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Publisher: Routledge

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## International Journal of Psychology

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/pijp20>

### Cooperativeness and competitiveness as two distinct constructs: Validating the Cooperative and Competitive Personality Scale in a social dilemma context

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Published online: 12 Nov 2012.

To cite this article: Su Lu, Wing-Tung Au, Feng Jiang, Xiaofei Xie & Paton Yam (2013) Cooperativeness and competitiveness as two distinct constructs: Validating the Cooperative and Competitive Personality Scale in a social dilemma context, *International Journal of Psychology*, 48:6, 1135-1147, DOI: [10.1080/00207594.2012.743666](https://doi.org/10.1080/00207594.2012.743666)

To link to this article: <http://dx.doi.org/10.1080/00207594.2012.743666>

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# Cooperativeness and competitiveness as two distinct constructs: Validating the Cooperative and Competitive Personality Scale in a social dilemma context

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The present research validated the construct and criterion validities of the Cooperative and Competitive Personality Scale (CCPS) in a social dilemma context. The results from three studies supported the notion that cooperativeness and competitiveness are two independent dimensions, challenging the traditional view that they are two ends of a single continuum. First, confirmatory factor analyses revealed that a two-factor structure fit the data significantly better than a one-factor structure. Moreover, cooperativeness and competitiveness were either not significantly correlated (Studies 1 and 3) or only moderately positively correlated (Study 2). Second, cooperativeness and competitiveness were differentially associated with Schwartz's Personal Values. These results further supported the idea that cooperativeness and competitiveness are two distinct constructs. Specifically, the individuals who were highly cooperative emphasized self-transcendent values (i.e., universalism and benevolence) more, whereas the individuals who were highly competitive emphasized self-enhancement values (i.e., power and achievement) more. Finally, the CCPS, which adheres to the trait perspective of personality, was found to be a useful supplement to more prevalent social motive measures (i.e., social value orientation) in predicting cooperative behaviors. Specifically, in Study 2, when social value orientation was controlled for, the CCPS significantly predicted cooperative behaviors in a public goods dilemma (individuals who score higher on cooperativeness scale contributed more to the public goods). In Study 3, when social value orientation was controlled for, the CCPS significantly predicted cooperative behaviors in commons dilemmas (individuals who score higher on cooperativeness scale requested fewer resources from the common resource pool). The practical implications of the CCPS in conflict resolution, as well as in recruitment and selection settings, are discussed.

**Keywords:** Cooperativeness; Competitiveness; CCPS; Validity; Social dilemma.

Cette recherche valide le construit et la validité empirique critériée de l'Échelle de personnalité coopérative et compétitive (Cooperative and Competitive Personality Scale) (CCPS). Les résultats de trois études soutiennent l'idée que la coopération et la compétition sont deux dimensions indépendantes, mettant ainsi en doute l'idée qu'il s'agisse des deux extrémités d'un même continuum. Premièrement, l'analyse factorielle confirmatoire révèle qu'une structure à deux facteurs correspond mieux aux données qu'une structure à facteur unique. De plus, la coopération et la compétition ne sont pas corrélées significativement (Études 1 et 3) ou ne sont corrélées positivement que de façon modérée (Étude 2). Deuxièmement, la coopération et la compétition sont associées de façon différente aux valeurs personnelles de Schwartz. Ces résultats soutiennent aussi l'idée que la coopération et la compétition sont deux construits distincts. De façon spécifique, les individus qui sont hautement coopératifs mettent plus l'accent sur les valeurs de transcendance de soi (i.e, l'universalisme et le bénévolat), tandis que les individus qui sont hautement compétitifs mettent plus l'accent sur les valeurs de dépassement de soi (i.e, pouvoir et accomplissement). Finalement, le CCPS, qui adhère à l'approche des traits de personnalité, se révèle un complément utile aux mesures prévalentes de la motivation sociale (i.e, Orientation sur les valeurs

sociales) pour prédire les comportements coopératifs. Spécifiquement, dans l'étude 2, lorsqu'on contrôle l'orientation sur les valeurs sociales, le CCPS prédit significativement les comportements coopératifs dans un dilemme de marchandises publiques (les individus ayant un pointage élevé de coopération contribuent davantage aux marchandises publiques). Dans l'étude 3, lorsqu'on contrôle l'orientation sur les valeurs sociales, le CCPS prédit significativement les comportements coopératifs dans les dilemmes communs (les individus ayant un pointage élevé de coopération demandent moins de ressources dans le bassin commun de ressources). La discussion porte sur les implications pratiques du CCPS dans la résolution de conflit, aussi bien que dans les paramètres du recrutement et de la sélection.

*E*n la presente investigación se validó el constructo y la validez de criterio de la Escala de Personalidad Cooperativa y Competitiva (CCPS) en un contexto de dilema social. Los resultados de tres estudios apoyaron la noción de que el cooperativismo y competitividad son dos dimensiones independientes, desafiando el punto de vista tradicional de que son dos puntos opuestos en un mismo continuo. En primer lugar se confirmó mediante varios análisis factoriales que la estructura de dos factores encajaba mejor de manera significativa que la estructura de un factor. Lo que es más, el cooperativismo y la competitividad no estuvieron correlacionados de manera significativa (Estudios 1 & 3), o estuvieron correlacionados moderadamente de manera positiva (Estudio 2). En segundo lugar, el cooperativismo y la competitividad estuvieron asociados diferencialmente con los Valores Personales de Schwartz. Estos resultados apoyaron aun más la idea de que el cooperativismo y la competitividad son dos constructos distintos. Específicamente, los sujetos que se mostraron altamente cooperativos enfatizaron más valores de trascendencia personal (es decir, el universalismo y la benevolencia), mientras que los sujetos que se mostraron altamente competitivos enfatizaron más valores de promoción personal (es decir, el poder y los logros). Finalmente, se observó que el CCPS, el cual adhiere a la teoría de rasgos de personalidad, era un suplemento útil para medidas más comunes de motivos sociales (es decir, orientación del valor social) a la hora de predecir conductas cooperativas. Específicamente, en el Estudio 2, cuando se controló orientación de valores sociales, el CCPS predijo de manera significativa conductas cooperativas en un dilema de bienes públicos (las personas que puntúan más alto en la escala de cooperativismo contribuyeron más a los bienes públicos). En el Estudio 3, al controlar la orientación de valores sociales, el CCPS predijo de manera significativa conductas cooperativas en dilemas comunes (las personas que puntúan alto en la escala de cooperativismo pidieron menos recursos de la fuente en común). Se analizan las implicaciones prácticas del CCPS en la resolución de conflictos, como también en contextos de reclutamiento y selección.

Cooperative and competitive behaviors have usually been examined in social dilemma settings, in which conflicts between individual interests and collective interests were simulated using economic games (Messick & Brewer, 1983). To predict cooperative or competitive behaviors in social dilemmas, researchers often categorize participants as either prosocial or proself along a unidimensional continuum (for review, see Bogaert, Boone, & Declerck, 2008).

Such dichotomous categorization, however, has been questioned in recent decades (Bonta, 1997; Lado, Boyd, & Hanlon, 1997). Many researchers have discussed the possibility and necessity of the coexistence of cooperativeness and competitiveness within an individual. For example, Bonta (1997) observed that people are able to behave cooperatively and competitively at the same time. The reason that cooperation and competition seemed to be mutually exclusive, as he elucidated, could be attributed to the limitations of laboratory experiments that did not allow the coexistence of the two constructs. Similarly, Lado et al. (1997) stated that the one-dimensional conceptualization that treats cooperation as more desirable than

competition has misled researchers and organizational members.

A Cooperativeness and Competitiveness Personality Scale was then developed to distinguish cooperation and competition as two distinct and independent constructs (Xie, Yu, Chen, & Chen, 2006). In the current research, the construct and criterion validities of the CCPS are examined. Specifically, we aim to validate the CCPS in a social dilemma context to test whether a two-dimensional personality measure, such as the CCPS, could serve as a useful supplement to one-dimensional prosocial/proself measures.

### THE SOCIAL MOTIVE MEASURE IN SOCIAL DILEMMAS

Social value orientation is a motivational theory describing individual differences in social motives in mixed-motive situations (Van Lange, 1999). The theory assumes that individuals tend to pursue goals that depart from their self-interests. In a payoff matrix of a two-person game, different types of motivation could be inferred based on

various choices. The three types of motivation most commonly observed are prosocial, individualistic, and competitive motivation (Van Lange, Otten, De Bruin, & Joireman, 1997).

Prosocial individuals, especially cooperators, tend to maximize joint outcomes and to promote equality between the self and the other player (giving positive weight to the other's payoff); individualists, on the other hand, tend to maximize their own outcomes, regardless of the other's outcome (little or no weight given to the other's payoff). Competitors tend to maximize the relative advantage over the other's outcome (giving negative weight to the other's payoff; Messick & McClintock, 1968). Competitive and individualistic people are often termed "proself" because they tend to exhibit similar behavioral patterns in many situations (e.g. De Cremer & Van Lange, 2001).

Although measures of social value orientation have largely increased our understandings of human nature, the existing game measurements have suffered from various criticisms (Bogaert et al., 2008; Murphy, Ackermann, & Handgraaf, 2011). For instance, using nominal categorization and forced-choice forms to classify individuals as either prosocial or proself prevents researchers from investigating the coexistence of prosocial and proself motivations in the same individual (Murphy et al., 2011). Additionally, the measure has been criticized for being very similar to social dilemma games in terms of its response structure; a considerable proportion of the variance explained by SVO could be accounted for by these shared structures (Bogaert et al., 2008).

Lastly, as an individual difference in motivation, it is evident that social value orientation can serve as a valid predictor of cooperative behaviors in a social dilemma context. However, little is known about whether other individual differences, such as cognitive, affective and behavioral expressions of one's cooperative and competitive personality traits, also play roles in predicting one's behavior in a social dilemma. We will investigate this question in the current research.

## BRIEF INTRODUCTION TO THE CCPS

Cooperativeness and competitiveness have been investigated as personality traits. In a departure from the tradition of defining personality in terms of overt behaviors (for a review, see Pervin, 1994), however, Xie and her colleagues (2006) studied cooperativeness and competitiveness from a trait perspective, through which personality traits were broadly defined as "stylistic and habitual patterns

of cognition, affect and behavior" (Winter, John, Stewart, Klohnen, & Duncan, 1998, p. 232). From this perspective, we should not only examine overt behavior but also emphasize covert expressions of a particular trait, such as affective and cognitive expressions, which all contribute to the predictive power of the personality trait on behavioral outcomes across times and situations (Kenrick & Funder, 1988).

In developing the CCPS, Xie and her colleagues adopted Mead's (2002, p. 8) conceptualization, defining cooperation as "the act of working together to one end" and competition as "the act of seeking or endeavoring to gain what another is endeavoring to gain at the same time." In other words, individuals who are highly cooperative are more likely to collaborate with others, consider others' perspectives, and enjoy working with others. People who are highly competitive, on the other hand, tend to outperform others, tap their own potential, and not tolerate failure.

The CCPS was developed based on in-depth interviews and items adapted from previously established cooperativeness and competitiveness scales, such as the Cooperativeness Scale (Lu & Argyle, 1991), the Cooperative/Competitive Strategy Scale (Simmons, Wehner, Tucker, & King, 1988) and the Hypercompetitive Attitude Scale (Ryckman, Hammer, Kaczor, & Gold, 1990). Exploratory factor analyses showed that cooperativeness and competitiveness were loaded on two distinct dimensions and were mildly positively correlated. An additional confirmatory factor analysis confirmed the two-dimensional structure.

The final version of the CCPS includes 23 items (see the Appendix). The cooperativeness scale comprises 13 items, which are further represented by three subdimensions. They tap into individuals' beliefs (four items, for example: *Initiation and completion of any work is inseparable from the help and cooperation of team members*), feelings (four items, for example: *I enjoy working with other team members to achieve common success*), and behavioral tendencies in terms of cooperation (five items, for example: *At work, I can usually stand in other team members' shoes to consider their interests*). The competitiveness scale includes 10 items, such as "even during teamwork, I still want to outperform others," which could further be divided into three subdimensions, including individuals' beliefs (three items, for example: *I like competition because it allows me to play my best*), feelings (four items, for example: *I cannot stand being beaten in an argument by other team members*), and behavioral tendencies in terms of

competition (three items, for example: *Even in a group working towards a common goal, I still want to outperform others*). The items are rated on a seven-point scale ranging from 1 (“do not agree at all”) to 7 (“totally agree”).<sup>1</sup> The scale’s reliability, as reported in several studies, ranges from .85 to .87 for cooperativeness and from .71 to .79 for competitiveness (Chen, Xie & Chang, 2011; Xie et al., 2006).

The convergent and discriminant validities of the CCPS have been tested against the Big Five Personality Traits (Saucier, 1994). The results suggested that cooperativeness and competitiveness converge on the dimension of openness, meaning that openness is positively associated with both cooperativeness and competitiveness. On the contrary, they diverge on the dimensions of conscientiousness and extraversion. Specifically, conscientiousness is positively correlated with cooperativeness, but not with competitiveness. Conversely, extraversion is positively correlated with competitiveness, but not with cooperativeness. Agreeableness and neuroticism could also discriminate between cooperativeness and competitiveness; higher agreeableness is associated with higher cooperativeness and lower competitiveness, whereas the pattern is reversed for neuroticism.

The criterion validity of the CCPS has been verified in organizational settings. Chen and her colleagues (2011) demonstrated that the CCPS predicted supervisors’ ratings of employees’ task performances and organizational citizenship behavior (OCB). Specifically, cooperativeness is positively related to both OCB and task performance, whereas competitiveness is not significantly related to OCB but is positively associated with task performance. More importantly, cooperativeness and competitiveness were able to predict a significant amount of variance in job performance, even after controlling for the Big Five personality traits.

In summary, previous studies have illustrated good construct validity for the CCPS, associating it with the Big Five personality traits and establishing its criterion validity in organizational settings (Chen et al., 2011; Xie et al., 2006). Little is known, however, about the predictive power of the CCPS in social dilemmas that pit the motives of cooperation and competition against each other (Komorita & Parks, 1995).

<sup>1</sup>In Xie et al.’s study (2006), a nine-point Likert scale was used.

<sup>2</sup>Mass mailing is a service provided by the university to generate electronic mass mailings of officially required notification information, announcements, and promotions of events and activities to all students in the university.

<sup>3</sup>The details of this experiment are not related to the aims of the current research, so we will not mention them.

## OVERVIEW OF THE PRESENT RESEARCH

Given that the CCPS is a relatively new instrument that challenges the conventional view that cooperativeness and competitiveness are mutually exclusive (Deutsch, 1949), we will conduct three studies to further examine the construct and criterion validities of the CCPS. In the first study, the factor structure of the CCPS will be tested using confirmatory factor analyses that compare the data fit of a two-dimensional model with that of a one-dimensional model. In the second study, the construct validity of the CCPS will be tested against Schwartz’s personal values (Schwartz & Bilsky, 1990), and the criterion validity will be tested in a public goods dilemma. In the third study, the criterion validity of the CCPS will be tested in a commons dilemma.

### STUDY 1: A CONSTRUCT VALIDATION

#### Participants

Two hundred and fifty-five Hong Kong university students were recruited through their university’s mass mailing service;<sup>2</sup> they were invited to several experimental sessions and were compensated with HKD50. Upon their arrival at the laboratory, participants were asked to finish the main task of the experiment and then to complete the CCPS via the Qualtrics online survey.<sup>3</sup> The sample consisted of 105 males and 150 females with a mean age of 19.96 years ( $SD = 1.69$ ). The females and males did not differ in their scores on the cooperativeness ( $M = 5.31$  vs.  $5.37$ , respectively) or competitiveness scales ( $M = 4.28$  vs.  $4.36$ , respectively). Cooperativeness and competitiveness were not significantly correlated with age.

#### Confirmatory factor analysis of the CCPS

We conducted confirmatory factor analyses of the 255 students to examine the structure of the CCPS. Both cooperativeness and competitiveness were reliably measured (Cronbach’s  $\alpha = .87$  and  $.79$ , respectively). Given the debate pertaining to the dimensionality of cooperativeness and competitiveness, we conducted CFAs of both one-dimensional and two-dimensional models.

Structural equation modeling software, EQS, was used with the maximum likelihood method.

For the one-factor model, 23 items were linked to a single latent factor. The results suggested that the model fit the data poorly,  $\chi^2(230) = 1442.47$ , NNFI = .39, CFI = .45, SRMR = 1.5 and RMSEA = .14; confidence interval = .14–.15).

For the two-dimensional model with two higher order dimensions (i.e., cooperativeness and competitiveness) and six sub-dimensions (cognitive, affective, and behavioral aspects of cooperativeness and competitiveness, respectively), the results indicated that the two-dimensional construct achieved a better fit,  $\chi^2(226) = 508.52$ , NNFI = .87, CFI = .88, SRMR = .10 and RMSEA = .070; confidence interval = .062–.078. The two-factor model was better than the one-factor model; a Chi-square difference test showed that  $\chi^2(4) = 933.95$  ( $p < .05$ ). As a result, we accepted the two-factor model over the one-factor model.

Following the LM test's suggestion, the fit of the two-factor model could be improved by adding five error covariances to the cooperativeness dimension and one error covariance to the competitiveness dimension.<sup>4</sup> The improved two-factor model achieved a satisfactory fit,  $\chi^2(220) = 432.85$ , NNFI = .90, CFI = .91, SRMR = .097 and RMSEA = .062; confidence interval = .053–.070.<sup>5</sup> The cooperativeness and competitiveness factors turned out to not be significantly correlated ( $r = .11$ ,  $p > .05$ ).

In sum, the two-factor structure of the CCPS was confirmed in the Hong Kong sample. Our findings provided additional evidence for the notion that cooperativeness and competitiveness could be considered two independent constructs (Chen et al., 2011; Xie et al., 2006).

## STUDY 2: A PUBLIC GOODS DILEMMA

### Methods

#### Participants

Two hundred and seventy Hong Kong university students were recruited through a mass mailing service for an experiment that compensated them with HKD50. Through the mass email, students could gain access to an experiment

registration spreadsheet. While completing the spreadsheet, students were instructed to choose their preferred time slots for the experiment and also to complete the CCPS. A total of 154 students (60 males and 94 females) showed up for the experiment across several sessions.

#### Procedure and materials

Upon their arrival at the laboratory, participants were instructed to complete the social value orientation measure in the questionnaire booklet; following this, they participated in a public goods game. After the game, the participants completed the rest of their questionnaire booklets, which consisted of Schwartz's personal values measures and questions gathering demographic information.

*Social value orientation.* Social value orientation was measured by the Triple Dominance Measure of Social Values (Van Lange et al., 1997). In each of the nine decomposed games, the individuals chose from among three different options that differed in their outcome allocations between them and an imaginary partner. The three outcome allocations are indicative of the individualistic, competitive, and cooperative orientations. Following a common practice in social dilemma studies, we categorized the competitors and individualists as "proself." Of the 154 participants, 80 were classified as prosocials and 49 as proselfs (with 42 individualists and 7 competitors).

*Personal values.* Personal values were measured by the Short Schwartz's Value Survey (Schwartz & Rubel, 2005). We examined five values that are related to cooperativeness and competitiveness: achievement (four items, Cronbach's  $\alpha = .87$ ), hedonism (three items, Cronbach's  $\alpha = .82$ ), power (three items, Cronbach's  $\alpha = .47$ ), benevolence (four items, Cronbach's  $\alpha = .69$ ) and universalism (six items, Cronbach's  $\alpha = .81$ ). These were assessed using a six-point scale.

Personal values are the primary principles that can greatly influence people's cooperative and competitive behaviors. Their impacts on cooperative behavior in social dilemmas are evident in a number of empirical studies. Sagiv, Sverdlik, and Schwartz (2011) investigated how personal values

<sup>4</sup>Note that we only included those error covariances that share similar wordings or meanings within a dimension if they were suggested by the LM test. Also, adding the error covariances did not change the estimation of the other parameters much, which suggests that the proposed model/theory fits the data well; no significant modification of the theory is needed. Practices for the following two studies are the same as for this one.

<sup>5</sup>Although according to Hu and Bentler (1998) index of a good fit for the SRMR should be smaller than .05, a recommendation by Schermelleh-Engel, Moosbrugger and Müller (2003) suggests that a value for the SRMR that is equal to or smaller than .10 is an acceptable fit.

influenced cooperative and competitive behaviors in a social dilemma game, either in a cooperative frame or in a competitive frame. They found that higher self-transcendent values (caring for others' wellbeing), such as universalism and benevolence, were associated with greater contributions, whereas higher self-enhancement values (caring for self-interests), such as power, achievement and hedonism, were associated with fewer contributions in a cooperative game. Additionally, Joireman and Duell (2005) found that proself individuals are less likely to endorse self-transcendent values than their prosocial counterparts. Based on these findings, we will test the discriminant validities of the CCPS by inspecting the correlation between cooperativeness and self-transcendent values, as well as between competitiveness and self-enhancement values.

*Criterion measure.* Participants' cooperative behaviors in a public goods game served as the criterion measure. Participants played the game in either a two- or a three-person group.<sup>6</sup> During the game, each participant had a fixed amount of time to make as many "mobile telephone straps" as possible. The participants then decided how many straps to contribute to a 12-person social enterprise (an act of cooperation) or to keep for themselves (an act of defection). Each strap kept for one's own use earned HKD5. Each strap contributed to the social enterprise earned HKD15, which would then be shared equally among the 12-person group. Cooperative behavior (i.e., cooperation rate) was indicated by the number of straps contributed to the public goods by an individual relative to total number of straps that person made. The average cooperation rate was 44%, with a standard deviation of 28%. To motivate participants to make genuine decisions, they were told before the experiment that a randomly selected participant would receive a monetary bonus that was commensurate with their performance in the public goods game. The extra bonuses ranged from HKD128 to HKD349. The average bonus received was HKD208.

## RESULTS

We first conducted confirmatory factor analyses of the sample to examine the two-factor structure of the CCPS. Both cooperativeness and

competitiveness were reliably measured (Cronbach's  $\alpha = .87$  and  $.85$ , respectively). The results indicated that the two-dimensional model achieved a satisfactory fit ( $\chi^2(222) = 492.16$ , NNFI =  $.90$ , CFI =  $.92$ , SRMR =  $.10$  and RMSEA =  $.068$ ; confidence interval =  $.060$ – $.076$ ).<sup>7</sup> The cooperativeness and competitiveness factors were moderately positively correlated ( $r = .37$ ,  $p < .001$ ). The two-factor model was, again, better than the one-factor model; a Chi-square difference test showed that  $\chi^2(4) = 942.75$  ( $p < .05$ ).

We also tested whether people of different social value orientations differed in their cooperativeness and competitiveness scores as measured by the CCPS. The results revealed that the prosocial and proself individuals did not significantly differ in their cooperativeness or competitiveness scores. Interestingly, when splitting the proself participants into individualists and competitors, we found that there was a trend; compared with the individualists, the prosocials scored higher on cooperativeness, although this difference was only marginally significant ( $p = .059$ ).

### Discriminant validity of CCPS

We tested the associations among cooperativeness, competitiveness<sup>8</sup> and Schwartz's personal values. As shown in Table 1, cooperativeness was positively correlated with benevolence ( $r = .51$ ) and universalism ( $r = .41$ ). Competitiveness was positively correlated with achievement ( $r = .63$ ) and power ( $r = .47$ ). These results support our prediction that competitiveness is associated with Schwartz's self-enhancement values, whereas cooperativeness is associated with self-transcendent values. Specifically, individuals who were high in competitiveness valued achievement and power more, whereas individuals who were high in cooperativeness valued benevolence and universalism more. Contrary to our expectation, competitiveness did not correlate with hedonism ( $r = -.07$ , *ns*), and cooperativeness was weakly positively correlated with achievement ( $r = .22$ ). One possible reason for these results is that the affective, cognitive, and behavioral aspects of competitiveness, described by the items on the CCPS, do not correspond to the hedonic experiences described by the items on Schwartz's hedonic value subscale. Moreover, cooperativeness, under the current

<sup>6</sup>Group size was an experimental factor that was beyond the scope of this study; adding group size into the analysis returned similar pattern of results; group size was thus excluded from further analyses.

<sup>7</sup>With four error covariances in the cooperativeness dimension added, following the recommendation of the LM test.

<sup>8</sup>Factor mean scores of the cooperativeness and competitiveness dimensions were used here and in subsequent analyses.

**TABLE 1**  
Correlations of CCPS competitiveness and cooperativeness with Schwartz's personal values (N = 153)

	<i>Achievement</i>	<i>Benevolence</i>	<i>Hedonism</i>	<i>Power</i>	<i>Universalism</i>
Competitiveness	.632*	-.002	-.072	.473*	.103
Cooperativeness	.223*	.512*	.126	.090	.406*

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

conceptualization, seems to fit with the goal to be successful in such an interdependent context. Recall that it is always better to have everyone cooperating, rather than defecting, in a social dilemma. As such, being cooperative can be seen as a strategy to maximize one's benefits in a social dilemma. Based on this elucidation, it is quite plausible that, at least in this context, cooperativeness is correlated with the achievement value.<sup>9</sup>

### Criterion validity of the CCPS

Hierarchical regression was used to examine the criterion validity of the CCPS by measuring its association with participant's contributions while controlling for the effects of SVO. SVO was entered in the first block, and the CCPS was entered in the second block. If cooperativeness and competitiveness were conceptually different from social value orientation, then the CCPS should have acted as an additional predictor of cooperative behavior; this was represented by a significant beta weight in the equation. As shown in Table 2, SVO in the first block significantly explained 3.8% of the variance in cooperative behavior,  $F(1, 152) = 6.054$ ,  $p = .015$ . The cooperativeness and competitiveness dimensions of the CCPS (in the second block) significantly explained an additional 3.8% of the variance in cooperative behavior,  $F(2, 150) = 3.123$ ,  $p = .047$ ,  $f^2 = .041$ . Specifically, even after we controlled for the effects of SVO, we observed that individuals who were high in cooperativeness contributed more to the public goods ( $\beta = .209$ ,  $p = .014$ ). Our finding, therefore, provides further support to the criterion validity of the CCPS, with which we can go beyond the effects of social value orientation and predict cooperative behaviors in a social dilemma. Another observation to note is that the predictive power of the CCPS in terms of contributive behaviors comes from its cooperativeness scale, but not from the

**TABLE 2**

Hierarchical regression analysis of social value orientation (SVO) and cooperativeness and competitiveness (CCPS) as predictors of contribution to public goods (N = 154)

<i>Model</i>		$\beta$	$\Delta R^2$
1	SVO	.196*	.038*
2	SVO	.167*	.038*
	Cooperativeness	.209*	
	Competitiveness	-.061	

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

competitiveness scale. These findings, once again, support the view that cooperativeness and competitiveness are two independent constructs.

## STUDY 3: A COMMONS DILEMMA

### Methods

#### *Participants*

One hundred and ninety Hong Kong university students (78 men and 112 women) were recruited through the mass mailing service for an experiment that promised compensation of HKD50. Similar to Study 2, students registered for the experiments by filling in an experiment registration spreadsheet that was linked to the mass email.

#### *Procedure and materials*

The students participated in the experiments across several sessions that took place in a computer room. Participants were asked to complete all of the tasks via a Qualtrics online survey. After finishing the SVO and CCPS measures, they were told that they would be grouped for the games with participants in the same room (although the grouping was actually bogus).

<sup>9</sup>We also tested whether prosocials and proselves differ in their scores for self-transcendent values and self-enhancement values, and we found that the proselves scored significantly higher on achievement values than the prosocials. Also, when the effect of SVO was controlled for, cooperativeness was still positively correlated with achievement, benevolence, and universalism, and competitiveness was still positively correlated with achievement and power.



The game required participants to make requests from a monetary reward pool. After three trials of decision-making, they completed the rest of the questionnaire booklet, were paid and were dismissed.

*Social value orientation.* The social value orientation measure was identical to those of Studies 1 and 2. We again categorized the competitors and individualists in a single group called “proself.” Of the 190 participants, 84 were classified as prosocials and 80 as proselfs (with 66 individualists and 14 competitors).

*Criterion measure.* Participants were asked to imagine that they could request any amount of money from a monetary reward pool. The pool would be shared by a certain number of participants in a sequential manner. The participants made their decisions three times under identical task structures and in the same orders (they were always the first to request), but the group sizes varied (i.e., seven, nine, and five; the group size sequence was fixed). They were told that the group membership changed in every trial and that they would not receive any performance feedback. The criterion measure was indicated by the total number of requests a person made. Larger requests from the pool indicated lower cooperativeness. In addition to their participation compensation, one participant from each session was randomly selected (by a lucky draw) to receive a bonus commensurate to their outcome in one of the trials. The average bonus received was HKD53.

## RESULTS

We first conducted confirmatory factor analyses of the sample to examine the two-factor structure of the CCPS. Both cooperativeness and competitiveness were reliably measured (Cronbach's  $\alpha = .87$  and  $.80$ , respectively). The results indicated that the two-dimensional construct achieved a satisfactory fit,  $\chi^2(222) = 385.20$ , NNFI =  $.90$ , CFI =  $.91$ , SRMR =  $.094$ , and RMSEA =  $.063$ ; confidence interval =  $.052-.073$ .<sup>10</sup> The cooperativeness and competitiveness factors were not significantly correlated ( $r = .19$ ,  $p > .05$ ). The two-factor model was, again, better than the one-factor

model, as was shown by the Chi-square difference test,  $\chi^2(4) = 811.88$ ,  $p < .05$ .

We also tested whether individuals of different social value orientations scored differently on the cooperativeness and competitiveness scales of the CCPS. The results revealed that prosocial and proself individuals differed significantly in their cooperativeness scores,  $t(160) = 3.40$ ,  $p = .001$ , but not in their competitiveness scores. When we divided the proselfs into individualists and competitors, we found that the individualists ( $M = 5.13$ ) scored lower than the prosocials ( $M = 5.56$ ) in cooperativeness ( $p < .001$ ).

## Criterion validity of CCPS

Hierarchical regression was used to examine the criterion validity of the CCPS by measuring its association with participants' contributions while controlling for the effects of SVO. SVO was entered in the first block, and CCPS was entered in the second block. We found results similar to those of Study 2, such as that SVO in the first model significantly explained 2.8% of the variance in cooperative behavior,  $F(1, 158) = 4.474$ ,  $p = .036$ . The cooperativeness and competitiveness dimensions of the CCPS in the second block significantly explained an additional 5.5% of the variance,  $F(2, 150) = 4.694$ ,  $p = .010$ ,  $f^2 = .060$ . Specifically, even after we controlled for SVO, individuals high in cooperativeness were found to have requested less from the common pool,  $\beta = -.232$ ,  $p = .004$ . Table 3 illustrates the results of the analyses.

## DISCUSSION

The present research validated the CCPS in a social dilemma context. We demonstrated high construct validity for the two-dimensional model of cooperativeness and competitiveness. Specifically, we showed that (1) a two-dimensional model fit the data better than a one-dimensional model, with the corresponding critical fit indices reaching satisfactory levels, and (2) cooperativeness and competitiveness had distinct associations with other related psychological constructs, such as Schwartz's personal values. Moreover, we also achieved high criterion validity of the CCPS, such that the CCPS has significant incremental validity

<sup>10</sup>With four error covariances in the cooperativeness dimension added, following the recommendation of the LM test. Note that across three studies, we added four to six error covariances to improve the model's fit. All two-factor models across all studies shared a considerable amount of error covariance (2–3). Such inconsistencies might be due to the differences in the CCPS administration in these studies. Specifically, the CCPS was administered at the end of the experiment in Study 1, and at the beginning of the experimental sessions in Studies 2 and 3.

**TABLE 3**

Hierarchical regression analysis of social value orientation (SVO) and cooperativeness and competitiveness (CCPS) as predictors of request from common resource pools (N = 190)

Model		$\beta$	$\Delta R^2$
1	SVO	-.166*	.028*
2	SVO	-.104	.055*
	Cooperativeness	-.232**	
	Competitiveness	.083	

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .

relative to social value orientation, in the prediction of cooperative behaviors in both a public goods dilemma and a commons dilemma. Our findings suggest that the CCPS is a valid measure and is both distinct from and complementary to SVO.

### Dimensionality of cooperativeness and competitiveness

While the mainstream conceptualizes cooperativeness and competitiveness as a single-dimensional construct, there exists considerable doubt as to whether an independent two-dimensional construct fits the empirical data better (Hoyle, Pinkley, & Insko, 1989). For instance, rather than “separate motives and separate behaviors having separate effects” (Van de Vliert, 1999, p. 231), cooperativeness and competitiveness could work simultaneously toward solving social conflicts or improving intergroup relations. Accordingly, the neologism “co-opetition” has been used to describe cooperative competition (Brandenburger & Nalebuff, 1996). Kline (1995) also found that cooperation and competition were orthogonal two-dimensional constructs when validating a scale that measured individuals’ preferences for cooperative and competitive learning environments. Lastly, we demonstrated that the coexistence of high cooperativeness and competitiveness could typically be found in managers in senior positions who had more working experience and higher educational levels (Xie et al., 2006).

Consistent with the work of Xie and colleagues (2006), the results of the present research further validated the two-dimensional view of cooperativeness and competitiveness, such that (1) the two-factor model, rather than the one-factor model, consistently achieved a satisfactory fit to the data (Studies 1, 2, and 3) and (2) cooperativeness and competitiveness were two independent constructs, as was evident based on their correlations, which

ranged from not significantly correlated (Studies 1 and 3) to moderately positively correlated (Study 2).

### Comparison with the social value orientation

Prosocial motivation and cooperative personality traits share some key features, which emphasize collective goals rather than individual goals. This was evident from the significant difference between prosel (mostly individualists) and prosocial individuals on the cooperativeness scale. Regression results from Studies 2 and 3 further qualified this convergent validity. After entering cooperativeness into the regression model, the predictive power of SVO decreased, indicating that SVO was partially mediated by cooperativeness. We also note that we failed to observe any differences along the competitiveness dimension. This might be due to the characteristics of our prosel samples, which consisted mostly of individualists whose primary concerns were for their own outcomes, rather than their relative advantages over others. As a result, it is not surprising that the individualist and prosocial participants did not differ in their degrees of competitiveness.

We noted, however, that the theoretical backbone of the CCPS is different from SVO in at least two significant ways. First, the CCPS is built upon the trait perspective of personality, and, hence, the scale captures all of the core components of a given personality trait (cognition, affect, and behavior) for both cooperativeness and competitiveness. On the other hand, SVO follows Murray’s motivational perspective (1938), and, thus, the scale captures only the dispositional motives that individuals bring to dilemmas (Batson et al., 1995). These fundamental and theoretical differences also result in their foci in regard to behaviors. The trait perspective (i.e., the CCPS) focuses on the consistency and recurrence of behaviors across situations, whereas the motivational perspective focuses on the variability of behaviors in a particular situation (Winter et al., 1998). Second, the CCPS measures individuals’ beliefs and behaviors (i.e., group coordination) toward their interdependent others, such as their group members, while SVO neglects individuals’ senses of group and attitudes toward others; thus, it provides little information about group coordination processes. Our findings confirmed the existence of the abovementioned conceptual differences between the CCPS and SVO. In Studies 2 and 3, we showed that the cooperativeness and

competitiveness measured by the CCPS uniquely and significantly contributed to the prediction of cooperative behaviors in a social dilemma, well beyond what SVO could offer. Additionally, the CCPS and SVO were found to have distinctive associations with personal values, which are other psychological variables related to individuals' cooperative and competitive behaviors. In particular, these correlation patterns remained the same, even after controlling for SVO (Study 2).

### Association with personal values

According to Schwartz's personal value theory (Schwartz & Bilsky, 1990), values guide our choices of actions toward desirable end states; these values serve either individual or collective interests. Recall that prosocial and proself individuals, as conceptualized by social value orientation, should exhibit different personal value priorities (Gärting, 1999; Joireman & Duell, 2005). Using the triple-dominance measures of SVO, however, we failed to find any noticeable differences between the prosocial and proself participants in five Schwartz's values (except for achievement values). On the other hand, the correlation pattern of the CCPS with Schwartz's values was much more meaningful. Competitiveness was moderately correlated with the self-enhancement values of achievement and power, while cooperativeness was moderately correlated with the self-transcendent values of benevolence and universalism and mildly correlated with achievement. The results as such validated, on one hand, the independent view of cooperativeness and competitiveness; on the other hand, they confirmed construct validity of the CCPS, that cooperativeness and competitiveness are differentially associated with key personal values that drive different cooperative and competitive behaviors respectively.

### LIMITATIONS AND FUTURE DIRECTIONS

Several limitations of the present study, as well as future direction, should be noted. First, this study only examined multiple validities of the CCPS in a Hong Kong sample of university undergraduates. The homogeneity of our sample might reduce the generalizability of our findings. Further validation studies using other populations in different settings should be conducted so that the CCPS can become a more reliable and valid instrument that can be

confidently used by the international scientific community.

Second, the independent views of cooperativeness and competitiveness may be culturally specific. Several crosscultural comparisons have shown that people from the West and the East hold different views on the relationship between these two concepts (Fülöp & Sándor, 2006; Keller & Loewenstein, 2011). For example, easterners tend not to view cooperativeness and competitiveness as antitheses as much as westerners do (Leung & Au, 2010). Thus, it would be meaningful to study the CCPS across various cultures in the future.

Third, although the current study demonstrated the strong predictive power of the CCPS, especially the cooperativeness scale, on cooperative behaviors, we could not conclude the same regarding the predictive power of the competitiveness scale. One plausible explanation is that the public goods and commons dilemmas employed in the present research are not optimal choices for investigating competitiveness. On one hand, competitive motivation tends to lead to identical behavioral outcomes as individualistic motivation in public goods dilemmas and commons dilemmas (e.g., De Cremer & Van Lange, 2001). We expect that if maximizing difference games were used, in which a maximizing differences option is differentiated from the self-interest option, both the cooperativeness and competitiveness scales would be particularly predictive of cooperation. On the other hand, compared with competitive motivation, cooperative motivation is more influential in social dilemmas that only involve intragroup interactions (Kollock, 1998). In intergroup dilemmas, where both cooperative and competitive motivations come into play independently, we predict that the cooperative and competitive personality traits measured by the CCPS would have greater predictive power, in predicting not only ingroup-love, as shown by intragroup cooperation, but also outgroup-hate, as shown by intergroup competition. This is one particular setting in which SVO was able to predict ingroup-love but not outgroup-hate (De Dreu, 2010).

Finally, it would be interesting to investigate how cooperativeness and competitiveness, as psychological variables at the individual level, may influence conflict resolution at the group level. Under the current framework, cooperativeness and competitiveness are regarded as independent constructs. Accordingly, people who are high in both cooperativeness and competitiveness are expected to be more capable of resolving social

dilemmas involving both interpersonal and intergroup conflicts (Bornstein & Erev, 1994). This is especially practical today, as interpersonal and intergroup conflicts are ubiquitous in organizational settings (Chen & Li, 2005). Considering cooperativeness and competitiveness as individual differences could provide policy makers with more in-depth understandings of the dynamics between individual level factors and group-level decisions. For instance, we could examine how team members' levels of cooperativeness and competitiveness may independently and dynamically affect group-level contributions. With the help of the CCPS, organizations could also effectively recruit employees based on their levels of cooperativeness and competitiveness, hence assigning them to jobs that are most suitable for their particular personality profiles.

## CONCLUSIONS

The present study investigated multiple validities of the Cooperative and Competitive Personality Scale in a social dilemma context. Following the notion that cooperativeness and competitiveness are independent constructs, the CCPS showed considerable predict power in the prediction of individuals' cooperative behaviors in social dilemmas, even after controlling for the impacts of social value orientation. In short, the CCPS has been proven as a reliable and valid instrument that could improve researchers' understandings of human behavior.

Manuscript received November 2011

Revised manuscript accepted September 2012

First published online November 2012

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## APPENDIX: ITEMS AND STRUCTURE OF THE COOPERATIVE AND COMPETITIVE PERSONALITY SCALE

### Cooperativeness

#### *Beliefs about cooperation (cognition)*

- In order to succeed at work, a person must cooperate with their partners.
- I believe work performance could be benefitted more from cooperation than competition.
- I believe having a good partner at work enables you to triumph over all your opponents.
- A person must rely on the help of other team members in order to achieve good results.
- Initiation and completion of any work is inseparable from the help and cooperation of team members.

#### *Behavioral tendencies of cooperation (behavior)*

- At work I would usually consider the interests of both parties.
- I can usually consider multiple views when I handle tasks.
- At work, I can usually stand in other team members' shoes to consider their interests.
- When working together with team members, I am willing to listen to others' opinions often, even though I might not agree with them.
- When working with others on a communal task, I am able to integrate the views of others.

#### *Feelings for cooperation (affect)*

- Working with team members makes me happy.
- At work, I like collaborating with team members.
- I enjoy working with other team members to achieve common success.

### Competitiveness

#### *Behavioral tendencies of competition (behavior)*

- Even in a group working towards a common goal, I still want to outperform others.
- My self-worth could be validated only if I outperform others in the group.
- Sometimes I consider appraisals as an opportunity to prove that I am smarter than others.

#### *Beliefs about competition (cognition)*

- I like competition because that it gives me a chance to discover my own potential.
- I like challenges that are brought by competing with other team members.
- I like competition because that it allows me to play my best.

#### *Feelings for competition (affect)*

- Being outperformed by other members in the group annoys me.
- I would be very sad if I lose in sport contests.
- I will be jealous when other team members get rewarded for their achievements.
- I cannot stand being beaten in an argument by other team members.

Source: Xie et al. (2006).<sup>11</sup>

<sup>11</sup>Items of the scale were originally in Simplified Chinese. Permission to publish the full scale was obtained from the scale developer.