instructors = RpunSup; Relief from punishment from consumption = RpunCon; Punishment by the team = PunTea; Punishment by supervisors/instructors = PunSup; Punishment from consumption = PunCon; Frustrative nonreward by the team = FnonTea; Frustrative nonreward by supervisors/instructors = FnonSup; Frustrative nonreward from consumption = FnonCon.

Statistical Analyses

Descriptive analysis, Cronbach's α, and regression analysis was performed with SPSS for Windows, Release 11. The hypotheses were tested by means of confirmatory factor analyses based on maximum likelihood estimation (Mplus 3.11; Muthén & Muthén, 2004). The confirmatory factor analyses were based on aggregates (parcels) for each combination of the item components presented in Table 2. Performing structural equation modeling on the basis of theoretically justified parcels instead of single items has been recommended because the single items contain a much larger amount of error variance (Little, Cunningham, Shahar, & Widaman, 2002). In the present case, the theoretical justification of the parcels is based on the MTMM design. For example, the sum of the raw scores of the four items representing reward in the team context gives the aggregate "RewTea" (see Table 2). The next aggregate was given by the sum of five items representing reward by supervisors/instructors (RewSup; see Table 2), etc. In order to evaluate model fit, besides the χ^2 test, the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR) were reported.

Results

Table 3 shows the descriptive data and the internal consistencies of the WRSQ scales. Females had larger sensitivity raw scores in all scales that are related to social stimuli, but the mean difference between males and females was not significant for the Consumption scale.

The confirmatory factor analysis was performed according to the expected structure, that is, for each scale of the instrument (SR, SP, Team, Supervisors, and Consumption) a factor was formed. The factors were formed according to a facet or MTMM

Table 3. Means (standard deviations) and Cronbach's α for the WRSQ scales.

Scale	Males (N = 196)	Females (N = 151)	Difference	Cronbach's α
SR	116.41 (17.49)	124.84 (12.95)	**	.90
SP	115.32 (17.68)	126.91 (15.72)	**	.87
Team	63.68 (12.29)	73.00 (10.46)	**	.91
Sup/Inst	83.33 (13.84)	94.48 (12.34)	**	.91
Con	79.56 (10.99)	78.97 (10.23)	ns	.79

Notes: Difference = differences by sex; scale labels: SR, Sensitivity to Reward; SP, Sensitivity to Punishment; Team, Sensitivity to reward or punishment by the team; Sup/Inst, Sensitivity to reward or punishment by supervisors/instructors; Con, Sensitivity to reward or punishment in consumption; **p < .001; ns, p > .05.

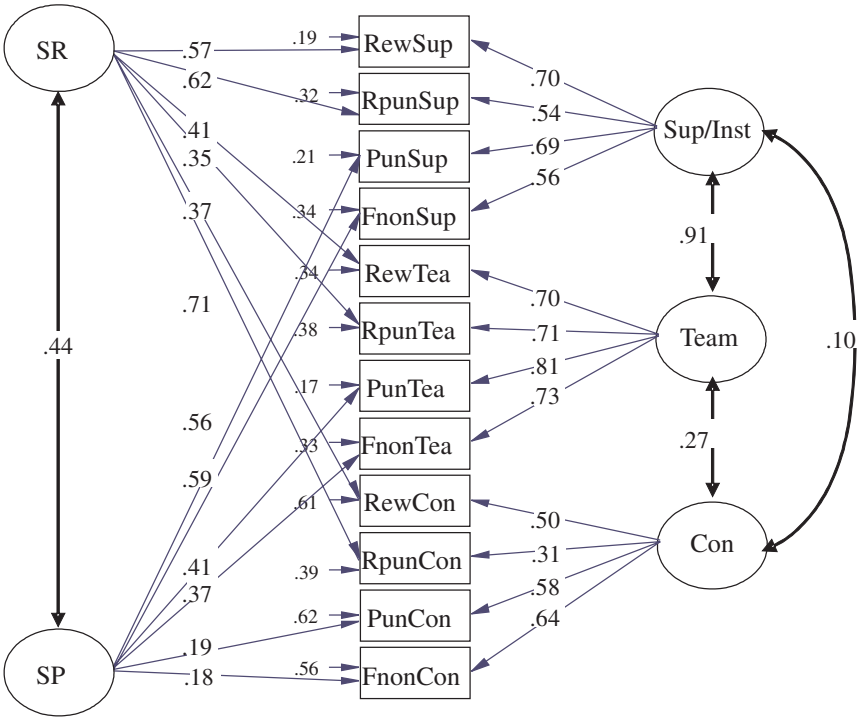

Figure 1. Confirmatory factor analysis of the WRSQ aggregates described in Table 2 (completely standardized solution). Variable labels: RewTea = Reward by the team; RewSup = Reward by supervisors/instructors; RewCon = Reward from consumption; RpunTea = Relief from punishment by the team; RpunSup = Relief from punishment by supervisors/instructors; RpunCon = Relief from punishment from consumption; PunTea = Punishment by the team; PunSup = Punishment by supervisors/instructors; PunCon = Punishment from consumption; FnonTea = Frustrative nonreward by the team; FnonSup = Frustrative nonreward by supervisors/instructors; FnonCon = Frustrative nonreward from consumption. Factor labels: SR, Sensitivity to Reward; SP, Sensitivity to Punishment; Team, Sensitivity to reward or punishment by the team; Sup/Inst, Sensitivity to reward or punishment by supervisors/instructors; Con, Sensitivity to reward or punishment in consumption.

model. This means that each variable had one freely estimated loading on the SR or the SP factor and another freely estimated loading on one of the context factors (Team, Supervisors, Consumption). The remaining loadings were fixed at zero. In order to assure model identification the context factors were not allowed to correlate with the SR and SP factors, and the factor variances were fixed to unit variance. The data did not conform to the multivariate normal distribution (χ^2 = 432.11; df = 2; p < .001). Therefore, the Satorra-Bentler scaled χ^2 statistic (Satorra & Bentler, 1994) was used as a basis for the evaluation of model fit. This statistic was shown to work effectively with nonnormal data when the sample size is not large (Hu, Bentler, & Kano, 1992). On this basis, the fit of the model presented in Figure 1 was acceptable (χ^2 = 98.74; df = 38; p < .001; CFI = .97; RMSEA = .068; SRMR = .051).

As expected, SP and SR could be shown together with the method factors corresponding to the situational context. Since the correlation between the factors Team and Supervisors/Instructors was very high, it was investigated whether a single factor could account for the variance explained by the two factors. Therefore, a model that corresponds exactly to the previous model, but with a single factor for Team and Supervisors/Instructors, was tested. The fit of this model was still acceptable (χ^2 = 111.06; df = 40; p < .001; CFI = .96; RMSEA = .072; SRMR = .050), however, the Satorra-Bentler scaled χ^2-difference test (see Satorra & Bentler, 2001) for the two models was significant (χ^2_{diff} = 11.49; df_{diff} = 2; p < .01), indicating that the model with separate factors for Team and Supervisors/Instructors had a more pronounced fit. Thus, the intended model is supported by the data, even when the differentiation between sensitivity to reward and punishment by the team or supervisors/instructors is rather weak.

A model containing only factors for SP and SR had a poor fit (χ^2 = 300.04; df = 53; $p < .001$; CFI = .87; RMSEA = .112; SRMR = .086) and the fit was significantly worse than the fit of the initial model containing five factors (χ^2_{diff} = 201.05; df_{diff} = 15; $p < .01$). A further model containing only the three method factors Team, Supervisors/Instructors, and Consumption had also a poor fit (χ^2 = 334.16; df = 51; $p < .001$; CFI = .85; RMSEA = .126; SRMR = .079), and the fit of this model was also significantly worse than the fit of the initial model (χ^2_{diff} = 239.55; df_{diff} = 13; $p < .01$).

Discussion

The aim of the present study was the development of a questionnaire for the measurement of sensitivity to reward and sensitivity to punishment, as they are conceived in Gray's (1991, 1994) theory. In Gray and McNaughton's (2000) modification of the RST the BIS is no longer regarded as the primary neurological basis of SP. It was proposed that SP is related to the FFFS, which is responsible for mediating reactions toward aversive stimuli. Therefore, the psychometric SP dimension, as it was developed here, should not be regarded as a dimension representing the BIS. However, further research is needed in order to clarify the correspondence between the neurological systems of the revised RST and psychometric traits.

The present study follows the MTMM approach with three method factors representing different situational contexts (team, supervisors/instructors, and consumption). Confirmatory factor analysis revealed that SR, SP, and the situational context factors explained a substantial amount of variance. Representing the situational context in which reward and punishment occur by means of method factors is regarded as an advantage because it controls for the specific situational variance instead of avoiding it. When the situational variance is avoided or unspecific, as, for example, in the BIS/BAS scales (Carver & White, 1994), the scales may be primarily related to general emotional traits, as they are, for example, measured with the PANAS (see Heubeck et al., 1998). When the specific situational variance is not avoided, this specific variance may conceal the underlying SR and SP dimensions when it is not controlled by means of a MTMM design. The present approach was to be specific with respect to the item content and to control for the situational variance by means of a MTMM design. The results show that it was possible to control for the situational variance in the SR and SP dimensions.

The MTMM approach used here has consequences for scoring the questionnaire. According to Humphreys (1962) the aggregation of raw scores across a heterogeneous facet of unwanted variance (the situational or method variance, in the present case) would suppress or balance out some of this unwanted variance, and the variance from the homogeneous aspects of the scores (i.e., the SR or SP variance) would be enhanced. An example demonstrating this effect of aggregation of variables across heterogeneous facets is discussed in Süß and Beauducel (2005). However, it would be insufficient to rely only on the aggregation effect in order to provide SR and SP scores that contain a minimum of situational or method variance, especially because the correlation between the Team and Superior/Instructor factor was so large that not much of the respective variance can be suppressed through aggregation. It is, therefore, recommended that factor scores be used in order to provide an optimal scoring of the WRSQ. The conventional regression score estimates that can be calculated with Mplus 3.11 are not recommended here because they are generally much more correlated than the factors, which they should represent. A more compelling type of factor score estimate, which preserves the correlations of the original factors in the scores, is available with LISREL 8.3 (Jöreskog, Sörbom, du Toit, & du Toit, 2000). Another type of scoring that may be interesting when uncorrelated scores are intended would be Anderson-Rubin (1956) score estimates (cited in Gorsuch, 1983). A SPSS job calculating the orthogonal Anderson-Rubin score estimates from a confirmatory factor pattern and the intercorrelations of the variables is available from the first author. It would, of course, be premature to prescribe a single type of scoring of the WRSQ for future research, since further research and larger samples are needed to provide solid knowledge on optimal weighting of the variables as well as for the calculation of reference norms.

It was shown that the sensitivity to reward and punishment in the social context was more pronounced in females than in males, whereas there was no gender difference for the Consumption scale. The higher sensitivity to punishment of females may be related to enhanced neuroticism or anxiety scores of females (Eysenck & Eysenck, 1991). However, the fact that no gender difference was found on the Consumption scale indicates that even the larger neuroticism or anxiety scores of females typically found in personality questionnaires could be related to the focus on social stimuli in these questionnaires. When questionnaires do not contain many items related to social stimuli, the difference between males and females on neuroticism may be reduced, as in the present study. On the other hand, the fact that females score higher both on SR and SP supports the idea that the reinforcement systems underlying these sensitivities are mutually interdependent in their functional outputs (Corr, 2004).

The present study was, of course, limited with respect

to the situational contexts investigated. However, the organizational and school context was regarded as especially interesting for the assessment of SR and SP, because it was assumed that strong rewards and punishments are possible in this context. Moreover, two general motivational tendencies that are similar to SR and SP were proposed in the organizational context on the basis of Higgins' (1997) theory on regulatory focus. The general motivational focus that is closest to SR is promotion-orientation, that is, pursuing all means of advancement. The motivational focus that is most similar to SP is the prevention-orientation, that is, carefully avoiding any mistakes. Promotion-orientation and prevention-orientation have been discussed as relevant dimensions in the context of organizational psychology (Brockner & Higgins, 2001; Kluger, Stephan, Ganzach, & Hershkovitz, 2004; Brockner, Parachuri, Idson, & Higgins, 2002). One aspect of the parallelism between Higgins' (1997) regulatory focus theory and Gray and McNaughton's (2000) RST is that the regulatory focus theory is based on general motivational orientations, whereas the RST is based on the sensitivity toward positive and negative stimuli. The regulatory focus theory typically emphasizes reactions to stimuli that are anticipated for months or years in advance (e.g., starting a new company or creating a supportive environment for one's children; Spiegel, Grant-Pillow, & Higgins, 2004), whereas the RST is focused on stimuli that are anticipated within a rather short time interval (typically within an experiment – one day) or even the reactivity to immediate stimuli. It might be regarded as an advantage to expand the time range for the anticipation of positive and negative stimuli of the RST by integrating long lasting anticipation processes as they were typically treated within the regulatory focus theory. Another interesting aspect of this parallelism is that the regulatory focus theory provides descriptions of general cognitive attitudes that may go along with specific sensitivities to positive and negative stimuli. Therefore, these two theories may be mutually enriched when related to each other.

Moreover, one may ask whether the dimensions that are measured by the WSRQ are primarily personality traits in the sense of Gray (1991, 1994) or whether they are primarily self-regulatory tendencies in the sense of Higgins (1997). However, Gray (1994) emphasized the situational aspect of his traits, since they are directly related to stimuli, whereas Higgins (2000) emphasized the stability or the dispositional component of the self-regulatory tendencies. There is, of course, no fundamental psychometric difference between stable self-regulatory tendencies and personality traits. The difference is more on a conceptual level and has to do with the research context in which the concepts were integrated. The focus on the personality trait concept has stimulated the search for underlying biopsychological dimensions (e.g., Gray, 1991), whereas the focus on the self-regulatory concept has stimulated the search for specific cognitive processes underlying the dimensions (e.g., Brockner et al., 2002). However, there is no need to fix the dimensions at one or the other side; it seems more interesting to maintain both the social-cognitive and the biopsychological perspective on these dimensions.

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