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Discrepancy in perception of bullying experiences and later internalizing and externalizing behavior: A prospective study

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Discrepancy in perception of bullying experiences may lead to later internalizing or externalizing behavior in adolescents. A 1,663 South Korean 7th and 8th graders (mean age: 13.1 and 14.1 years old), were seen for a follow-up study to examine the relationships between the discrepancy in perception of their bullying experiences (defined as discrepancy between self- and peer-reports of bullying experiences) and internalizing or externalizing behavior at follow-up. Bullying was assessed by self- and peer-report. The discrepancy in perception of bullying experiences was defined by the concordance or discordance between self- and peer-reports. Internalizing and externalizing behavior was evaluated using the Youth Self Report and Child Behavior Checklist, at baseline and follow-up. Two by two ANCOVA was performed with a factorial design, categorizing discrepancy in perception of bullying experiences based on the agreement between self-report and peer-report. Internalizing/externalizing behavior-at-follow-up was used as an outcome, adjusting for other known risk factors for internalizing/externalizing behavior, including baseline internalizing/externalizing behavior, and bullying experiences. Adolescents with perceptions of bullying experiences discrepant from peer-reports showed increased internalizing/externalizing behavior at follow-up. Bullying also stands out as an independent risk factor for the development of future externalizing behavior even among adolescents with accurate perceptions of bullying experiences. These specific groups of youth warrant more focused assessment and intervention.

KEYWORDS

adolescence, bullying, discrepancy in the perception of bullying experiences, internalizing/externalizing behavior

1 | INTRODUCTION

Bullying is a complex social phenomenon. As such, perceptions and reports by victims, perpetrators, and victim-perpetrators of bullying, as well as bystanders, play a crucial role in the accurate recognition of the bullying experience itself along with the related consequences/impacts of bullying (Graham & Juvonen, 1998; Ladd & Kochenderfer-Ladd, 2002; Vessey, Strout, DiFazio, & Walker, 2014).

Because bullying is more likely to occur in contexts with limited adult supervision, child and adolescent self-reports, along with peer reports, have been the primary source of information used to identify bullying experiences (Graham & Juvonen, 1998; Ladd & Kochenderfer-Ladd, 2002; Vessey et al., 2014). Self report has been widely used because it has the advantages of directly assessing the experiences, feelings and consequences of those involved in bullying; additionally, it

is relatively easy to administer self-report surveys. However, self-reports of bullying experiences can be affected by the individual differences in interpretation of the bullying, the ability to accurately reconstruct events, and willingness to report painful experiences (Ladd & Kochenderfer-Ladd, 2002; Vessey et al., 2014). As a complement to self-reports of bullying, peer-reports have the advantage of gathering data from individuals in a unique position to witness bullying. Furthermore, multiple peer nominations can be aggregated to provide a more objective judgment of the nature of bullying (Graham & Juvonen, 1998; Kim, Koh, & Leventhal, 2004; Ladd & Kochenderfer-Ladd, 2002).

Studies have found that students who report bullying experience may have distinctive patterns of social information processing. For example, children who tend to interpret ambiguous social situations as aggressive and hostile due to their own personality traits and the

specific situational characteristics, are more likely to misinterpret otherwise normal social events to be bullying (de Castro, Merk, Koops, Veerman, & Bosch, 2005; Dodge & Coie, 1987; Gromann, Goossens, Olthof, Pronk, & Krabbendam, 2013; Hubbars, Dodge, Cillessen, & Coie, 2001; Ziv, 2012). In addition, those with self-reported perceptions of bullying experiences that are different from peer-reports showed higher risks for psychopathology (such as non-clinical psychotic symptoms) than peer-reported-only victims and non-victims (Gromann et al., 2013). Although previous studies have demonstrated potential impairment of social information processing in children with experience of bullying (Laible, Murphy, & Augustine, 2014; Ziv, Leibovich, & Shechtman, 2013), this was not investigated in lieu of discrepancy between self- and peer-reports.

Thus, the present study was designed to investigate the relationship between the discrepancy in perception of bullying experiences and the later development of internalizing/externalizing behavior. To achieve this goal, we examined the discrepancy in perception of bullying experiences in a community sample of adolescents, with a 10-month, prospective, follow-up design. The discrepancy in the perception of bullying experiences was measured by examining the concordance/discordance between peer-report and self-report of the bullying experiences, as victim, perpetrator, and victim-perpetrator. Self-report of bullying experiences depends on the individual's interpretation of abusive interaction (e.g., recognizing the behavior of peers as aggressive), ability to encode or reconstruct such events, and willingness to report painful or embarrassing experiences. In contrast, peer nomination is the aggregation of multiple peer reports leading to more reliable (consensus) estimates of an individual's status with respect to bullying behavior (Graham & Juvonen, 1998; Ladd & Kochenderfer-Ladd, 2002).

Internalizing/externalizing behavior was evaluated by multiple informants, including the adolescents themselves and their parents, using the Korean Youth Self-Report (K-YSR) and Korean Child Behavior Checklist (K-CBCL) (Achenbach, McConaughy, & Howell, 1987; De Los Reyes, 2011; De Los Reyes, Thomas, Goodman, & Kundey, 2013). This was carried out to address the well-described discrepancies between self-reports of internalizing/externalizing behavior by youths and parent-reported internalizing/externalizing behavior problems, as well as the value of both types of data in understanding the nature of the internalizing/externalizing behavior in youth with bullying experiences.

Two hypotheses were tested in this study:

1. Compared to those who have concordant perceptions of their bullying experience (between self-report and peer-report), adolescents who have discordant perceptions of their bullying experience will show increased internalizing/externalizing behavior at follow-up.
2. Bullying experiences themselves are associated with increased internalizing/externalizing behavior at follow-up.

Hypothesis 1 was tested by comparing the internalizing and externalizing behavior at follow-up in those adolescents who have discrepancies in the perceptions of bullying experiences at baseline to those of adolescents with concordant perceptions of bullying

experiences, after controlling for baseline internalizing and externalizing behavior, bullying experience and other demographic risk factors.

Hypothesis 2 was tested by comparing internalizing/externalizing behavior at follow-up in those adolescents who have bullying experiences (both confirmed by self- and peer-report) with those without bullying experiences, after controlling for baseline internalizing/externalizing behavior and other demographic risk factors.

By controlling baseline internalizing/externalizing behavior, we aimed to measure the changes in internalizing/externalizing behavior across time for each group in both hypotheses tests.

2 | METHODS

2.1 | Subjects

A prospective cohort study of a community sample was conducted at two public middle schools in metropolitan Seoul area.

Students in the first two schools that agreed to participate in the study became study subjects. In previous papers, we reported that these two participating schools had typical characteristics of class structure and size of the middle schools in South Korea (Kim, Koh, et al., 2004).

The study population included all 7th and 8th grade students at the participating schools. The Hallym University Institutional Review Board approved the study, allowing for passive consent from parents and students (Kim, Koh, & Leventhal, 2005; Kim, Leventhal, Koh, Hubbard, & Boyce, 2006). Of the eligible students, 1,719, 7th and 8th grade students (97.7%) participated in the baseline evaluation and 1,663 students (96.7%) continued to participate in the follow-up evaluation. Mean ages of the 7th and 8th grade students were 13.1 years ($SD = 0.3$) and 14.1 years ($SD = 0.3$), respectively, with an age range of 12–15 years.

The baseline evaluation was conducted in October of the first year of the study; follow-up took place in July of the following year. This timeframe was selected so the study would cross two academic years (the Korean academic year starts in March). In this way, the study participants were in the same school for the duration of the study but moved into different classroom groups; peers are randomly re-sorted into other classes across the two academic years, allowing for more and varied raters to be involved in the peer nomination process. This design minimized cluster effects from teachers and/or classes on bullying experiences in youths.

Each student completed a 45–60 min, in-classroom survey during school hours, under the direction of the research assistants.

2.2 | Instruments

2.2.1 | Predictor measure: Self-report and Korean peer nomination inventory (KPNI) of bullying

Self-report of bullying experience at baseline was measured by 2 items: (1) "for the past week, how many times were you bullied?", "for the past week, how many students bullied you?" and (2) "for the past week, how many times did you bully other students?" and "for the past

week, how many other students did you bully?". The specific Korean term for bullying, "wangtta ()," was used to identify bullying experience in the self-report. This term includes a wide range of bullying behavior, such as exclusion, coercions, verbal, and physical abuse. The students who answered affirmative for both items of victimization and perpetration were classified as victim-perpetrators whereas those who endorsed only single item were classified as victims or perpetrators.

Peer-report of bullying was measured by the Korean-Peer Nomination Inventory (K-PNI) at baseline. The K-PNI is composed of 28 items: 11 for victim, 6 for perpetrators, and 11 neutral items. Examples of items are: "Persons who are left out during recess or lunch time (excluded victim);" "Persons who are called names all the time (verbally abused victim);" "Persons who get beat up often (physically abused victim);" and "Persons who are coerced to do work for other students, such as doing homework or carrying bags for them (coerced victim)." Students were asked to name their classmates of the same gender who fit the behavioral type described in each item. Good to excellent reliability and validity have been previously reported for the K-PNI in Korean children (Kim, Koh, et al., 2004). In order to aggregate K-PNI data on individual students, Victim and Perpetrator scales of K-PNI are expressed in a standardized percent nomination (SPN) score. The SPN is calculated by (1) summing up the frequencies of nomination for all items of a scale; (2) dividing summed frequencies by total number of items in a scale; and (3) dividing #2 by the number of same gender students in a classroom. Based on a series of previous sensitivity analyses, a SPN > 1% is a useful cut-off point for categorizing bullying. SPN > 1% has optimal psychometric properties, because it is: (a) operationally conservative; (b) identifies a more homogenous bullying group; and (c) results in minimal misclassification of the bullying group (Kim, Koh, et al., 2004). Adolescents with SPN score >1% on the Victim scale of K-PNI (range: 0–47.5%; most youth scored 0%) were classified as victims, whereas those with SPN score >1% on the Perpetrator scale (range: 0–58.1%; most youth scored 0%) were classified as perpetrators. Adolescents with a SPN score >1% on both the Victim and Perpetrator scales were categorized as a Victim-Perpetrators.

K-PNI data collection was under the direction and supervision of trained research assistants who were present in the classroom to prevent peeking or possible interruption by classmates, ensuring confidentiality of peer nomination.

2.2.2 | Outcome measure: Internalizing/externalizing behavior

Internalizing/externalizing behavior was measured with the K-CBCL and K-YSR. The CBCL is a parent-completed check-list (Achenbach, 1991a) for assessing the type and severity of internalizing/externalizing behavior in children. The CBCL consists of 112 items for psychopathology and 48 items for internalizing/externalizing behavior. The YSR is the self-report companion to CBCL; it is for adolescents, ages of 11–18 years, and assesses competence and internalizing/externalizing behavior for the last 6 months. The CBCL and YSR are reported to have good psychometric properties (Achenbach, 1991b). The K-CBCL, the Korean version of CBCL, and K-YSR, the Korean version of YSR, have similar psychometric properties when used for

Korean adolescents. The K-CBCL and K-YSR have been normed for gender-and age-specific groups; they have been used widely for clinical and research purposes in Korea (Han & Yoo, 2005; Kim et al., 2004; Oh, Hong, & Lee, 1997; Park, Bang, & Kim, 2014; Park et al., 2014). The K-CBCL and K-YSR externalizing and internalizing behavior scales were used to measure internalizing/externalizing behavior in study participants. The internalizing subscale is consists of items from the withdrawn, somatic complaints and anxious/depressed subscales. The externalizing subscale is consists of items from the delinquent behavior and aggressive behavior domains (Achenbach, 1991a).

All study participants completed the K-YSR. Parents of a subsample of 400 students, based on the K-PNI subscale scores (top-100 and bottom-100 students on the K-PNI Victim and Perpetrator scales), were asked to complete K-CBCL. At baseline, 330 parents returned the questionnaires (82.5% response), and 295 out of 330 baseline-respondents returned follow-up questionnaires (89.4% follow-up).

2.2.3 | Other covariates: Demographic information

The students provided demographic information, including: age, gender, parental education levels, and with whom they lived. Family structure was determined from the information on the student's living arrangement and, because students are assigned to neighborhood schools, the students' residence was based on the location of school.

2.3 | Data analysis

We employed a 2 by 2 factorial design to categorize discrepancies in perceptions of bullying experiences based on the agreement between self-report (self-report-yes/self-report-no) and peer-reports (peer-report-yes/peer-report-no) of bullying experiences. This design created 4 categories: (1) Both self-report-no and peer-report-no; (2) self-report-yes/peer-report-no; (3) self-report-no/peer-report-yes; and (4) self-report-yes/peer-report-yes. This factorial design of categorization was used for the three types of bullying experience as victimization, perpetration and victimization-perpetration. For example, for victims, there were 873 participants categorized as self-report-no/peer-report-no, 217 participants as self-report-no/peer-report-yes, 35 as self-report-yes/peer-report-no, and 42 participants as self-report-yes/peer-report-yes (see Table 2). Three separate analyses were conducted on these three types of bullying experience. Non-responders (who left self-reports blank) for each bullying experience (370 for victim, 108 for perpetrator, and 47 for victim-perpetrator) were not included in these analyses.

The distribution of K-YSR and K-CBCL scores (skewedness = 0.654–1.4470) allowed the use of general linear model in these analyses. To examine the impacts of the discrepancies in participants' perceptions of bullying experiences at the beginning of study period on the future increase of internalizing/externalizing behavior problems 10-month later, internalizing and externalizing behavior at follow-up were treated as dependent variables, using analysis of covariance (2 [report type: self or peer] by 2 [presence of bullying experience: yes or no] ANCOVA), adjusting for covariates of other known risk factors. The categorical independent variables were 4 groups defined by discrepancies in their perceptions of bullying

experiences. Other covariates in the current analyses include: (1) psychopathological risk factors at baseline: internalizing and externalizing behavior measured by K-YSR and K-CBCL; (2) socio-demographic risk factors: gender, family structure, and parental educational level; (3) school was entered as a covariate to control for any impact on the observed results due to differences in the class size, gender composition of the two schools and residence of the students; and (4) we also controlled for baseline bullying status to examine the independent impact of discrepancies in perceptions of bullying experiences on the later increase in internalizing/externalizing behavior. All the covariates were included in the ANCOVA prior to entering the 2 by 2 factors (type III sum of squares).

To examine interaction with gender in all planned analyses, we conducted additional preliminary analysis of 2 (gender: male, female) by 2 (report type: self, peer) by 2 (presence of bullying experience: yes, no) ANCOVA using same covariates, except gender. These analyses showed that gender did not have main effect on later externalizing or internalizing behavior ($F[1, 1429] = 0.02-1.88, p = 0.170-0.964$). In addition to this, there was no significant interaction between gender and report type (self or peer) or gender and presence of bullying experience (yes or no) on later internalizing/externalizing behavior ($F[1, 1429] = 0.03-1.78, p = 0.156-0.867$).

3 | RESULTS

3.1 | Study population

Most students came from two parent families and were of middle socioeconomic status (SES). Male and female students were evenly distributed in the samples (Table 1).

3.2 | Discrepancies in perceptions of bullying experiences

Agreement of victim, perpetrator, and victim-perpetrator classification by self- and peer reports is illustrated in Table 2. Seventy-seven of the 1663 adolescents reported themselves to be victim. Among those, 35 adolescents (35/77 = 45.5%) were classified as non-involved and 46 as victims (54.5%) by peer nomination. Likewise, adolescents who self-reported as perpetrators (200) were classified by peer nomination as non-involved (58.0%) and perpetrators (42.0%). Among adolescents who self-reported as victim-perpetrators (36 adolescents), 27 were classified as non-involved by peer-nomination (75.0%) and 9 (25.0%) as victim-perpetrators.

3.3 | Increased internalizing/externalizing behavior at follow-up in victim-perpetrators with discrepancy of bullying experience (self-report-yes/peer-report-no), measured by self-report (K-YSR), and parent-report (K-CBCL)

While there was no main effect of peer-reported involvement as victim-perpetrators ($F[1, 1,133] = 0.53, p = 0.466$), there was a main

TABLE 1 Demographic characteristics of study subjects (N = 1,663)

	Number	Percentage (%)
School		
Seoul	580	34.9
Anyang	1083	65.1
Sex		
Male	917	55.1
Female	746	44.9
Grade		
7th (13.1 ± 0.3) ^a	817	49.1
8th (14.1 ± 0.3) ^a	846	50.9
Family structure ^b		
Living with both parents	1453	87.4
Living with father	41	2.5
Living with mother	51	3.1
Living with grandparents	21	1.3
Parental Education ^b		
Father < = 12 years	731	43.9
>12 years	885	53.2
Mother < = 12 years	983	59.1
>12 years	580	34.8
SES ^b		
High	29	1.7
high	284	17.1
Middle	1117	67.2
Middle low	164	9.9
Low	13	0.8

^aAge in years ± standard deviation.

^bSum of percentage not 100% due to missing data.

effect of self-reported involvement as victim-perpetrators ($F[1, 1,133] = 9.77, p = 0.002$) on later internalizing behavior by self-report (K-YSR). Additionally, there was a significant interaction between self- and peer-reported involvement as victim-perpetrators ($F[1, 1,133] = 4.01, p = 0.029$) on follow-up internalizing behavior by self-report (K-YSR). A post-hoc *t*-test showed that self-report-yes/peer-report-no victim-perpetrators showed significantly increased internalizing behavior at follow-up, compared to the self-report-no/peer-report-no group ($t[1102] = 2.35, p = 0.019$); see Table 3.

There was no main effect of self-reported involvement as victim-perpetrators ($F[1, 282] = 1.94, p = 0.165$) on later internalizing behavior by parent-report (K-CBCL). However, there was a main effect of peer-reported involvement as victim-perpetrators ($F[1, 282] = 4.05, p = 0.045$) on later internalizing behavior by parent-report (K-CBCL). Also there was a significant interaction between self- and peer-reported involvement as victim-perpetrators ($F[1, 282] = 5.3, p = 0.032$) on follow-up internalizing behavior measured by parent-report (K-CBCL). Post-hoc analyses indicated that self-report-yes/peer-report-no victim-perpetrators showed significantly

TABLE 2 Concordance of bullying classification by self-report and peer nomination

Self-report	Peer nomination				Total (N)
	None (N)	Victim (N)	Perpetrator (N)	VP (N)	
Victim***					
(-)	80.1% (873)	19.9% (217)	-	-	100% (1,090)
(+)	45.5% (35)	54.5% (42)	-	-	100% (77)
No-response	74.6% (370)	25.4% (126)	-	-	100% (496)
Perpetrator***					
(-)	76.3% (760)	-	23.7% (236)	-	100% (996)
(+)	58.0% (116)	-	42.0% (84)	-	100% (200)
No-response	76.9% (359)	-	23.1% (108)	-	100% (467)
VP**					
(-)	92.0% (1048)	-	-	8.0% (91)	100% (1,139)
(+)	75.0% (27)	-	-	25.0% (9)	100% (36)
No-response	90.4% (441)	-	-	9.6% (47)	100% (488)

VP, victim-perpetrator; (N), number of students; Pearson Chi-square tests were performed to examine if agreement between self-report and peer nomination was by chance, ** p -value < 0.005, *** p < 0.001.

increased internalizing behavior at follow-up, compared to the other three groups (self-report-no/peer-report-no ($t[278] = 2.82$, $p = 0.005$), self-report-no/peer-report-yes ($t[161] = 4.25$, $p = 0.001$), and self-report-yes/peer-report-yes ($t[268] = 2.88$, $p = 0.004$): see Table 4.

There was no main effect of self- ($F[1,282] = 3.02$, $p = 0.083$) or peer-reported ($F[1, 282] = 0.01$, $p = 0.96$) involvement as victim-perpetrators on externalizing behavior at follow-up by parent report (K-CBCL). However, there was a significant interaction ($F[1, 282] = 4.3$, $p = 0.043$), with post-hoc analyses indicating that the self-report-yes/peer-report-no victim-perpetrators showed significantly increased externalizing behavior at follow-up by parent-report (K-CBCL), compared to the self-report-no/peer-report-no ($t[278] = 3.71$, $p = 0.000$) and self-report-no/peer-report-yes victim-perpetrators ($t[268] = 2.61$, $p = 0.031$): see Table 5.

3.4 | Increased externalizing behavior at follow-up in victims with discrepancy of bullying experience (self-report-yes/peer-report-no), measured by self-report (K-YSR)

While there was no main effect of self-reported involvement as victims ($F[1,1121] = 1.99$, $p = 0.158$), there was a main effect of peer-reported involvement as victims ($F[1,1121] = 5.38$, $p = 0.020$) on later externalizing behavior by self-report (K-YSR). Also, There was a significant interaction between self- and peer-reported involvement as victims ($F[1, 1121] = 4.30$, $p = 0.039$) on externalizing behaviors at follow up by self-report (K-YSR). A post-hoc analyses showed that self-report-yes/peer-report-no victims showed significantly increased externalizing behavior at follow-up, compared to the self-report-no/peer-report-no group ($t[1090] = 2.14$, $p = 0.033$): see Table 6.

TABLE 3 K-YSR internalizing behavior at follow-up in adolescents with various discrepancies in perception of their bullying experience (means/adjusted means for the covariates)

Self-report	Peer-nomination	
	(-)	(+)
Victim		
(-)	49.9 (10.0)/49.8 (9.3) [843]	50.3 (10.7)/51.1 (9.0) [207]
(+)	52.9 (12.9)/53.3 (11.5) [32]	55.3 (4.4) /55.6 (3.7) [40]
Perpetrator		
(-)	49.9 (10.2)/49.8 (9.3) [750]	49.5 (5.6)/50.0 (4.8) [189]
(+)	51.3 (9.3)/51.2 (7.3) [105]	51.8 (7.7)/52.0 (6.8) [72]
VP		
(-)	49.9 (10.1)/49.8 (10.0) ^a [1035]	50.2 (10.6)/51.4 (10.3) [67]
(+)	55.8 (10.0)/56.6 (9.4)^b [24]	50.8 (7.3)/51.8 (6.5) [8]

VP, victim-perpetrator; (-), absent; (+), present.
(): standard deviation; a < b: $p < 0.05$.
[]: sample size.

TABLE 4 K-CBCL internalizing behavior at follow-up in adolescents with various discrepancies in perception of their bullying experience (means/adjusted means for the covariates)

Self-report	Peer-nomination	
	(-)	(+)
Victim		
(-)	49.8 (10.0)/49.8 (9.6) [243]	53.1 (10.3)/53.1 (9.9) [28]
(+)	52.4 (9.9)/52.3 (9.2) [10]	47.0 (5.4)/46.0 (4.6) [6]
Perpetrator		
(-)	50.2 (9.9)/50.1 (8.6) [231]	48.5 (9.6)/48.8 (8.7) [36]
(+)	47.1 (3.6)/47.7 (3.2) [6]	54.8 (17.2)/55.1 (13.4) [9]
VP		
(-)	50.1 (10.1)/50.0 (9.6) ^a [259]	48.6 (6.9)/48.7 (5.9) ^b [13]
(+)	70.3 (8.3)/70.2 (7.2)^c [8]	44.4 (15.6)/46.1 (13.0) ^d [3]

VP: victim-perpetrator; (-): absent; (+): present.
 (): standard deviation; a < c, b < c, d < c: $p < 0.005$.
 []: sample size.

3.5 | Increased externalizing behavior at follow-up in confirmed perpetrators (self-report-yes/peer-report-yes) measured by self-report (K-YSR) and parent-report (K-CBCL)

There were main effects of self-reported involvement ($F[1, 1115] = 8.11$, $p = 0.004$) and peer-reported involvement ($F[1, 1115] = 10.43$, $p = 0.001$) as a perpetrator on later externalizing behaviors measured by self-report (K-YSR): see Table 6.

In addition to this, while there was no significant main effect of self-reported involvement as perpetrators ($F[1, 281] = 0.18$, $p = 0.668$), there was a significant main effect of peer-reported involvement as perpetrators on externalizing behaviors at follow-up, measured by parent-report (K-CBCL) ($F[1, 281] = 7.38$, $p = 0.007$). Also, there was a significant interaction ($F[1, 281] = 4.05$, $p = 0.045$); post-hoc analyses revealed that self-report-yes/peer-report-yes perpetrators showed significantly

increased externalizing behavior at follow-up compared to self-report-no/peer-report-no group and self-report-yes/peer-report-no perpetrators ($t[46] = 2.38$ and $t[9.71] = 2.48$, $p = 0.033$ and 0.01 , respectively): see Table 5.

For the rest of the result, see the Supplemental Material.

3.6 | Correlations among internalizing and externalizing behavior measures at baseline and follow-up

Internalizing and externalizing behaviors at baseline and follow-up, measured by both K-YSR and K-CBCL, were correlated with each other, except: (1) K-YSR externalizing behavior at baseline and K-CBCL internalizing behavior at baseline; (2) K-YSR externalizing behavior at follow-up and K-CBCL internalizing behavior at baseline; (3) K-YSR externalizing behavior at baseline; and K-CBCL internalizing behavior at follow-up; (4) K-YSR internalizing behavior at baseline and K-CBCL

TABLE 5 K-CBCL externalizing behavior at follow-up in adolescents with various discrepancies in perception of their bullying experience (means/adjusted means for the covariates)

Self-report	Peer-nomination	
	(-)	(+)
Victim		
(-)	49.8 (9.6)/49.8 (8.6) [243]	51.0 (2.2)/50.9 (1.7) [28]
(+)	54.5 (9.6)/53.8 (9.6) [10]	42.8 (1.2)/42.6 (1.0) [6]
Perpetrator		
(-)	49.6 (9.1)/49.6 (9.0) ^a [231]	51.1 (10.3)/51.3 (9.5) [36]
(+)	43.5 (4.3) /43.5 (3.6) ^b [6]	54.6 (9.4) /55.3 (8.0)^c [9]
VP		
(-)	49.6 (9.4)/49.6 (8.6) ^d [259]	51.4 (7.4)/51.5 (5.9) ^e [13]
(+)	60.2 (17.6)/60.0 (16.8)^f [8]	57.8 (18.8)/58.5 (16.7)^g [3]

VP: victim-perpetrator; (-): absent; (+): present.
 (): standard deviation; a < c, b < c: $p < 0.05$; d < e, e < f, g < f: $p < 0.05$.
 []: sample size.

TABLE 6 K-YSR externalizing behavior at follow-up in adolescents with various discrepancies in perception of their bullying experience (means/adjusted means for the covariates)

Self-report	Peer-nomination	
	(-)	(+)
Victim		
(-)	50.0 (9.9)/50.0 (9.3) ^a [843]	49.0 (9.8)/49.3 (9.0) [207]
(+)	58.0 (8.8)/57.8 (7.7)^b [32]	47.8 (8.7)/47.9 (8.4) [40]
Perpetrator		
(-)	49.5 (10.0)/49.5 (9.0) ^c [750]	51.4 (8.8) /51.4 (8.3) ^d [189]
(+)	51.4 (9.6) /51.8 (8.8) ^e [105]	55.7 (10.6)/56.3 (9.7)^f [72]
VP		
(-)	49.7 (9.7) /49.7 (8.9) ^g [1035]	53.6 (13.3)/54.2 (12.5) [67]
(+)	54.4 (11.4) /54.4 (10.4)^h [24]	51.8 (8.0)/52.3 (7.3) [8]

VP: victim-perpetrator; (-): absent; (+): present.

(): standard deviation; a < b, c < f, d < f, e < f, g < h: $p < 0.05$.

[]: sample size.

externalizing behavior at follow-up; (5) K-YSR internalizing behavior at follow-up and K-CBCL externalizing behavior at baseline: Table 7.

4 | DISCUSSION

Our study examined how discrepancies in the perceptions of bullying experiences are related to the future increase of internalizing and externalizing behavior. There are three main findings: (1) victim-perpetrators endorsed by self-report only (not supported by

peer-report) showed significantly increased internalizing (measured by both self-report [K-YSR] and parent-report [K-CBCL]) and externalizing behavior (measured by parent-report; K-CBCL) at follow-up compared to both self- and peer endorsed non-participation group (self-report no/peer-report no); (2) victims endorsed by self-report only (not supported by peer report) showed significantly increased externalizing behavior (measured by self-report [K-YSR]) at follow-up compared to non-participation group (self-report no/peer-report no); and, (3) perpetrators endorsed by both self- and peer-report showed increased externalizing behavior at follow-up

TABLE 7 Correlation among internalizing and externalizing behavior measures (K-YSR and K-CBCL) at baseline and follow-up (Pearson correlation)

	K-YSR internalizing behavior at baseline	K-YSR externalizing behavior at baseline	K-CBCL internalizing behavior at baseline	K-CBCL externalizing behavior at baseline	K-YSR internalizing behavior at follow-up	K-YSR externalizing behavior at follow-up	K-CBCL internalizing behavior at follow-up	K-CBCL externalizing behavior at follow-up
K-YSR internalizing behavior at baseline		0.43**	0.17*	0.13*	0.38**	0.23**	0.18*	0.10
K-YSR externalizing behavior at baseline	0.43**		0.08	0.19*	0.33**	0.52**	0.11	0.18*
K-CBCL internalizing behavior at baseline	0.17*	0.08		0.61**	0.23**	0.04	0.55**	0.41**
K-CBCL externalizing behavior at baseline	0.13*	0.19*	0.61**		0.14	0.28**	0.45**	0.66**
K-YSR internalizing behavior at follow-up	0.38**	0.33**	0.23**	0.14		0.55**	0.43**	0.19*
K-YSR externalizing behavior at follow-up	0.23**	0.52**	0.04	0.28**	0.55**		0.23**	0.35**
K-CBCL internalizing behavior at follow-up	0.18*	0.11	0.55**	0.45**	0.43**	0.23**		0.70**
K-CBCL externalizing behavior at follow-up	0.10	0.18*	0.41**	0.66**	0.19*	0.35**	0.70**	

** $p < 0.001$, * $p < 0.05$.

compared to the other three groups (self-report-no/peer-report-no, self-report-yes/peer-report-no, and self-report-no/peer-report-yes) measured by both self-report (K-YSR) and parent-report (K-CBCL). These findings were all confirmed after controlling for other known risk factors for internalizing and externalizing behaviors.

These results indicate that not only those who experienced bullying, but also those whose bullying perceptions were discrepant from their peers (in other words, those who perceived they experienced bullying, which was not supported by peer reports) warrant further attention for clinical care and future research. This particular group might have difficulties in processing information related to bullying experience because: (1) peer nomination has been considered as a "gold standard" for the assessment of bullying experience (Graham & Juvonen, 1998; Ladd & Kochenderfer-Ladd, 2002; Österman et al., 1994; Verlinden et al., 2014); and (2) self-report of bullying experience depends on one's ability to interpret and reconstruct social events, and their willingness to report painful experience (Graham & Juvonen, 1998; Ladd & Kochenderfer-Ladd, 2002; Vessey et al., 2014). Previous studies also have demonstrated impairment of social information processing in victims and perpetrators of bullying, either by self-report (Laible et al., 2014; Ziv et al., 2013) or parent/peer report (van Reemst, Fischer, & Zwirs, 2014; Ziv, 2012). When presented with an ambiguous social scenario, children, and adolescents who report bullying experience tend to interpret these situations as hostile, with higher levels of aggression, anger, and retaliation than do children without bullying experiences (Camodeca & Goossens, 2005; Hubbars et al., 2001; Lansford, Malone, Dodge, Pettit, & Bates, 2010; Lemerise & Arsenio, 2000; Pellegrini, Bartini, & Brooks, 1999; van Reemst et al., 2014; Ziv et al., 2013). Findings from our study add support to these previous results that adolescents who might misinterpret neutral or ambiguous situations as bullying, are also showing later increased externalizing, as well as internalizing behavior. The prospective follow-up design of our study assures observed associations by establishing a temporal correlation between the presence of discrepancies in perceptions of bullying experiences at baseline and later increase of internalizing/externalizing behavior. Our findings are also in line with previous results showing that discrepancies between peer-report and self-report of bullying experience is an indicator of developing future psychopathology (Gromann et al., 2013). Additionally, a prior study reported that experiences which cause subjective feelings of shame in an individual are closely associated with aggressive behavior (Åslund, Starrin, Leppert, & Nilsson, 2009). Taken together, it is plausible that perceived feelings of shame due to victimization may result in externalizing behavior, including aggressive behavior in those adolescent who self-identified as victims of bullying which was not supported by peer-report. This hypothesis should be tested in future studies.

We also replicated prior findings that bullying experiences themselves are associated with increased internalizing/externalizing behavior at follow-up in adolescents whose bullying experiences were endorsed by both self- and peer-report, especially for the perpetrators. Once again, the findings from our study, along with findings from previous studies, support the notion that bullying not only interferes with normal developmental and educational processes, but

it also places adolescents at additional risk for later increase in externalizing behavior (Cleary, 2000; Ivarsson, Broberg, Arvidsson, & Gillberg, 2005; Juvonen, Graham, & Schuster, 2003; Kim et al., 2005; Kim & Leventhal, 2008).

Lastly, we report the unexpected findings of no increased behavior problems at follow-up in those adolescents whose bullying experiences were recognized by peers but not by themselves in our study. We posit three potential explanations for this finding: (1) adolescents who cannot recognize the intent of their peers' (or even their own) bullying behavior might be less impacted by their bullying experiences than those who recognized them. One previous study showed that perpetrators according to peer-report, but not according to self-report were the psychologically strongest group, with the lowest level of anxiety and depression (Juvonen et al., 2003); (2) these may be the adolescents who do not want to report bullying experiences or their behavior problems (shared method variance) (Graham & Juvonen, 1998; Kim et al., 2006; Ladd & Kochenderfer-Ladd, 2002; Vessey et al., 2014). However, multiple informants (peer report, self-report and parents-report) were used to identify bullying experiences and behavior problems in our study, in order to avoid shared method variance; and (3) the size for this group is too small to detect modest effect sizes ($n = 91$). Future study is warranted to test these hypotheses in an independent population.

This study has several strengths: (1) a prospective design; (2) the comprehensive evaluation of bullying and internalizing/externalizing behavior using multiple informants; (3) the examination of the independent effects of discrepancies in perceptions of bullying experiences on the future increase of internalizing/externalizing behavior, controlling for other well-established risk factors, including baseline internalizing/externalizing behavior and bullying experiences; (4) analytic approaches controlling for important confounders; and (5) a large sample size with minimal loss at follow-up.

4.1 | Limitations

Limitations of the study include: (1) the examination of discrepancies in perceptions of bullying experiences is based on the agreement between peer- and self-report of bullying experience. It was not evaluated by other means, including clinical/psychological evaluation; (2) peer reports involve multiple perspectives of bullying experience, whereas self-reports only address presence of victimization or perpetration experience as single items. Further comprehensive study is warranted to investigate the complexity among subjective experiences of bullying, actual bullying situations, and presence/development of psychopathology; (3) the follow-up period was relatively short (10 months). Longer follow-up is necessary to observe the full trajectories of the unfolding relationship between the discrepancies in perceptions of bullying experiences and risks for later internalizing/externalizing behavior; (4) parent report of internalizing/externalizing behavior (K-CBCL) was obtained from only a sub-sample of the entire study group. To yield more reliable and generalizable results, a larger sample size is desirable; and (5) internalizing/externalizing behavior was evaluated by self- and parent-report, not by clinicians. Future studies with a longer-term,

prospective follow-up design, clinical examination of internalizing/externalizing behavior and additional comprehensive evaluations of bullying experiences, are warranted.

4.2 | Implications for school health

In school settings, adolescents who show discrepancies in perceptions of their bullying experiences not only have challenges in processing complex social information such as bullying, but also are at greater risk for increases in internalizing and externalizing behavior. Thus, these students require careful attention and care, with an emphasis on preventing them from being exposed to further damaging bullying experience and the potentially lifelong impact of consequent behavior problems.

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