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The Adolescent Peer System and Academic Engagement

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10 The Adolescent Peer System and Academic Engagement
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ADOLESCENT PEER SYSTEM

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Abstract

Peers are central in shaping adolescents' development across various domains. This research examined patterns of peer system resources and liabilities, and their association with academic adjustment. A person-centred approach, Latent Profile Analysis, was used to classify students into groups based on characteristics of the peer system: friendship quality, group, and general peer relations. Participants were 443 students in their ninth grade year, 14 years old on average, and 57% female. Peer system characteristics formed four profiles. The most common profile had high resources and low liabilities; the three other profiles were mixtures of moderate/high resources and low/moderate liabilities. Students with high resources/low liabilities had higher self- and teacher-reported academic engagement and GPA in fall and spring. The three mixed profiles were associated with poorer academic outcomes. These findings underscore the limitations on access to academic success for students negotiating different peer contexts.

Key words: Peers; peer system; social context; adolescent; academic engagement

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Peers become increasingly important for adolescents and are a key context for shaping well-being. Peers constitute a social system (or 'peer system') with embedded levels of complexity including individuals, social exchanges, relationships, groups, relations with the larger peer group, and culture (Rubin, Bukowski, & Parker, 2006). Components of the peer system and their associations with childhood well-being have been largely explored in separate literatures. Although there is recognition that the peer system has multiple characteristics existing within various levels of social organisation, theory and research has only recently begun to explore the multiple ways that adolescent peer systems contribute to academic achievement and psychological factors related to learning in school, such as student motivation, collectively referred to as academic adjustment (Zee & Koomen, 2016).

A large body of research has identified predictors of academic achievement and its proximal predictor, engagement (for examples see Fredricks, Blumenfeld, & Paris, 2004; Skinner, Furrer, Marchand, & Kindermann, 2008). Less attention has been paid to understanding the role of peers in academic adjustment, but they are widely considered a central factor (Ryan, 2001). The interface between peers and academic adjustment is not straightforward. Research shows that peers promote academic adjustment by supporting positive emotions and self-beliefs (e.g., belonging, self-efficacy, goal orientation) (Martin & Dowson, 2009; Wentzel, 1999). Peers offer instrumental and psychological resources by providing social capital (Crosnoe, Cavanagh, & Elder, 2003). Bullying, coercion, modelling antisocial behaviour, and engaging with antisocial peers can also undermine academic adjustment (Dishion & Tipsord, 2011; Wang & Eccles, 2012).

The goal of this research is to examine within-person configurations of peer system characteristics and their association with academic adjustment. Taking a person-centred

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4 approach (von Eye & Bogat, 2006), this study identified distinct profiles characterizing students'
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6 perceptions of their peer system at three levels (friendship quality, group, and general peer
7
8 relations) and associated academic outcomes.
9

10 **Peer System as a Developmental Context**

11
12 Peers form a critical developmental context for adolescents (Furrer, 2010; Ryan, 2001).
13
14 As adolescents increasingly spend time with peers, their relationships become more supportive
15
16 and intimate (Bagwell & Schmidt, 2013). Adolescents select their friends, are influenced by their
17
18 friends, and shape their friendships over time (Popp, Laursen, Kerr, Stattin, & Burk, 2008).
19
20 Drawing from ecological systems theory (Bronfenbrenner & Morris, 1998), the peer system has
21
22 been conceptualised various ways. Rubin and colleagues (2006) suggested four levels of
23
24 increasing social complexity: interactions, relationships, groups, and culture. La Greca and
25
26 Harrison (2005) outlined three levels of adolescent interpersonal functioning: general peer
27
28 relations (crowd affiliation, victimisation), best friendships, and romantic relationships. This
29
30 study borrows from these conceptualisations to arrive at three levels of the peer system:
31
32 friendship quality, group, and general peer relations.
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38 **Friendship quality.** Friends spend time talking and listening to each other, creating a
39
40 sense of belonging and care (Parker & Asher, 1993). Adolescents with supportive friendships
41
42 feel more competent at school, are more involved in classroom activities, and have higher
43
44 academic achievement (Martin & Dowson, 2009; Wentzel, Barry, & Caldwell, 2004). High
45
46 quality friendships are associated with school competence, classroom involvement, and
47
48 achievement (Kindermann, 2007; Kurdek & Sinclair, 2000). Feeling connected to peers is related
49
50 to academic engagement (Furrer & Skinner, 2003; Juvonen, Espinoza, & Knifsend, 2012),
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52 whereas peer rejection and loneliness are linked to lower participation and interest in school,
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4 lower grades, and dropout (Bellmore, 2011; French & Conrad, 2001; Wentzel, 1999).

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6 Controlling friends can undermine academic engagement, motivation, and positive well-being
7
8 (Hawley, Little, & Pasupathi, 2002; Legault, Green-Demers, & Pelletier, 2006). Thus, supportive
9
10 friendships are resources, and controlling friendships are liabilities, for academic adjustment.
11

Group

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15 Friendship groups have unique characteristics including size, perceived social power, and
16
17 group behaviours.
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19
20 **Friendship network size.** Number of friends influences involvement in school. Students
21
22 with fewer friends had lower school involvement before the transition to middle school and in
23
24 sixth grade (Kingery & Erdley, 2007). A larger number of friends could increase social support,
25
26 improve one's sense of social competence, or reflect one's own social skill (Juvonen et al.,
27
28 2012). Having at least one reciprocated friendship was associated with higher academic
29
30 motivation and lower likelihood of high school dropout (Ricard & Pelletier, 2016).
31
32 Consequently, friendship network size is likely a resource for academic adjustment.
33
34

35
36 **Group power.** Social power can be explicit and aggressive, eliciting fear, submission, or
37
38 compliance. Another form is implicit, or a referent approach based on group assets valued by
39
40 others (La Freniere & Charlesworth, 1983). According to Rubin et al. (2006), "...the main
41
42 rewards that can be provided at the level of the group are power, attention, and status (p. 599)." It
43
44 is likely that referent power, which is related to social assets (Lease, Kennedy, & Axelrod, 2002),
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46 is a resource, and that fear power, which is related to aggression (Vaillancourt, Hymel, &
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48 McDougall, 2003), is a liability in the school setting.
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52 **Friend involvement in problem behaviour.** Affiliating with friends involved in
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54 problem behaviours (e.g., substance use) has been shown to reduce school connectedness
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(Dishion & Tipsord, 2011), leading to school disengagement and dropout (French & Conrad, 2001). Thus, associating with friends involved in problem behaviours is likely an academic liability.

General Peer Relations

Although aggression and victimisation typically refer to an individual, they reflect general relations with peers in the school context (La Greca & Harrison, 2005). Individual and peer group aggression have been linked to poorer academic adjustment (Chung-Hall & Chen, 2009; Loveland, Lounsbury, Welsch, & Buboltz, 2007). Adolescents who are victimised at school tend to have poorer academic adjustment due to negative self-perceptions, peer rejection, and diminished school belonging (Espelage, Hong, Rao, & Low, 2013; Nakamoto & Schwartz, 2010). Both aggression and victimisation are likely academic liabilities.

Complexity of the Peer System

Individual characteristics do not capture the complexity of the peer system. Variable-centred methods (e.g., moderation) examine interactive effects between characteristics. For example, affiliation with friends involved in delinquent behaviour, typically viewed as a liability, had no influence on school attachment when friendship quality was high (Boman, Krohn, Gibson, & Stogner, 2012). As another example, victimisation had a negative effect on academic functioning, but only when children had a high or low number of aggressive friends (Schwartz, Gorman, Dodge, Pettit, & Bates, 2008). Thus, peer systems shape multiple pathways to academic adjustment through resources and liabilities that interact in unexpected ways.

A person-centred approach focuses on configurations of characteristics (Kretschmer et al., 2016; Scholte, van Lieshout, & van Aken, 2001). This study explored whether perceived peer system characteristics clustered into profiles with different patterns of academic adjustment. It

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2
3 was hypothesised that there would be at least three profiles: high resource/low liability, low
4 resource/high liability, and mixed resource/liability. A *high resource/low liability* peer system
5
6 would have high quality friendships, larger friendship networks with referent power, and low
7
8 friend involvement in problem behaviour, aggression, and victimisation. In contrast, a *low*
9
10 *resource/high liability* peer system would be marked by poor friendship quality, fear power,
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12 friends involved in problem behaviours, and more aggression and victimisation. At least one
13
14 *mixed quality profile* was also expected (Smith, Ullrich-French, Walker II, & Hurley, 2006).
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16
17 Certain peers are more competent at meeting needs than others, peers may be complementary,
18
19 and power dynamics arise within friendships (Rubin, Fredstrom, & Bowker, 2008). One possible
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21 combination is *moderate resource/moderate liability*, in which students have fewer friends, some
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23 fear power and friend involvement in problem behaviour, but also perceived high quality
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29 friendships.

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31 Student gender and race were included as predictors of profile membership. Research has
32
33 shown that peer system characteristics and their associations with academic adjustment differ
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35 according to gender and race. Girls report higher prosocial behaviour, more time spent creating
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37 intimate relationships with friends, and less direct aggressive than boys (Perry & Pauletti, 2011;
38
39 Rose & Rudolph, 2006). Students experience peer relationships at school, social support, and
40
41 school belonging differently based on racial/ethnic identity (Faircloth & Hamm, 2005;
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43 Matthews, Banerjee, & Lauermann, 2014). For example, stigmatized interactions at school may
44
45 result in fewer opportunities for minoritised males, in particular, to experience positive
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49 relationships within the school context (Gray, Hope, & Matthews, 2018).
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51 **Academic Adjustment**

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Two indicators of academic adjustment from three informants were studied: classroom engagement and grade point average (GPA). Classroom engagement predicts learning and achievement, high school graduation, and college entry (Fredricks et al., 2004). Engagement is a resource for managing academic challenges and it facilitates motivational resilience (Furrer, Skinner, & Pitzer, 2014; Martin & Marsh, 2009). Two dimensions of engagement, behaviour and emotion, were examined. The behavioural dimension focuses on active participation, effort, and persistence in learning activities, whereas the emotional dimension gauges interest and enjoyment (Skinner, Kindermann, & Furrer, 2009).

Classroom engagement was evaluated using student and teacher reports. An engaged state is highly salient, so students are considered the best reporters of their own engagement (Skinner et al., 2009). Teachers regularly interact with students and can provide a good assessment of engagement, but perhaps they are more sensitive to observed aspects if students are masking emotional states like boredom or anxiety. Cumulative GPA was another marker of academic adjustment. Although GPA is often viewed as unreliable due to differences grading standards, research suggests that GPA has strong predictive validity in terms of college success (Geiser & Santelices, 2007).

It was hypothesised that the *high resource/low liability* profile would have the highest, and the *low resource/high liability* profile would have the lowest, engagement and GPA. It was also expected that *mixed quality* profiles would have moderate academic adjustment. Due to the lack of previous research on profile membership based on perceptions of the peer system, we did not hypothesize specific differences for gender and race/ethnicity.

Methods

Participants

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Students were recruited from a ninth grade career selection class ($n = 655$) at a suburban high school (9th - 12th grade) in Northwestern United States. The class was taught by seven teachers. The sample included 443 students (68% of those enrolled in the class), 57% girls and 14.7 years old on average. Nearly two-thirds (64%) of the students were white, and one-third identified as Latinx (14%), Asian/Pacific Islander (10%), Multiracial (7%), African-American (5%), and American Indian/Native American (1%).

Measures

Descriptive and reliability statistics are provided in Table 1.

Background. Students reported their gender (male/female) and race (White, Black, Hispanic, Asian/Pacific Islander, American Indian/Native American, and Other). Age at time of assessment was calculated from date of birth.

Friendship quality. Two friendship quality scales, Supportive and Controlling, were constructed using exploratory factor analysis with principal axis factoring and oblique rotation. Fourteen items split evenly into two dimensions with no cross-loadings $> .30$, accounting for 42.4% of the variation in the data. The Supportive scale had factor loadings ranging from .53 to .87 (My friends... 'listen to me,' 'understand me'). The Controlling scale had factor loadings ranging from .45 to .63 (My friends... 'try to control what I do,' 'tell me what to do'). Scale scores were calculated by averaging item responses (1=*not at all true for me* to 4=*totally true for me*).

[Table 1 near here]

Friendship group power. The average of two self-reported items (1=*not at all true for us* to 4=*totally true for us*) formed the Referent Power scale: 'Other kids want to be like people in our group' and 'Other kids want to be in our group.' Similarly, the Fear Power scale was

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4 calculated by averaging responses to three items: ‘Our group can get kids to do whatever we
5
6 want,’ ‘Adults at school do not like our group,’ and ‘Other kids are afraid of our group.’
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8 **Aggression and victimisation.** Aggression was measured using an 11-item self-report
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10 measure of frequency of behaviours (e.g., “I fought back when someone hit me first,” “I pushed
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12 or shoved other students”) (Aggression Scale, Orpinas & Frankowski, 2001). Victimization was
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14 measured with an 8-item measure assessing how often students were bullied over the past month
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16 (e.g., “Someone threatened me,” “Someone laughed at me in a mean way”) (Boulton, Trueman,
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18 & Flemington, 2002). Aggression and victimisation scales were calculated by averaging
19
20 responses for each item (0 = *never* to 4 = *all of the time*).
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24 **Friend involvement in problem behaviour.** Students indicated how many of their
25
26 friends were involved in 12 different behaviours (0 = *none* to 4 = *almost all*) such as substance
27
28 use and stealing, and athletics and school (reverse-coded). Ratings were averaged to create an
29
30 overall problem behaviour score.
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33 **Friendship network size.** Students nominated an unlimited number of same-grade
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35 friends at school (spent the most time, knew the best). A nomination was reciprocal if the student
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37 was also nominated by their friend. Of the 443 participants, 376 (85%) nominated at least one
38
39 friend who participated in the study, 15 (3%) nominated students who did not participate in the
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41 study, 6 (1%) did not nominate any friends, and 46 (10%) did not complete the assessment. Of
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43 the 376 who nominated friends, 335 (89%) had at least one reciprocated nomination (76% of the
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45 sample).
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49 **Classroom engagement.** Students reported on their classroom engagement using
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51 Wellborn’s (1991) 20-item scale evenly split between behavioural (e.g., ‘When we start
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53 something new in class, I participate’) and emotional items (e.g., ‘When we start something new
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4 in class, I feel worried' [reverse-coded]). Teachers also rated 13 items about their students'
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6 behavioural and emotional engagement (Wellborn, 1991). To reduce workload, teachers
7
8 completed the measure for a random subset of students ($n = 245$). Scales for behavioural and
9
10 emotional engagement were computed for each reporter by reverse-scoring disaffection items
11
12 and averaging responses (1 = *totally not true* to 4 = *totally true*).

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14
15 **Grade point average.** The Human Subjects Review Board required that students could
16
17 opt out of the administrative data collection. A subset of 148 students consented to the extraction
18
19 of their first semester and cumulative GPA (4.0 scale) from administrative records.

Data Analysis

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24 To investigate group classification based on peer system characteristics, a series of
25
26 mixture models were conducted using Mplus v7.0 (Muthén & Muthén, 1998-2011). Missing data
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28 were handled using MLR (maximum likelihood robust) estimation for non-normal data (see
29
30 Yuan & Bentler, 2000). This approach assumes that data are missing at random (MAR), or the
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32 probability of nonresponse on one or more variables is associated with other observed variables
33
34 (Collins, Schafer, & Kam, 2001). Missing data for this study was mostly teacher-reported
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36 engagement and GPA, which were correlated with other variables in the model.
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41 Latent Profile Analysis (LPA) classified students into groups based on peer system
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43 characteristics: supportive and controlling friendship quality, friendship network size, referent
44
45 and fear power, friend involvement in problem behaviour, aggression, and victimisation. Models
46
47 included race (student of colour/not) and gender (male/female) as predictors. LPA classifies
48
49 individuals based on the covariances of a set of observed dependent variables, or latent class
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51 indicators (Marsh, Lüdtke, Trautwein & Morin, 2009). In contrast to other person-centred
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53 approaches like cluster-analysis, LPA directly tests competing models with differing numbers of
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4 classes. Whereas cluster analysis assigns individuals to a particular class, LPA accounts for the
5
6 uncertainty of classification by determining the probability of being assigned to each class.
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8 The 3-step method (Asparouhov & Muthén, 2012) was used to determine number of
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10 classes. After identifying the optimal log-likelihood value using random starting values, model
11
12 fit comparison was assessed using the Lo-Mendell-Rubin likelihood ratio test (LMR; Lo,
13
14 Mendell, & Rubin, 2001). Significantly smaller log-likelihood values reject the $k-1$ class model
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16 in favour of the k class model. The last step compares models using the bootstrap likelihood ratio
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18 test (BLRT; Nylund, Asparouhov & Muthén, 2007). The models were also evaluated on the basis
19
20 of Akaike information criteria (AIC) and Bayesian information criteria (BIC) fit indices, and
21
22 entropy values, a measure of differentiation among classes. Classes were then differentiated by
23
24 academic adjustment using the Auxiliary (DESTEP) function, which tests for the equality of
25
26 means on variables external to LPA classification using posterior probabilities to calculate a
27
28 Wald chi-square statistic (Asparouhov & Muthén, 2013; Chen, 2012).
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Results

Descriptives

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38 Students reported having supportive friendships and low levels of friend involvement in
39
40 problem behaviour, aggression, and victimisation (see Table 1). Friendship networks contained
41
42 three friends on average. Fear power was low, but students reported moderate levels of referent
43
44 power. Both students and teachers reported moderately high classroom behavioural and
45
46 emotional engagement. Correlations were moderate and in the expected direction. Peer system
47
48 resources (supportive friendship quality and friendship network size) were positively correlated
49
50 with at least one academic outcome. Referent power was not significantly associated with
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4 academic outcomes, but it was positively correlated with the other resources. Peer system
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6 liabilities were all negatively correlated with at least one academic outcome.
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8 **Latent Profiles**

9
10 Table 2 depicts the goodness-of-fit indices for models with two through six latent
11 profiles. The four-profile solution offered a strong distinction among the classes, with an entropy
12 level of .85 (see Figure 1). *High resource/low liability* (HR/LL) was the most common profile,
13 with 63% ($n = 279$) of students in this group. The probability of correct classification (PCC) for
14 HR/LL was 95%. There was not a *low resource/high liability* profile as hypothesised, but there
15 were three less common mixed profiles. One in five participants were categorised as *high*
16 *resource/medium liability* (HR/ML; 21%, $n = 92$, PCC = 83%). There was also a *medium*
17 *resource/high liability* (MR/HL) profile (9%, $n = 41$, PCC = 87%), and a *low resource/medium*
18 *liability* (LR/ML) profile comprising only 7% of participants ($n = 29$, PCC = 87%). A
19 significantly larger share of girls had the most common HR/LL profile, and a larger share of
20 boys had the MR/HL profile ($OR = 2.96$, $p < .05$). Students of colour were marginally less likely
21 to have the HR/LL and LR/ML profiles, and more likely to have the MR/HL profile ($OR = 2.06$
22 and $OR = 3.06$, respectively, $p < .10$).
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40 [Table 2 near here]

41 [Figure 1 near here]

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45 Table 3 shows differences between the four profiles on peer system characteristics.
46 HR/LL distinguished itself from the other three profiles by having the most positive general peer
47 relations (lowest aggression and victimisation) and the lowest friend involvement in problem
48 behaviour. Students with this profile also reported high supportive and low controlling friendship
49 quality, and group characteristics typical of popularity (larger friendship network, moderate
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referent and low fear power). This profile was labelled the *Dominant* peer system at this school, and it was most similar to the school in terms of gender and race.

[Table 3 near here]

HR/ML was the next largest profile, and uniquely had moderate fear power and victimisation. These students were not significantly different from *Dominant* on friendship quality and friendship network size, but had group characteristics and general peer relations that suggested some challenge (high referent power, moderate friend involvement in problem behaviour and aggression). This profile was labelled *Signs of Challenging Peer Relations* (abbreviated to '*Signs*').

Another less common peer system profile, MR/HL, had the most challenging group characteristics and relations with peers (high fear power, friend involvement in problem behaviour, aggression, and victimisation) combined with moderately supportive and controlling friendship quality. These students also reported a smaller friendship network and higher referent power (not significantly different than *Dominant* and *Signs*). This profile was labelled *Most Challenging Peer Relations* (abbreviated to '*Most*').

Students with the least common profile, LR/ML, had the least supportive friendships and the lowest referent power along with a mixture of peer system liabilities. Like *Most*, they reported having controlling friends and a high degree of victimisation. Similar to *Dominant*, these students reported low fear power, and similar to *Signs*, they had moderate friend involvement with problem behaviour and aggression. This profile was named *Low Friend Quality, Some Challenging Peer Relations* (abbreviated to '*Low, Some*').

Academic Adjustment

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As hypothesised, the most common peer system profile, *Dominant*, was associated with the highest student- and teacher-reported engagement and GPA in fall (see Table 4). Academic outcomes for *Signs* were significantly poorer than *Dominant*, significantly better than *Most* (except for student-reported emotional engagement), and similar to *Low*, *Some*. Contrary to expectations, *Most* had the poorest student- and teacher-reported behavioural engagement, and lower teacher-reported emotional engagement and GPA (not statistically different than *Low*, *Some*).

[Table 4 near here]

Academic adjustment patterns became more homogenous in spring. *Dominant* continued to have the best academic outcomes, although teacher-reported emotional engagement only differed significantly from *Signs*. The three other profiles looked similar in terms of student- and teacher-reported behavioural engagement, and student-reported emotional engagement. *Most* showed some improvement in academic adjustment, with teacher-reported behavioural and emotional engagement and GPA improving by approximately a half of a scale point. The between-profile differences found for fall GPA persisted in spring despite the fact that *Low*, *Some* and *Most* no longer had the poorest engagement.

Discussion

The peer system is a critical developmental context for adolescents. The current study endeavoured to understand whether the peer system reflects multiple developmental pathways to academic adjustment through the provision of resources and liabilities. Four distinct peer system profiles were found. Supporting the hypothesis that the most common profile would have high resources and low liabilities, *Dominant* had the most 'desirable' characteristics at all three levels of the peer system: high friendship quality, larger group size, feelings that others wanted be like

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4 them and not fear them, and little experience with problem behaviours, aggression, and
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6 victimisation. *Dominant* had a higher proportion of girls and white students, and it was
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8 associated with the most positive pattern of academic outcomes in both fall and spring.
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10
11 There were also three less common profiles with mixtures of resources and liabilities and
12
13 lower academic adjustment; however, there was not a *low resource, high liability* profile with the
14
15 worst academic adjustment. The *Signs* profile was similar to *Dominant* in terms of friendship
16
17 quality and friendship network size, but these students also faced challenges with problem
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19 behaviour, aggression, and victimisation. They were similar to *Most* in feeling that other students
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21 wanted to be like them but also feared them. *Signs* had both positive and negative peer system
22
23 characteristics, a finding consistent with bistrategic friendships that are both coercive and
24
25 prosocial (Hawley, Little, & Card, 2007). *Signs* had modest academic adjustment across all
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27 indicators, suggesting that peer system challenges may have undermined academic adjustment
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29 despite higher quality friendships, contrary to evidence of the buffering effect of friendship
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31 quality (e.g., Boman et al., 2012).
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37 The *Low, Some* profile had the poorest friendship quality, low feelings of power, higher
38
39 victimisation, and moderate friend involvement in problem behaviour and aggression.
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41 Victimization has been linked to both poor friendship quality (Bollmer, Milich, Harris, & Maras,
42
43 2005) and lower academic performance (Espelage et al., 2013), especially if also involved in
44
45 disruptive behaviours (Beran, 2009). *Low, Some* were similar in academic adjustment to *Signs*,
46
47 but they were also similar to *Most* in terms of teacher-reported emotional engagement and GPA.
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49 Perhaps teachers view victimised students as being unhappy or weak (Fox & Boulton, 2005),
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51 attributes that may also influence teachers' perceptions of student engagement and performance.
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The *Most* profile, more likely to be boys and students of colour, had high fear power, small friendship networks, and higher levels of peer problem behaviours, aggression, and victimisation. *Most* was closest to the hypothesised *low resource, high liability* profile but these students reported *moderate* resources in terms of friendship quality and referent power. Previous research has also shown that students involved in delinquent behavior perceive the quality of their friendships similarly to students not involved in delinquent behavior (Selfhout, Branje, & Meeus, 2008; Vaillancourt et al., 2003). *Most* had the lowest fall behavioural engagement, and low teacher-reported emotional engagement and GPA. It is noteworthy that *Most* had higher teacher-reported engagement and GPA in the spring, and did not differ significantly from the other mixed profiles on self-reported engagement. It is possible that the transition to high school may have been difficult for *Most* and they improved over time. Alternatively, perhaps teachers initially made inferences about academic engagement based on students' behaviour, but over the school year they used relational information to make such observations.

Configurations of Resources and Liabilities

Resources and liabilities are one organising principle for research on the peer system, but the current study suggests a more complex picture. Peer system resources did not necessarily protect students from the influence liabilities had on academic outcomes. However, students with power and aggression may have other assets valued by teachers and peers (Vaillancourt et al., 2003), and therefore might be viewed as more engaged at school. Nevertheless, students with mixed profiles had more academic challenges than students with the *Dominant* profile, suggesting that liabilities are functionally equivalent when it comes to the school environment. Narrow definitions of 'acceptable' school behavior can serve to marginalise students associated with any type of peer system liability (Osborne, 1996) and the harmful effects seem to exert

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3 more influence on academic adjustment than the beneficial effects of the peer system resources
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6 (see Baumeister et al., 2001) .
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8 Findings suggest one dominant path afforded by the peer system to greater academic
9 adjustment, and multiple pathways to poorer academic adjustment. As students adapt to
10 conditions at school, they may use aggression and coercion in place of, or in addition to, more
11 ‘normalised’ prosocial strategies (Bjorkland & Hawley, 2014). If the dominant path is less
12 accessible, students may take on liabilities in response to a lack of access to resources. Therefore,
13 the generalisability of specific profiles may be less important than the notion that there is a
14 dominant path and a number of less common paths. The utility of understanding the less
15 common paths, which would differ according to context, is the degree of teachers’ attunement to
16 them and their ability to respond with support (Farmer, Lines, & Hamm, 2011).
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28 **Role of Race and Gender**

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31 Although there were not specific hypotheses regarding race and gender, it is noteworthy
32 that *Dominant* was more likely to include white girls, whereas *Most* was disproportionately
33 males of colour. In contrast to *Most*, *Dominant* faced the fewest peer system challenges and
34 performed what may be ‘normalised’ behavior at school and with friends. This is consistent with
35 research showing that girls report more typically prosocial and self-regulated behavior (Perry &
36 Pauletti, 2011; Rose & Rudolph, 2006). It also aligns with research suggesting that minoritised
37 males face stigma about their social groups that may lead to alienation from school, fewer
38 positive teacher relationships, and lack of access to curriculum that capitalises on their cultural
39 heritage (Gray et al., 2018; Taylor & Graham, 2007). Repeated exposure to stigmatised
40 interactions and harsh discipline policies may leave boys particularly vulnerable to motivational
41 and academic challenges (Taylor & Graham, 2007).
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Limitations and Future Directions

Survey administration occurred on a school day in a particular class, thereby excluding students who were absent or not enrolled in the class. Students were able to decline participation in the administrative data collection. Those who declined reported a significantly smaller friendship network; more friend involvement in problem behaviour, aggression, and victimisation; higher fear power; and lower behavioural engagement. However, missing data were handled with MLR estimation, which reduces the likelihood that parameter estimates were biased (Allison, 2009). Another issue is the nested data structure was not accounted for in the models due to the small number of teachers ($n = 7$), which could have led to underestimates of standard errors. Future studies with a larger number of clusters should adjust for cluster correlated data to reduce the likelihood of Type 1 errors.

Data were collected in fall and spring but analysed concurrently so it is not possible to infer causality or change over time. A next step is to examine changes in peer system profiles and their association with different developmental trajectories. Most of the measures were self-reported, which could have led to inflated correlations. Self-perceptions are probably best captured with self-reports, but the peer system could also be assessed through observations or other reporters, or by using qualitative methods (DeCuir-Gunby & Schutz, 2014; Usher, 2018).

The majority of white students in this study possibly obscured the identification of profiles specific to minoritised students (Matthews, 2014). It is also possible that the measures centred white student experiences and lacked relevance to students of colour (DeCuir-Gunby & Schutz, 2014). Replicating this study with specific student populations would provide a more accurate understanding of peer systems and academic adjustment for students who are not members of a privileged group. Finally, additional research is needed on how culture influences

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4 the development of peer systems (Rubin et al., 2008) and the impact of school environments that
5
6 do not value students' heritage (Meece, Glienke, & Askew, 2009).
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Implications

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10 Peer systems reflect opportunities and liabilities afforded by the school context. With
11
12 multiple types of peer systems associated with poorer academic adjustment, it is important that
13
14 schools work to broaden 'normalised' social structures by creating more opportunities in the
15
16 classroom. Teachers attuned to peer systems can manage the classroom social context to promote
17
18 a positive culture and support marginalised students (Farmer et al., 2011). Some school-based
19
20 interventions focus on creating positive relationships between students and shared learning,
21
22 especially through mixed group interactions and collaborative learning tasks with students
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24 outside their gender, racial, or cultural groups (Chen & Graham, 2015; Gillies, 2003; Slavich &
25
26 Zimbardo, 2012). Culturally responsive pedagogy shows promise for reducing classroom
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28 management practices that marginalise students and promoting engagement (e.g., Bradshaw et
29
30 al., 2018). Finally, multi-systemic approaches, in which communities, staff, parents, and students
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32 co-create classroom contexts that support positive behaviour, also show positive impacts on
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34 students' academic adjustment (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011).
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For Peer Review Only

Table 1. Descriptives, correlations, and reliability statistics

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Supportive friendship quality	---												
2. Controlling friendship quality	-.40*	---											
3. Fear power	-.15*	.21*	---										
4. Referent power	.21*	-.03	.24*	---									
5. Friendship network size	.16*	-.05	-.12*	.15*	---								
6. Friend involvement in problem behaviour	-.22*	.24*	.46*	.02	-.13*	---							
7. Aggression	-.17*	.22*	.47*	.04	-.17*	.60*	---						
8. Victimization	-.23*	.28*	.21*	-.06	-.18*	.42*	.66*	---					
9. Behavioural engagement – student	.23*	-.21*	-.37*	.06	.08	-.50*	-.42*	-.30*	---				
10. Emotional engagement – student	.31*	-.24*	-.31*	.04	.02	-.43*	-.32*	-.23*	.69*	---			

	1	2	3	4	5	6	7	8	9	10	11	12	13
11. Behavioural engagement – teacher	.13*	-.01	-.36*	-.06	.25*	-.38*	-.42*	-.34*	.32*	.15*	---		
12. Emotional engagement – teacher	.20*	-.10	-.34*	-.05	.34*	-.34*	-.34*	-.32*	.33*	.20*	.74*	---	
13. GPA	.06	-.09	-.31*	-.06	.26*	-.33*	-.33*	-.28*	.49*	.32*	.41*	.30*	---
Mean (<i>SD</i>)	3.34 (0.61)	1.49 (0.48)	1.67 (0.66)	2.49 (0.83)	3.31 (2.87)	0.89 (0.43)	0.66 (0.72)	0.55 (0.63)	2.99 (0.59)	3.08 (0.55)	2.88 (0.68)	3.02 (0.59)	3.12 (0.72)
Alpha	.88	.75	.64	.80	---	.86	.89	.82	.83	.84	.88	.89	---

* $p < .05$

Table 2. Fit indices for comparing latent profiles

No. Group	No. Parameters	AIC	BIC	p LMR	Smallest class count (prop)	Entropy
2	27	6744.23	6854.64	—	103 (.23)	0.84
3	38	6574.52	6729.90	0.02	40 (.09)	0.82
4	49	6490.33	6690.70	0.64	29 (.07)	0.85
5	60	6429.91	6675.25	0.18	22 (.05)	0.76

Note. AIC = Akaike information criteria. BIC = Bayesian information criteria.

p LMR = p values for the comparison of k versus $k-1$ classes.

Table 3. Profile descriptives for peer system dimensions

Peer System Dimensions	Higher			Moderate			Lower			
	Profile	<i>M</i>	<i>SE</i>	Profile	<i>M</i>	<i>SE</i>	Profile	<i>M</i>	<i>SE</i>	
Friendship Quality	Supportive	Dominant Signs	3.47 3.34	0.04 0.09	Most	3.09*	0.15	Low, Some	2.42	1.12
	Controlling	Low, Some Most	1.96 1.73	0.76 0.11	Most Signs	1.73 1.53	0.11 0.08	Signs Dominant	1.53 1.38	0.08 0.03
Group	Friendship network size	Dominant Signs	3.66 3.02	0.20 0.36	Signs Low, Some	3.02 2.41	0.36 0.60	Low, Some Most	2.41 2.16*	0.60 0.42
	Referent Power	Signs Most	2.79 2.71	0.33 0.17	Most Dominant	2.71 2.46	0.17 0.05	Low, Some	1.67	0.47
General Peer Relations	Fear Power	Most	2.52	0.15	Signs	2.17	0.39	Low, Some Dominant	1.43 1.39	0.13 0.03
	Friend involvement in problem behaviour	Most	1.51	0.08	Signs Low, Some	1.15 1.18	0.07 0.27	Dominant	0.71	0.03
General Peer Relations	Aggression	Most	2.47	0.12	Signs Low, Some	1.14 1.08	0.10 0.16	Dominant	0.26	0.03

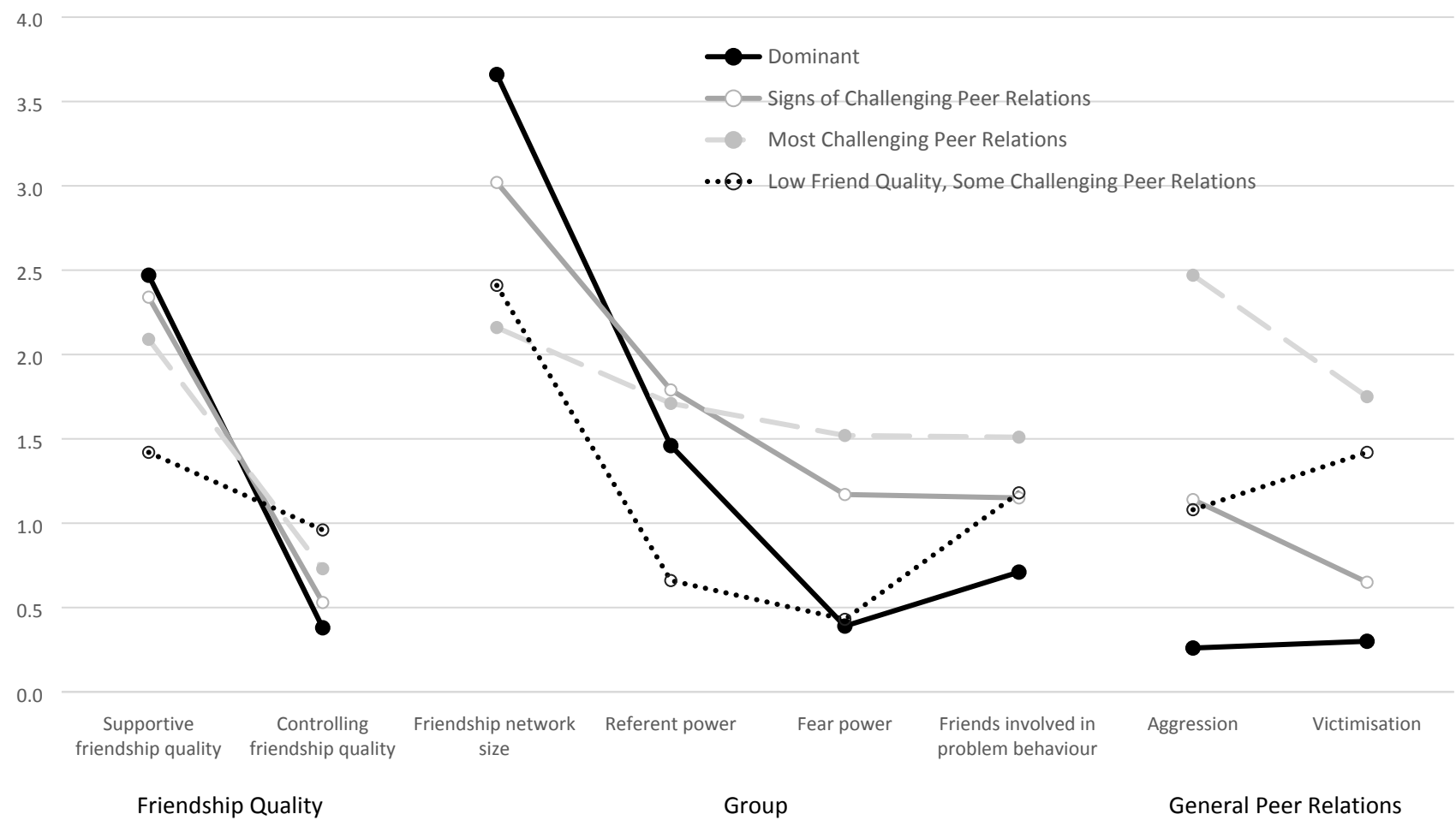
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Peer System Dimensions	Higher			Moderate			Lower		
	Profile	<i>M</i>	<i>SE</i>	Profile	<i>M</i>	<i>SE</i>	Profile	<i>M</i>	<i>SE</i>
Victimisation	Most	1.75	0.15						
	Low, Some	1.42	0.24	Signs	0.65	0.26			
							Dominant	0.30	0.03

Notes: Signs = Signs of Challenging Peer Relations; Most = Most Challenging Peer Relations; Low, Some = Low Friend Quality, Some Challenging Peer Relations. Profiles that differ significantly $p < .05$ are in separate groupings (Higher = highest means; Moderate = moderate means; Lower = lowest means). If a profile is in two groupings, it was not statistically different than the profiles in both groupings.

* Signs vs. Most was marginally significant, $p < .10$

Figure 1. Peer system profiles



Note. Scores for constructs measured on a scale starting with 1 (supportive and controlling friendship quality, friends involved in problem behavior, fear and referent power) were adjusted down by 1 point for visual consistency.