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Validation and short-form development of Conflict and Problem-solving Strategy Scales

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ABSTRACT

The Strategy scales from the Conflicts and Problem-solving Scales is widely used and meaningfully distinguishes between conflict behaviours characterized by Cooperation, Avoidance, Child Involvement, Stalemating, and Verbal and Physical Aggression. The aim of this study was to validate the scale and develop a short-form for use across family structures. Confirmatory factor analyses (CFA) showed an unsatisfactory fit of the original Strategy scales in a sample ($n = 794$ parents) from the Norwegian Mother, Father and Child cohort study. Less than half of the items were included in the new Strategy short-form, which supported the original six-factor structure, had acceptable fit and comparable concurrent validity to the full-scale. CFAs also showed acceptable fit for the short-form across reporters and family structures in the more heterogeneous Sample 2, consisting of parents living together ($n = 838$) and apart ($n = 902$), recruited from family counselling centres across Norway. The short-form scales explained variance in parental wellbeing and relationship satisfaction over and above thebackground variables, supporting incremental validity. However, associations with child mental health were of minor size. Given that the trategy short-form has better fit and validity compared to the original scale, we recommend it for use in family research and practice. Further validation is called for.

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Interparental conflicts; Conflicts and Problem-solving Scales (CPS); short-form development; instrument validation; family dynamics study; MoBa

A considerable body of research has emphasized the negative impact of interparental conflict (IPC) on parents (Proulx et al., 2007) and children (van Eldik et al., 2020), regardless of whether parents live together or not (Harold & Sellers, 2018). Importantly, the impact on children varies depending on how parents express and manage conflicts across a broad continuum of severity (Harold & Sellers, 2018; Kerig, 1996). Availability of robust measures of IPC in research and clinical practice identifying destructive conflict behaviours across family structures is therefore warranted. The aim of this study was to evaluate the psychometric properties of the Strategy scales from Conflict and Problem-

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solving Scales (CPS; Kerig, 1996) and to develop a short-form for use across family structures and clinical settings.

The Strategy scales

The CPS (Kerig, 1996) was developed to assess major dimensions of IPC, providing a detailed typology of different IPC aspects (Kerig, 1996). As shown in Figure 1, the CPS has six Strategy scales tapping different behaviours with separate versions for self- and partner (coparent) report. The six Strategy scales are: Cooperation, tapping ways to approach the other in cooperative ways; Avoidance, tapping attempts to escape arguments; Child involvement, tapping ways to involve the children in IPC; Stalemating, tapping conflict behaviours characterized by unresolved hostility, distress, and disengagement; Verbal aggression, tapping aggressive expressions such as cursing, accusing or yelling; and Physical aggression, reflecting threats or inflictions of harm to the other parent.

Although the original version of the CPS has four additional IPC dimension scales (Frequency/Intensity, Content/severity, Efficacy and Resolution), only the Strategy scales are the focus of the current study. These scales were originally established through Exploratory Factor Analysis (EFA) on responses to 44 items in a sample of 273 parent couples, showing satisfactory internal reliability for all strategy subscales (Kerig, 1996). Still, the statistical support for the six-factor model is halting. The mean factor loadings in each subscale in the original sample varied from .42 (i.e. Stalemating, both respondents) to .71 (Physical aggression, mothers) (Kerig, 1996). Furthermore, 21 of the items in this original paper had factor loadings below .40 and 22 items had considerable cross-loadings (i.e. the difference between factor loadings and cross-loading

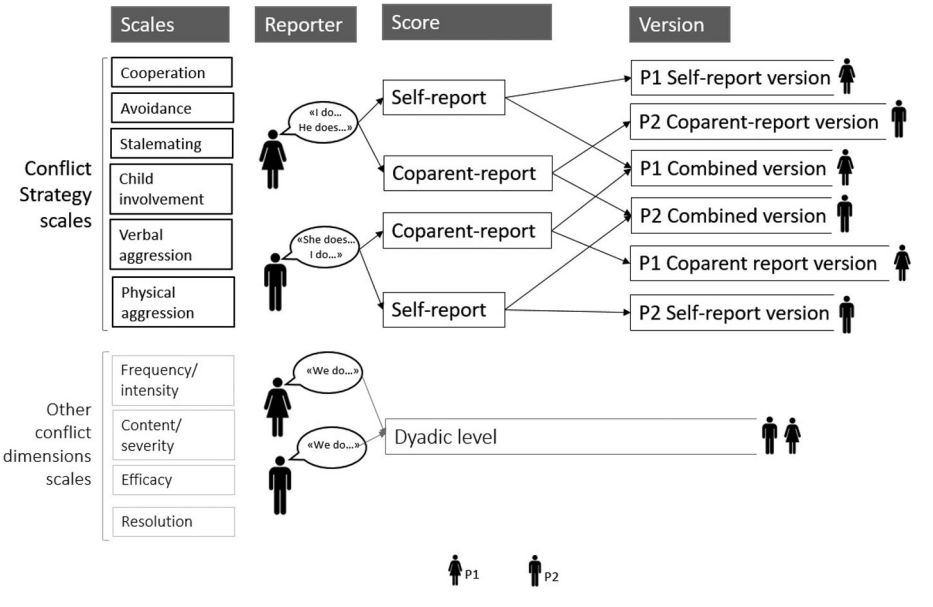

Figure 1. Schematic overview of CPS including six conflict Strategy scales and four other conflict dimension scales.

were <.20). Moreover, the Strategy scales were developed nearly 25 years ago, and the phenomenon may have changed over this period. Consequently, the scales would benefit from a critical review with the purpose of finding ways to improve their statistical quality.

Former attempts to validate the Strategy scales

The CPS Strategy scales are widely used and cited, particularly as a predictor of child adjustment (Davies et al., 2012; George et al., 2014). Despite the popularity of the Strategy scales, no studies have confirmed the original factor structure through a Confirmatory Factor Analysis (CFA). Quite contrary, new EFA-attempts have resulted in alternative factor structures (e.g. Burney & Leerkes, 2010; George et al., 2014) that have not been replicated. A simple two-factor model, distinguishing between constructive versus destructive behaviours is also occasionally used (e.g. McCoy et al., 2013), but we have found no records of CFAs formally testing such models. The six-factor structure is conceptually meaningful and has the advantage of enabling testing of specific conflict behaviour (e.g. avoidance or child involvement in conflicts), rather than the broader distinction between constructive versus destructive conflict behaviours or a simple measure of conflict frequency or intensity. A CFA based on the original six-factor structure could establish a better statistical basis for the Strategy scales and identify items that undermine the quality of the scales. However, also testing the fit of a two-factor model can clarify whether such simpler models are preferable, despite the advantages of the more nuanced six-factor model.

The Strategy scales have been used in Welsh (Davies et al., 2012), Dutch (Keuning et al., 2002) and Chinese (Li et al., 2016) samples, in addition to samples from the US. However, the suitability of the scale across cultural settings needs to be more thoroughly investigated. It is noteworthy that none of the studies outside the US have investigated the model fit based on the original factor structure and the scales have not been used in the Scandinavian countries.

Advantages of developing a short-form

The original version of the Strategy scales is comprehensive, including 88 items altogether. Generally, a need exists for scales that are more concise to foster greater utility in both research studies and clinical practice. In research settings, shorter questionnaires generally give higher response rates than longer questionnaires (Edwards et al., 2002). As more complex constructs are being investigated, simpler ways of capturing these constructs are needed including the use of abbreviated scales (Ziegler et al., 2014). Moreover, data quality may increase as the length of a questionnaire decreases (Herzog & Bachman, 1981).

The Strategy scales from the CPS include both self- and coparent-reports. This is an important advantage, as both reliability and validity may vary between self- and coparent-reported conflict behaviours. Sanford (2010) found that partner reports on conflict behaviours correlated more strongly with ratings by independents observers in a laboratory setting than did self-reports (Sanford, 2010). This finding underscores the importance of including multiple reporter perspectives and to investigate whether more

global measures of IPC show sufficient psychometric qualities across different reporters. Shorter versions of the CPS will also simplify the inclusion of several perspectives within shorter questionnaires.

Need for validation across reporters and family structures

The CPS was originally developed and tested in a sample of married parents. A Divorce form of CPS was later suggested by Kerig (unpublished scoring form), but no use of this is found in the literature. Coparent relationships today take many forms, and as children are affected by IPC independently of family structures (Harold & Sellers, 2018) there is a call for more studies that investigate IPC patterns across family settings. When developing a short-form of the Strategy scales it is therefore important to validate it both in families where parents live together and where they live apart.

From a clinical perspective, the importance of detecting destructive IPC is highlighted by the negative relationship between low quality marriages and wellbeing of children as well as parents (Lizdek et al., 2016; Proulx et al., 2007). When developing an IPC short-form it is therefore essential that the concurrent validity vis-à-vis parental wellbeing, relationship satisfaction and child mental health is similar to that of the full-scale. Furthermore, investigating the association between the short-form and child and parental outcomes in a sample including individuals with severe distress is important to provide indications of the scale's clinical relevance.

The current study

The aim of this study is fourfold. We first investigate the psychometric properties of the Strategy scales, including the model fit of the original six-factor structure, in a Norwegian sample with low IPC levels. Second, with the same sample, we develop a short-form. Third, we evaluate the psychometric properties of the short-form across respondents (i.e. self- and coparent-report and a combination of the two), samples and family structures (i.e. parents living together and apart). Fourth and finally, in a subsequent sample with higher levels of IPC, we examine the concurrent, incremental and discriminant validity of the short-form by investigating to what extent each subscale and the entire strategy scale are related to relevant outcome variables.

Methods

Samples

Sample 1 consisted of 397 families participating in a sub-study of the Family Dynamics study in Norway. The families were recruited from two different settings: Most families ($n = 381$) already participated in the Norwegian Mother, Father and Child Cohort study (MoBa; Magnus et al., 2016), a population-based pregnancy cohort study conducted by the Norwegian Institute of Public Health. A small subsample of families from MoBa were invited to the Family Dynamics sub-study if the parents lived together and had an 11-year-old child at the time of recruitment. A small number of additional families ($n = 16$) were recruited at family counselling centres when parents attended mandatory

mediation relating to parental break-up or divorce. Both parents had to consent before study participation. Questionnaires were sent by mail to participating families and mothers and fathers each filled in a questionnaire.

Sample 2 consisted of 1740 parents participating in the Family Dynamics study. Parents were recruited through family counselling centres across Norway. Family counselling centres are free, low-threshold services providing couples and family therapy, mandatory mediation and counselling and guidance to improve the coparent relationship for parents living apart. Thus, users of these centres comprise a diverse group of families which, on a mean level, tend to have more challenges than the general population, but not necessarily to have difficulties on a clinical level. Out of the 1785 mothers and 1353 fathers answering the questionnaire, only parental dyads where both participated and filled in the CPS were included in this study ($n = 870$ parental dyads).

All analyses were performed with long-files across gender and family relatedness. Thus, Sample 1 consists of 794 respondents, whereas Sample 2 consists of 1740 respondents.

Measures

Conflict strategies (self- and coparent-reported) were measured with the Strategy scales from a Norwegian translation of the Conflict and Problem-solving Scales (CPS; Kerig, 1996). The Strategy scales consist of 44 items describing different IPC behaviours. On each item parents rate how often they and the coparent behave in certain ways. Each item is rated from 0 (Never) to 3 (Often). In this study, each respondent have three different scores on each strategy item, namely, a self-report score, a coparent-report score and a combined report score, which represents the mean score of the parent's self-report and the other parent's coparent-report (e.g. the mean of mother's self-report and father's report about mother). In the study by Kerig (1996), item 44 (Harm self) did not load significantly on any factors and was therefore excluded from the current analyses. The original version of CPS was translated and back-translated in accordance with existing standards (Hilton & Skrutkowski, 2002).

Parental wellbeing (self-reported) was measured with the Satisfaction with life scale (SWLS; Diener et al., 1985), a five-item scale developed to assess satisfaction with the life as a whole. Agreement with statements about own life satisfaction were rated on a 7-point scale (1 = Strongly disagree to 7 = Strongly agree). Mean scores were calculated with higher scores indicating higher wellbeing (Sample 1 $\alpha = .90$; Sample 2 $\alpha = .90$).

Relationship satisfaction in the coparent relationship (self-reported) was assessed with a single CPS-question (Kerig, 1996): 'Overall, how happy are you with this relationship?' answered on a 6-point scale (0 = Extremely unhappy to 5 = Extremely happy).

Child Mental health problems (dyadic level) was measured with the four the Strength and Difficulties Questionnaire (SDQ; Goodman, 2001). Mothers in both samples rated 20 items pertaining to child internalizing (i.e. emotional problems and peer problems) and externalizing problems (i.e. hyperactivity and conduct problems) on a 3-point scale (1 = Not true to 3 = Certainly true). A mean score was calculated with higher scores indicating more problems (Sample 1 $\alpha = .74$; Sample 2 $\alpha = .76$).

IPC Frequency/intensity (dyadic level) was measured with two items tapping the frequency of low and high intensity conflicts, respectively, rated on a six-point scale

(1 = Once a year or less to 6 = Almost every day). As recommended by Kerig (1996), high intensity conflict values are double-weighted before items are summed to a Frequency/intensity index (range: 3–18). A mean was computed across parental scores within each couple. Higher scores indicate more frequent/intense IPC.

Parental mental health problems (self-reported) were measured with the eight-item Symptoms Check List (SCL-8), a global measure of symptoms of anxiety and depression (Derogatis & Cleary, 1977; Tambs & Røysamb, 2014). Each item was rated on a 4-point scale of distress (1 = Not at all to 4 = Very much). Mean scores across items were calculated, with higher score indicating more distress (Sample 1 $\alpha = .88$; Sample 2 $\alpha = .92$).

Family Structure (dyadic level) was investigated in Sample 2 based on a dummy variable (i.e. parents living together = 1 and parents living apart = 2). Parents who were about to move apart had all attended mandatory mediation. We therefore considered their romantic relationship as ended and coded these as 'living apart' although they had still not practically moved apart.

Number of children (dyadic level) in both samples referred to the number of children the parents attending the study had together.

Relationship duration (dyadic level) was calculated based on the number of years since parents got together when they filled in the questionnaire. For parents living apart, relationship duration was the number of years they were together before they broke up.

Statistical procedures

Investigating model fit of the original Strategy scales

Three initial CFAs were performed to investigate the fit of the original six-factor structure of the Strategy scales in Sample 1. Separate CFAs were run for self-report, coparent-report and combined report, respectively. Item 43 ('Beat partner severely') had too little variance and model fit was therefore tested without this item. An alternative two-factor model was also tested, to investigate whether this had substantially better fit and should be preferred.

Following Marsh et al. (2005), the criterion for acceptable fit was a Root Mean Square Error of Approximation (RMSEA) <.08, whereas RMSEA <.05 reflected an excellent fit. Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) >.90 and .95, reflected acceptable and excellent fit to the data, respectively. Due to deviations from normality and the ordinal nature of items, the weighted least-squares (WLSMV) estimator was used in all CFAs, performed in Mplus (Muthén & Muthén, 2018). Internal consistency of each subscale was calculated as ordinal alphas (i.e. Oα) based on polychoric correlations using the psych package from *R* (Revelle, 2019).

Strategy short-form development

The original CFA model based on the combined report (i.e. average of mother's self-report and father's report about mother and vice versa) was used to develop the short-form, but the self- and coparent report models were consulted along the way, as the goal was to develop a short-form with sufficient fit across all three reporter-models. The short-form was developed and tested in the following way:

(1) Choosing items: First, using Sample 1, modification indexes were used to remove items with the highest suggested cross-loadings one at a time until an acceptable fit was reached. Items for the short-form were then selected based on their factor loadings. If two items had equal or similar factor loadings in the combined reports model, the self- and coparent-report models were consulted to avoid inclusion of items with low factor loadings or high cross-loadings in any of these models. The goal was to develop a succinct short-form while including enough items capture sufficient nuances within each strategy. Regression analyses were therefore used to ensure that we included a sufficient number of items for each short-scale factor to be strongly correlated (i.e. $r \geq .80$) with the same factor in the original model.
(2) Investigating model fit and validity in Sample 1: Model fit and factor loadings of the Strategy short-form was investigated with three separate CFAs using self-report, coparent-report and combined-report scores, respectively. Concurrent validity of the original and short-form versions were investigated through three linear regression analyses with the combined version of the six strategy subscales as independent variables and Parental wellbeing, Relationship satisfaction and Child mental health problems as outcomes, respectively.

Investigating model fit and validity of the Strategy short-form in Sample 2

Three separate multi-group CFAs were run in Sample 2 to investigate the fit of the Strategy short-form across reporters (i.e. self-report, coparent-report and combined-report) with family structure (i.e. parents living together and parents living apart) as grouping variable. Outliers were recoded to the highest score reported in both family types to enable the running of CFAs with two groups while keeping the variables as categorical. To decrease complexity of the models, thresholds were collected from six initial models, where parents living together and apart respectively were analysed separately. In the final analyses, standard errors were adjusted for dependency between partners' responses (Cluster option).

Finally, using the combined reporter-version, the validity of the new short-form was investigated in three different ways: (1) Concurrent validity was investigated by regression analyses investigating the associations between each subscale and Parental wellbeing, Relationship satisfaction and Child mental health problems. (2) Discriminant validity was tested by investigating the bivariate associations between each subscale and number of children the parents have together. These regression analyses were performed in Mplus and were adjusted for dependency between partners' responses (Cluster option). (3) Incremental validity was investigated through stepwise regression analyses with Parental wellbeing, Relationship satisfaction and Child mental health as outcomes. We first included the four control variables IPC frequency/intensity, Parental mental health problems, Relationship duration and Number of children and then tested whether the explained variance of each outcome increased significantly when the six strategy subscales were added concurrently in the next step of the model. These analyses were run in SPSS 27 (IBM, 2020), as stepwise regressions cannot be performed in Mplus.

Results

Descriptive statistics of the two samples

Descriptive statistics and background variables for Samples 1 and 2 are provided in Table 1. In Sample 2, 838 respondents (48%) were living with the other parent and 902 (52%) were living apart or were about to move apart.

Test of original model fit

Model fit, factor loadings and internal consistencies for the original six-factor model are shown in Table 2. The model fit was poor across all three reporter-types (i.e. self-, coparent- and combined-report). Ordinal alphas were acceptable for all scales and varied between .75 (self-reported Stalemating) and .95 (coparent-reported Physical aggression).

Across all three models (i.e. self, coparent and combined report), all but two items had significant ($p < .001$) factor loadings. However, 12 factor loadings across 6 items were below .40 in the original model. Mean factor loadings across the three reporter-types ranged from .52 (Stalemating, combined report) to .88 (Physical aggression, combined report).

Tentatively testing a simpler two-factor model using combined-reports did not improve the model fit (RMSEA = .093; CFI = .64; TLI = .62). With the advantage of being able to investigate IPC in a more nuanced way, the original multifactorial model was therefore chosen for further analyses.

Short-form development

The short-form was developed based on the combined report. First, nine items were removed due to high cross-loadings. In five sub-scales, inclusion of three items was sufficient to reach a correlation of .80 with the same factor in the original model. However, four items were included in the Physical aggression scale. Three items were sufficient to reach a correlation of .80 with the original model, but due to low variance on the self-report version on one of the included items (i.e. item 42 'Hit, kick or bite the other parent'), an additional item was included to ensure capturing this strategy across reporter models. An overview of included short-form items, internal consistencies,

Table 1. Descriptive statistics of both samples.

	Sample 1 ($n = 794$)		Sample 2 ($n = 1740$)	
	M (SD)	Range	M (SD)	Range
Parental wellbeing	5.78 (0.98)	1–7	4.55 (1.34)	1–7
Relationship satisfaction				
Females	4.25 (1.45)	0–5	2.72 (1.52)	0–5
Males	4.29 (1.42)	0–5	2.91 (1.51)	0–5
Child mental health problems	0.24 (0.18)	0–1.5	0.40 (0.21)	0–1.24
Number of children[a]	2.55 (0.91)	1–11	1.65 (0.66)	1–5
IPC frequency/intensity	6.64 (2.926)	3–18	8.77 (3.79)	3–18
Parental mental health problems	1.29 (0.40)	1–3.75	1.75 (0.68)	1–4
Relationship duration (years)[b]	20.62 (4.25)	9–34	12.18 (6.25)	1–32

Note. IPC = Interparental conflict.
[a]Only children where both respondents are parents are included.
[b]For parents living apart, the number of years living together prior to break-up.

Table 2. Model fit, internal consistency and factor loadings original six-factor model, Sample 1 (n = 794).

	Self-report		Coparent-report		Combined report[b]	
RMSEA	.073		.073		.094	
CFI	.78		.79		.76	
TLI	.77		.78		.75	
	Factor loading	Oα	Factor loading	Oα	Factor loading	Oα
Cooperation		.81		.86		.88
1. Talk it out with the other	.78**		.76**		.77**	
2. Express thoughts and feelings openly	.63**		.56**		.54**	
3. Listen to the other's point of view	.77**		.85**		.86**	
4. Try to understand what the other is really feeling	.79**		.85**		.89**	
5. Try to reason with the other	.64**		.66**		.76**	
6. Try to find a solution that meets both of our needs	.77**		.83**		.87**	
8. Compromise, meet the other half way	.34**		.46**		.50**	
11. Accept the blame, apologize	−.07ns		.20**		.31**	
Avoidance		.82		.85		.81
9. Try to smooth things over	.60**		.59**		.56**	
10. Give into the other's view to avoid arguments	.64**		.52**		.37**	
12. Placate, humour, indulge the other	.57**		.45**		.30**	
13. Try to ignore problem, avoid talking about it	.81**		.81**		.79**	
14. Change the subject	.64**		.63**		.65**	
15. Clam up, hold in feelings	.71**		.65**		.59**	
16. Leave the room	.64**		.80**		.83**	
17. Storm out of the house	.55**		.70**		.82**	
Child involvement		.85		.86		.85
22. Become angry with the child when really angry with the other	.50**		.60**		.64**	
23. Argue in front of the child	.94**		.92**		.90**	
24. Involve the child in our argument	.72**		.73**		.80**	
25. Argue when the child might be able to overhear	.89**		.91**		.88**	
26. Talk with child about problems with the other	.60**		.62**		.72**	
Stalemating		.75		.83		.76
7. Seek intervention from counsellor or friend	.29**		.21**		.12*	
18. Cry	.29**		.22**		.20**	
19. Sulk, refuse to talk, five 'the silent treatment'	.57**		.58**		.60**	
20. Complain, bicker without really getting anywhere	.74**		.78**		.74**	
21. Enlist friends or family to support own point of view	.54**		.54**		.61**	
35. Threaten to end relationship	.70**		.79**		.77**	
36. Withdraw love or affection	.57**		.62**		.59**	
Verbal aggression		.87		.90		.89
27. Insist on own point of view	.69**		.70**		.71**	
28. Try to convince the other of own way of thinking	.63**		.63**		.69**	
29. Raise voice, yell, shout	.68**		.76**		.74**	
30. Interrupt/don't listen to the other	.71**		.74**		.74**	
31. Be sarcastic	.64**		.63**		.65**	
32. Make accusations	.76**		.80**		.80**	
33. Name-calling, cursing, insulting	.76**		.83**		.85**	
34. Say or do something to hurt the other's feelings	.73**		.98**		.79**	
Physical aggression		.82		.90		.95
37. Throw objects, slam doors, break things	.68**		.80**		.83**	
38. Throw something at the other	.97**		.90**		.91**	
39. Threaten to hurt the other	.70**		.74**		.82**	
40. Push, pull, shove, grab the other	.71**		.90**		.94**	
41. Slap the other	.57**		.78**		.92**	
42. Hit, kick or bite the other[a]			.98**		.86**	

Note. * $p < .05$; ** $p < .01$.
[a]Not included in self-report due to too low variance in Sample 1.
[b]Combined report is the mean score of self-reported and coparent-reported behaviours of the same parent.

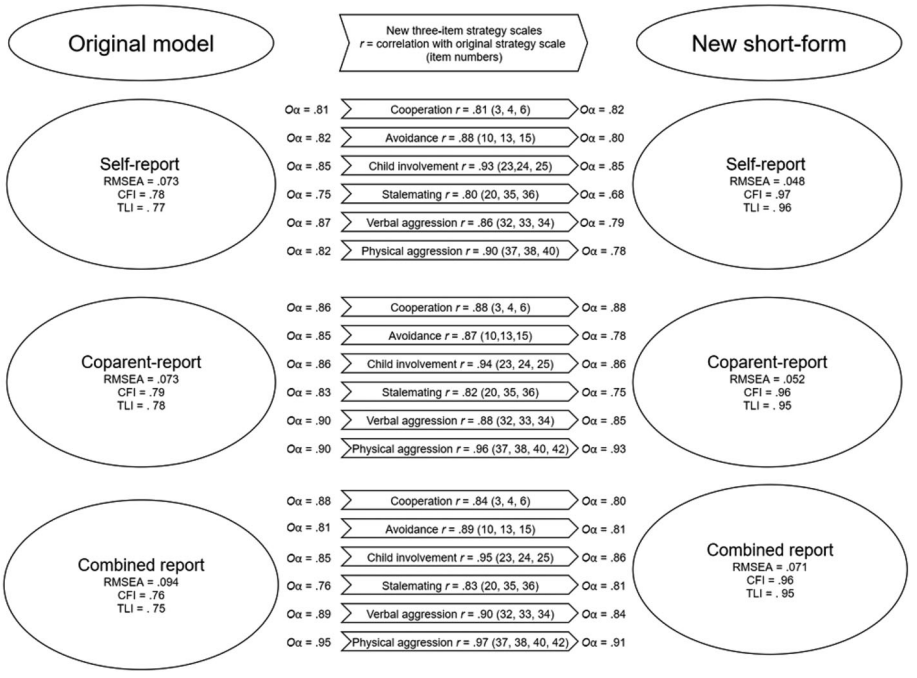

Figure 2. Psychometric properties of original Strategy model and new Strategy short-form, Sample 1.

correlations between the original and the short-form and fit indices across reporters are provided in Figure 2.

The short-form had acceptable or excellent fit to the data across reporter-type in Sample 1. Moreover, ordinal alphas were acceptable (i.e. Oα > .70) for all subscales except from self-reported Stalemating. Correlations between the original Strategy scales and the new short-form scales ranged from .80 (Stalemating, self-report) to .97 (Physical aggression, combined report). No factor loadings fell below .40 in the short-form. Mean factor loadings were higher than in the original model for all strategies and ranged from .65 (Stalemating, self-report) to .85 (Child involvement, coparent-report).

Validity of original and short-form versions

To compare the concurrent validity of the Original and Short-form Strategy scales respectively, all strategies were included concurrently as independent variables in three separate regression analyses with Parental wellbeing, Relationship satisfaction and Child mental health problems as dependent variables. No other variables were included in these analyses. All subscales of the original scale accounted for 20.4% ($p < 0.001$) of the variance in Parental wellbeing; 3.5% ($p < 0.001$) of the variance in Relationship satisfaction and 3.9% ($p < 0.001$) of the variance in Child mental health problems when entered concurrently as independent variables in the regression analyses. The short-form subscales together accounted for 20.5% ($p < 0.001$), 3.7% ($p < 0.001$) and 2.8% ($p = 0.002$) of the variance in the same three outcomes respectively, indicating that validity was not compromised by using the short-form.

Fit of the Strategy short-form across reporters and family structures in Sample 2

The Strategy short-form showed excellent or acceptable fit across reporters and family structures in Sample 2. Mean factor loadings ranged from .57 (Stalemating, combined-report among parents living apart) to .87 (Physical aggression, coparent-report among parents living apart) and were thus higher for all strategies across reporters and family structures compared with the original scales. Internal consistency was satisfactory (i.e. Oα > .70) for all subscales except self-reported Cooperation among parents living apart and self- and coparent-reported Stalemating across family structure. Item factor loadings were generally moderate or high and all factor loadings were above .40 among parents living together. Among parents living apart, however, one item on the Stalemating subscale (i.e. 'Withdraw love or affection') had factor loadings on or below .40 on both self-report and combined-report.

We had to run the self-report model without the Physical aggression subscale in Sample 2, due to too few responses on some of the response categories. A closer inspection of the frequencies of the two items involving physical aggression towards the other (i.e. 'Throw something at the other' and 'Push, hit, kick or grab the other') revealed highly skewed responses. Specifically, less than one percent replied that they 'sometimes' exhibited these behaviours and no respondents responded 'often'. The coparent-responses were less skewed, with all response options being used and approximately four percent using the two most extreme response options. Thus, the variance was sufficient to run the model for the coparent-report version (and the combined version), but not for the self-report version. The results in Table 3 are therefore reported without factor loadings for self-reported Physical aggression.

The close model fit estimates across reporters and family types indicated that the short-scale is suitable across family contexts. Additionally, factorial invariance across family types was formally tested with multi-group analysis treating the variables as continuous and using the MLR estimator in Mplus. A model where factor loadings were constrained to be equal across family types, was compared with an unconstrained model were factor loadings could vary with family type. Factorial invariance according to the Sattora-Bentler Scaled Chi-Square Difference (TRd) was not achieved for any of the models, although the self-report model was close to an insignificant model comparison (TRd = 21.62; p = 0.04). All three models were however factorial invariant according to the less sample size sensitive indicator suggested by Cheung and Rensvold (2002) stating that the null hypothesis of invariance should not be rejected if ΔCFI is smaller than or equal to –0.01. ΔCFI for the three models were <0.01 (self-report), 0.01 (coparent report) and <0.01 (combined). In addition, we can see from Table 3 that the factor loadings are generally similar across family types. Mean difference of the factor loadings between the two family types were 0.06, 0.07, and 0.06 for three reporter versions respectively.

Validity of the Strategy short-form in Sample 2

The results of the regression analyses investigating the validity of the new Strategy short-form in Sample 2 are shown in Table 4. Concurrent validity was supported by the significant associations between most strategy sub-scales and the three outcomes Parental wellbeing, Relationship satisfaction and Child mental health, although some associations

Table 3. Model fit, standardized factor loadings and descriptive statistics for the new short scales across reporters and family structures (Living Together, $n = 838$; Living Apart, $n = 902$), Sample 2.

	Self-report		Coparent-report		Combined report	
RMSEA	.037		.061		.041	
CFI	.98		.96		.97	
TLI	.98		.96		.98	
	Living together	Living apart	Living together	Living apart	Living together	Living apart
RMSEA	.034	.031	.050	.054	.032	.037
CFI	.98	.98	.96	.97	.98	.96
TLI	.98	.99	.96	.97	.98	.98
Cooperation						
3. Listen to the other's point of view	.75	.76	.85	.90	.80	.84
4. Try to understand what the other is really feeling	.73	.62	.81	.87	.79	.77
6. Try to find a solution that meets both of our needs	.62	.58	.78	.82	.73	.74
Oα	.73	.68	.85	.90	.79	.82
M	2.53	2.63	2.15	1.73	2.34	2.19
SD	.45	.41	.63	.82	.44	.48
Avoidance						
10. Give into the other's view to avoid arguments	.58	.53	.58	.84	.58	.63
13. Try to ignore problem, avoid talking about it	.88	.78	.79	.53	.89	.71
15. Clam up, hold in feelings	.81	.78	.74	.77	.79	.83
Oα	.80	.73	.73	.72	.82	.77
M	2.06	2.12	1.89	1.74	1.98	1.93
SD	.45	.70	.71	.76	.62	.61
Child involvement						
23. Argue in front of the child	.93	.92	.91	.93	.92	.92
24. Involve the child in our argument	.59	.54	.72	.79	.65	.70
25. Argue when the child might be able to overhear	.86	.91	.90	.92	.90	.92
Oα	.83	.81	.87	.88	.86	.85
M	.82	.57	.94	.99	.88	.79
SD	.56	.54	.65	.83	.52	.58
Stalemating						
20. Complain, bicker without really getting anywhere	.63	.67	.63	.70	.68	.65
35. Threaten to end relationship	.71	.68	.71	.74	.73	.68
36. Withdraw love or affection	.55	.40	.60	.48	.59	.39
Oα	.66	.61	.68	.68	.77	.70
M	1.33	1.34	1.39	1.68	1.36	1.48
SD	.68	.76	.71	.84	.61	.63
Verbal aggression						
32. Make accusations	.73	.65	.76	.80	.74	.71
33. Name-calling, cursing, insulting	.79	.75	.84	.83	.84	.82
34. Say or do something to hurt the other's feelings	.71	.71	.79	.80	.77	.74
Oα	.78	.75	.83	.85	.83	.79
M	1.19	1.02	1.38	1.61	1.28	1.32
SD	.68	.63	.78	.84	.62	.60
Physical aggression						
37. Throw objects, slam doors, break things			.78	.86	.78	.81
38. Throw something at the other			.74	.94	.76	.92
40/42. Push, hit, kick or grab the other[a]			.85	.82	.77	.84
Oα	.81	.86	.81	.90	.88	.90
M	.19	.16	.26	.37	.23	.27
SD	.33	.34	.41	.60	.33	.43

Note. All factor loadings are significant ($ps < .001$). Self-report model was run without Physical aggression items.
[a]Reframed in Sample 2.

were weak. The associations were generally strongest between the conflict strategies applied by one parent and the Relationship satisfaction of the other parent, with a total explained variance of .17 when all conflict strategies of the other parent were applied concurrently as independent variables in a regression model with no control variables. Avoidance was the only strategy that was not related to one's own or to the

Table 4. Regression analyses investigating concurrent, incremental and discriminant validity for the strategy short-form. Sample 2 ($n = 1716$; Unadjusted/Adjusted βs[1]).

	Own wellbeing	Coparent wellbeing	Own relationship satisfaction	Coparent relationship satisfaction	Child mental health problems	Number of children (unadjusted)
Cooperation	.07**/ −.02	.14**/ 08**	.30**/ .21**	.40**/ .34**	−.12**/ −.10*	.08**
Avoidance	−.11**/ −.14**	−.08**/ −.11**	−.01/ −.05*	.02/ −.01	.02/ .05	−.01
Child involvement	−.08**/ .01	−.07**/ .03	−.12**/ .02	−.17**/ −.02	.09*/ .06	.10**
Stalemating	−.15**/ −.11**	−.13**/ −.06	−.29**/ −.23**	−.26**/ −.09**	.07*/ .02	−.02
Verbal aggression	−.13**/ −.06	−.14**/ −.06	−.20**/ .02	−.26**/ .04	.06/ −.04	−.04
Physical aggression	−.12**/ −.09**	−.12**/ −.08**	−.10**/ .01	−.14**/ .00	.08**/ .06	.01
Total r^2 all strategies (no control variables)[a]	.05**	.05**	.12**	.17**	.02*	
R^2 change from control variables[b]	.02**	.02**	.09**	.13**	.02**	

Note. *ps < .05; **ps < .01.
[a]All strategies included concurrently as independent variables in one step, no control variables.
[b]Control variables (included in a first step) were IPC frequency/intensity, (own) Parental mental health problems, Relationship duration and Number of children. All strategies included concurrently in Step 2.

coparent's relationship satisfaction. Incremental validity was supported by the significant increase in explained variance for all outcomes when the Strategy short-form subscales were added to a model where IPC frequency/intensity, Parental mental health problems, Relationship duration and Number of children were included as a control variables in a first step. Supporting the discriminant validity, number of children was only weakly related to each conflict strategy with no associations were above 0.10. Substantial associations between the different strategies within each parent as well as between parents were supported by the correlations presented in Table 5.

Discussion

The aim of this study was to investigate the validity of the Strategy scales from the CPS (Kerig, 1996) and to develop a Strategy short-form for use in research and clinical practice across family structures. Although the fit of the original model proposed by Kerig was unsatisfactory, the six-factor structure was supported by the substantially improved fit of the new Strategy short-form. This had comparable concurrent validity to the original Strategy scales and acceptable fit across reporters, samples and family structures. The relevance of the scale for psychological practice is underscored by the clear associations with parental wellbeing, relationship satisfaction and, although to a smaller extent, to child mental health problems in a sample with higher levels of IPC, Sample 2, highlighting the importance of including measures of different aspects of interparental conflicts across psychological disciplines.

Poor fit of the original Strategy scales

A poor fit of the original Strategy scales was found, indicating a need to modify the scale. The original factor structure identified by Kerig (1996) has not previously been

Table 5. Correlations between all strategies in the Strategies short form, combined reports. Upper diagonal = parents living apart (n = 902); lower diagonal = parents living together (n = 838).

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Coop-O		−.10**	−.27**	−.42**	−.44**	−.19**	.42**	−.06	−.22**	−.34**	−.28**	−.16**	.15**	.19**	−.02	.07*	−.27**	−.06	−.02
2. Avoid-O	.11**		−.06	−.08*	−.14**	−.14**	−.06	−.27**	.07	.30**	.18**	.14**	−.16**	−.10**	.03	−.02	−.03	.09*	.09**
3. CI-O	−.33**	−.20**		.41**	.53**	.30**	−.22**	.06	.80**	.34**	.41**	.17**	−.09*	−.11**	.09*	.04	.46**	.08*	.26**
4. Stale-O	−.40**	−.16**	.44**		.63**	.34**	−.33**	.31**	.34**	.40**	.37**	.15**	−.28**	−.28**	0	−.02	.42**	.20**	.09*
5. VA-O	−.48**	−.24**	.55**	.61**		.47**	−.28**	.18**	.42**	.37**	.59**	.24**	−.16**	−.16**	0.03	−.08*	.45**	.15**	0.06
6. PA-O	−.27**	−.20**	.47**	.36**	.45**		−.16**	.14**	.18**	.15**	.23**	.38**	−.16**	−.04	.08*	−.08*	.26**	.15**	−.01
7. Coop-CP	.43**	.08*	−.23**	−.30**	−.31**	−.18**		−.11**	−.27**	−.42**	−.45**	−.19**	.22**	.24**	−.02	.07*	−.32**	−.14**	−.02
8. Avoid-CP	.07*	−.26**	0.04	.12**	.12**	0	.11**		−.07	−.07*	−.13**	−.14**	−.12**	−.10**	.02	−.02	−.01	.16**	.11**
9. CI-CP	−.23**	.03	.64**	.32**	.34**	.29**	−.34**	−.19**		.41**	.53**	.29**	−.11**	−.14**	.08*	.05	.51**	.04	.26**
10. Stale-CP	−.29**	.13**	.32**	.39**	.36**	.20**	−.40**	−.16**	.44**		.63**	.33**	−.20**	−.22**	−.01	−.01	.39**	.10**	.08*
11. VA-CP	−.30**	.12**	.35**	.35**	.52**	.24**	−.47**	−.24**	.54**	.61**		.47**	−.18**	−.19**	0.03	−.07	.47**	.10**	0.04
12. PA-CP	−.18**	0	.29**	.20**	.24**	.33**	−.27**	−.20**	.47**	.36**	.45**		−.18**	−.07*	.08*	−.08*	.26**	0.03	−−0.01
13. SWLS	−.02	−.07*	−.09*	−.02	−.09*	−.08*	.05	−.05	−.05	−.04	−.09**	−.07*		.30**	−.15**	.10**	−.24**	−.52**	−.02
14. CPSSAT	.34**	.04	−.17**	−.26**	−.24**	−.12**	.49**	.10**	−.24**	−.26**	−.31**	−.17**	.02		−.02	−.04	−.17**	−.21**	−.09**
15. SDQ	−.18**	.02	.10**	.11**	.07	.08*	−.17**	.03	.10**	.12**	.06	.08*	0	−.17**		−.16**	.08*	.14**	0.04
16. No of children	.04	−.02	.10**	.01	0	.06	.04	−.01	.10**	.01	0	.06	.02	.05	−.10**		−.03	−.06	.21**
17. Con Fre/Int	−.27**	−.04	.42**	.40**	.44**	.31**	−.34**	−.14**	.49**	.43**	.53**	.35**	−.12**	−.30**	.08*	.04		.18**	−.02
18. SCL	.06	.04	.06	.06	.09*	.03	−.04	.11**	.04	.02	.04	.03	−.55**	−.01	.05	−.02	.13**		0
19. Relationship duration	.16**	.12**	.14**	−.03	−.08*	−.04	.15**	.10**	.14**	−.02	−.07	−.04	−.07*	.14**	−.13**	.24**	−.06	.04	

Note. Coop = cooperation; Avoid = avoidance; CI = child involvement; Stale = stalemating; VA = verbal aggression; PA = physical aggression; -O = Own strategies; -CP = Coparent strategies; SWLS = Parental wellbeing (Satisfaction with life scale); CPSSAT = Relationship satisfactions; SDQ = Child mental health problems (Strength and difficulties questionnaire); Con Fre/Int = Conflict frequency/intensity; SCL = Parental mental health problems (Symptom check list).

* indicates $p < .05$. ** indicates $p < .01$.

investigated through CFA, but the availability of improved statistical methods now enabled the necessary analyses for further nuancing and improvement of the scale. Higher factor loadings and comparable internal consistencies with those presented by Kerig (1996) indicated that the current data were suitable for replication of the original model, but that a modification of the original Strategy scales was called for.

Although the fit of the original Strategy scales was unsatisfactory, we did find support for the original six-factor structure. When modification indices were used to remove suboptimal items, a satisfactory fit was reached. Importantly, the findings support the clinically meaningful differentiation between conflict strategies characterized by cooperation, avoidance, child involvement, stalemating and verbal and physical aggression respectively, indicating that the Strategy scales is capturing a major complexity of the IPC phenomena. The CPS was developed nearly 25 years ago based on a sample of married couples in the US and no later studies have confirmed the original factor structure. Replicating the six-factor structure among parents raising children in a substantially different temporal and cultural context highlights the Strategy scales (with some modifications) as a robust and useful measure of IPC behaviours.

Improved fit and comparable validity with the Strategy short-form

The Strategy short-form had acceptable to excellent fit across reporter type in both samples, and kept the advantage of the original Strategy scales as a measure of different dimensions of IPC behaviours. In the short-form, items from the original scale with non-significant and weak factor loadings were removed and the factors were more 'pure' in the sense that items with the highest cross-loadings were removed. Thus, the fit of the Strategy short-form is clearly improved from the original model. Importantly, the new short-form is notably shorter as it includes less than half of the original items. This enables more extensive use of the scale in research and clinical practice.

Internal reliability was generally acceptable or good for the Strategy short-form subscales, despite the considerable reduction of items. In Sample 1, internal reliability of the new short-form was satisfactory (i.e. O$\alpha \geq .70$) across reporters and subscales, with self-reported Stalemating as the only exception. As the reliability of a scale is a function of the number of items, shorter scales will often have lower reliability estimates yet still be preferable in many situations because they are easier to administer and require less time to complete. This is one of the reasons why the sole reliance on objective cut-off values for internal consistency based on alpha values has been criticized (e.g. Peters, 2018). In Sample 2, satisfactory reliability was established across reporters and family structures for Avoidance, Child involvement, Verbal aggression and Physical aggression, whereas reliability of the three-item version was considered suboptimal for self-reported Cooperation among parents living apart as well as both self- and coparent-reported Stalemating across family structures. Moreover, all short-form subscales had acceptable reliability scores in both studies when using the combined-report, indicating that this version should be applied whenever possible.

Importantly, the concurrent validity of the Strategy short-form was comparable to that of the original Strategy scales when associations with parental wellbeing, relationship satisfaction and with child mental health problems were investigated, indicating that the new short-form has good validity. Thus, the robustness of the Strategy

scales as an indicator of IPC behaviours and the ability to investigating IPC strategies in relation to other relevant phenomena does not seem to be impaired by using the Strategy short-form.

Good fit and validity of the Strategy short-form in a more diverse sample

The robustness of the Strategy short-form was further supported when investigating the fit across reporter type and family structures in Sample 2. Scores on parental wellbeing and relationship quality and child mental health problems all indicate low levels of distress in Sample 1, whereas scores in Sample 2 indicate a more diverse sample. In Sample 1, the mean level of mental health problems reflect those of other samples from the general population of Norway (Strand et al., 2003) and the wellbeing scores reflect that parents are on average highly satisfied. In Sample 2, the mean level of mental health problems was higher (1.75) and resembles the clinical cut-off for longer versions of the SCL (Strand et al., 2003). Further, wellbeing was lower in Sample 2, with mean scores indicting that parents were only 'slightly satisfied' (Diener et al., 1985). Pertaining to relationship quality, in Sample 1, the frequency and intensity of IPC was low and parents had high levels of relationship satisfaction. This contrasts with Sample 2, where conflicts were more frequent and relationship satisfaction scores were closer to the mid-point of the scale.

Importantly, Sample 2 allowed us to explore the scales both in families where parents live together and where parents live apart. As far as we know, this is the first ever study to explore the Strategies scales across family structures. This is vital as family structures today are more heterogeneous than when the CPS was originally developed. Establishing that the short-form had good fit and comparable factor loadings across family structures has important implications for the ability to further investigate the impact of IPC on parental and child wellbeing across the heterogeneous child-rearing settings that exist today. This study also used a more diverse sample recruited from family welfare centres. Establishing the validity of the new short-form in this sample is important to support its use in clinical practice.

The self-report version of the short-form was suboptimal in Sample 2 in regard to capturing both Cooperation and Physical aggression. Refusal to report own actions of physical aggression due to social desirability or guilt is a well-known pattern and low agreement between partners about physical aggression or violence has also repeatedly been found (e.g. Schafer et al., 2002). More surprisingly however, internal consistency of self-reported Cooperation was also suboptimal among parents living apart in Sample 2. As noted earlier, alpha has important weaknesses as an indication of reliability (Peters, 2018). Still, it is noteworthy that both aggression and cooperative behaviours during IPC may be inadequately captured by self-report in settings where IPC levels are high, and parents are struggling in their coparent relationship. Following Sanford's (2010) notion of higher predictive validity of coparent-report compared to self-report, our findings thus support the notion that coparent or combined reports should be preferred. Furthermore, using the combined report version has resulted in satisfactory internal reliability scores in previous studies (e.g. Davies et al., 2012) and showed acceptable reliability in Sample 2. We therefore recommend use of the combined score whenever available.

The short-form strategies were significantly associated with parental wellbeing, relationship satisfaction and child mental health problems, indicating satisfactory concurrent validity also in Sample 2. The conflict strategies were significantly related both to one's own as well as to the coparent's wellbeing and relationship satisfaction as well as to mental health problems among children in the families, and the strongest associations were found with the coparent's relationship satisfaction. Importantly, the strategy subscales, when entered concurrently in a second step in the regression analyses, added significant increase in the explained variance of these outcomes over and above what could be explained by relevant aspects such as own mental health problems, conflict frequency and family background variables, indicating incremental validity and underscoring the importance of studying a broader spectrum of IPC aspects. Support of discriminant validity was found through weak association with the number of children the parents had together.

Limitations and future research

The Strategy scales from CPS are widely used, but scarcely validated. The efforts to validate, improve and offer a short-form was therefore called-for. Still, this study also has important limitations that should guide future work. First, Sample 1 consisted of parents that had been living together for a long time and had the necessary resources to attend a comprehensive longitudinal study. This Norwegian low-conflict sample had somewhat low variance, and this may have influenced which items were included in the short-form, especially in regards to the Physical aggression scale. Furthermore, the more fierce Avoidance items (e.g. 'leave the room' or 'storm out of the house') were abandoned. These items may be more relevant in cultures characterized by more explicit expressions of emotions than what is typical in Norway. However, confirming the statistical quality of the Strategy short-form in a more diverse sample (Sample 2) strengthened our trust of a valid form across conflict levels and family structures. Still, future studies should investigate the applicability and psychometric properties of the Strategy short-form across gender and cultural contexts.

Second, stalemating as a distinct conflict strategy did not seem to be captured in an optimal way, neither by the original Strategy scales nor by the new short-form. Stalemating, which is supposed to capture IPC behaviours characterized by unresolved hostility or disengagement, had the lowest mean factor loadings across studies and samples. Both in Kerig's (1996) original paper and in the current study, several stalemating items had factor loadings below .40 in the original scale and the lowest internal reliability scores. Unsatisfactory reliability scores for Stalemating are also commonly reported in other studies (e.g. Burney & Leerkes, 2010; Keuning et al., 2002; Li et al., 2016), indicating that lower statistical support of this subscale may be a more general problem. Most items in the Strategy scales describe quite concrete conflict behaviours. Stalemating, however, may be characterized more by an emotional undertone, which is not easily captured through pure behavioural descriptions. For instance, one of the items in the original scale, 'cry', may be an expression of several emotions, including sadness and anger, whereas as a stalemating item this may refer to crying as a manipulative or hostile action. In Sample 2, factor loadings were particularly low among parents living apart, indicating that some of the items may be inappropriate to

capture this type of conflict behaviours when parents are not a romantic couple. The subscale is, however, clinically meaningful and has formerly been documented to be associated with for instance parental propensity of child abuse (Keuning et al., 2002). Significant associations with wellbeing, relationship satisfaction and child mental health problems were also confirmed in both samples in this study. Thus, steps should be taken in future studies to further investigate ways to grasp the passive-aggressive nature of stalemating across family structures.

Third, future studies should strive to find better ways to measure Stalemating. The hostility characterizing this strategy highlights the importance of capturing this type of conflict behaviours in studies of how IPC influence parents, children and family life. Thus, there is a call for a thorough search for items that could capture stalemating through both self- and coparent-reports.

Some of the scales exhibited low reliability on the self- and coparent-versions in Sample 2. This may limit the applicability of the scales and we therefore recommend the use of the combined version whenever possible.

Finally, indications of concurrent validity vis-à-vis child mental health problems were weak and could be further explored in future studies.

Conclusions and implications

The aim of this study was to validate and develop a short-form of the widely used CPS Strategy scales. The new and shortened Strategy short-form showed comparable or better fit and validity compared with the original Strategy scales. The fit of the Strategy short-form was supported with acceptable or excellent fit across reporter-type and family structure in a diverse sample. In particular, the combined reporter model showed good psychometric properties across family structures. The significant associations with the investigated parental and child outcomes highlight the importance of including investigations of couple conflict patterns across clinical settings. We hope the new short-form will increase the applicability of the CPS. Importantly, the CPS Strategy scales have the advantage of capturing a broad spectrum of conflicts behaviours and this advantage was confirmed by the support of the six-factor structure. The new short-form is therefore recommended for use in clinical practice. Still, we recommend that future studies invest the extra efforts to further replicate and extend the psychometric properties of the Strategy short-form, particularly if using it in different cultural contexts.

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