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Children's Affective Experiences During Recess: Who Changes the Most Across a School Year?

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ABSTRACT

The objective of this study was to investigate changes in elementary school students' affective states during recess throughout a school year, and examine distinct subgroups variations by gender, grade level, race/ethnicity, and beginning of the school year scores. Participants included 1,022 students across nine schools within a large metropolitan area in the United States, who received services from a national nonprofit organization focused on improving recess quality. A shortened version of the Positive and Negative Affect Schedule was used at four timepoints. Analyses used latent growth curve models that were computed using a maximum likelihood estimator with robust standard errors. Changes in positive affect ($\beta = 0.170$, $p = .020$) and negative affect ($\beta = -0.040$, $p < .001$) at recess for the entire sample were observed. Across sub-groups, the largest gains were for students who reported low levels of positive affect ($\beta = 0.340$, $p < .001$) and high levels of negative affect ($\beta = -1.253$, $p < .001$) at the beginning of the school year. Findings from the current study suggest the need to move beyond aggregating all scores within recess interventions, and, rather, toward targeting particular student sub-groups with both intervention strategies and analytical approaches.

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Elementary school recess has gained increasing attention in both the popular press and scholarly literature. Recess represents an often-coveted time in the school day in which children are presumed to have autonomy to choose what they want to do and with whom they want to do it. The role of recess extends beyond a break from classroom activities; it is a pivotal context with potential to impact the overall well-being and development of students. Public health officials have declared recess necessary to increase levels of physical activity for an increasingly sedentary child population (Guthold et al., 2018), while developmental researchers have argued that participation in play at recess can facilitate the improvement of social and emotional skills (McNamara et al., 2015), increase adaptive classroom behavior and time on task (Barros et al., 2009; Stapp & Karr, 2018), and improve self-regulation (Muir et al., 2023). Moreover, it has been suggested that recess can bolster school culture and promote a more enriched academic environment (London et al., 2015). Despite all of the favorable evidence, in the current educational and legislative environment of evermore standardized testing and mandated instructional time in the United States of America (USA), recess opportunities have been systematically reduced or eliminated since the early 2000s, with the largest changes seen for children attending schools in low-income and/or racially diverse districts (Monnat et al., 2017). This trend may be shifting positively in some places, as there has been renewed attention on recess time following a return to in-person schooling post-pandemic. Moreover, multiple states in the USA have proposed and passed legislation to mandate a minimum amount of time spent at recess (e.g., California, Tennessee, Washington).

While time allocation for recess remains at the forefront of policy discussions in the USA, a growing body of literature has suggested that what happens during this time, or recess quality, plays a substantial role in the benefits, or lack thereof, that children experience (Mak & Koustova, 2023). One emerging, yet critical, area of research, is children's affective experiences at recess. Positive and negative mood states have been associated with anxiety and depression in children (Uhl et al., 2019), which is critical given that childhood rates of anxiety and depression continue to increase (Bitsko et al., 2022), and schools continue to struggle to accommodate these challenges. Previous research has shown that engagement in natural environments can help increase positive mood states (Barrable et al., 2021), emphasizing the importance of outside play opportunities such as recess. Specific to recess, access to loose parts has been shown to increase enjoyment in 5- to 12-year-old children in Australia (Hyndman, 2016). More recently, Méndez-Giménez and Durán (2023) reported decreases in fear, anger, and sadness for children who were part of an intervention that introduced equipment and games during recess periods in which COVID-19 isolation restrictions were in place in Spain. Further, Méndez-Giménez and García-Rodríguez (2024) reported that higher self-determined motivation predicted lower levels of negative mood states (fear, anger, sadness), whereas novelty predicted happiness for boys and relatedness predicted happiness for girls. These findings are supported by research showing that for older elementary school children (i.e., grades 3 through 5), boys find more enjoyment from playing structured games (e.g., sports) that may support novelty, while girls find more enjoyment from socializing that supports relatedness need satisfaction (Brez & Sheets, 2017). Other researchers have suggested that affective experiences at recess can have lasting effects, with results from Massey, Szarabajko, et al. (2021) highlighting that remembered recess enjoyment from childhood was associated with current physical activity enjoyment among adults.

Researchers have also documented factors that likely lead to negative affective experiences during recess. For example, a systematic review of qualitative research revealed that gender stereotypes, social hierarchies, and bullying were commonly discussed by children when asked about recess (Massey et al., 2020), a finding that is also supported by observational (e.g., Massey et al., 2017) and survey-based research (e.g., McNamara et al., 2018). Some of these findings may in part be explained by demographics trends. For example, while researchers have consistently reported that boys record more physical activity on the play yard than girls (Ridgers et al., 2011; Wong et al., 2024), research findings also have shown that boys, particularly older boys, tend to monopolize space and equipment during recess (Pawlowski, Ergler, et al., 2014a; Pawlowski, Tjørnhøj-Thomsen, et al., 2014b), which may impact the affective states of other children during this time. Further, while children in affluent, suburban schools and schools with a higher percentage of White children get more access to recess opportunities in the USA (Barros et al., 2009; Monnat et al., 2017); others have shown similar trends as it relates to recess quality and adult training and supervision (Van Dyke et al., 2018).

In terms of adult supervision at recess, researchers have suggested that the role of adults is central to quality recess. In one study, Massey et al. (2017) reported that trained adults on the playground led to more positive interactions between adults and elementary school students, as well as less peer-to-peer conflict. In a more recent study, Massey, Perez, et al. (2021) observed 112 recess sessions across 25 elementary schools in the USA. Results suggested that through their influence on norms, rules, and access, inequity at recess was a function of adult influence. Others have reported similar trends. For example, in a systematic review of recess research, Jerebine et al. (2022) found that adults can restrict creativity and innovation on the playground and are often inattentive to social conflict and developmental needs. Thus, while there are debates in the literature as to what the role of adults should be during recess, adult influence, or lack thereof, has a meaningful influence on recess quality. In the current study, we sought to understand the impact that a trained adult on the playground has on different trajectories of affective experiences at recess throughout one school year across various groups of students. We chose this focus due to (1) emerging literature that highlights the importance of affective experiences at recess (Massey, Szarabajko, et al., 2021; Trajkovski et al., 2024); (2) extant research that has established evidence of the impact of affective experiences on both physical (Ekkekakis & Brand, 2019) and mental health (Uhl et al., 2019); and (3) a gap in research that has

examined affective experiences in the context of adult support as opposed to the focus of equipment and games at recess.

In order to accomplish these aims, we partnered with Playworks, an organization in the USA that provides services to schools to increase their recess quality through both direct service (i.e., designated recess coaches in the schools) and professional development opportunities. Previous research has supported the effectiveness of Playworks for increasing physical activity (Beyler et al., 2014), decreasing bullying (Fortson et al., 2013; Massey et al., 2017), providing opportunities for leadership (Massey, Stellino, Wilkison, et al., 2018), and increasing attention in the classroom (Fortson et al., 2013; Massey et al., 2017). The partnership for this study was to broadly conduct a program evaluation of a modified Playworks model in which elementary schools received support from a recess coach 10 days per month across the school year. It was hypothesized that a positive growth trajectory for positive affect during recess across the school year, and a negative growth trajectory for negative affect would be evident. Differences in the rate of change of positive and negative affect were also investigated as a function of student sub-groups, including those of different genders, racial identities, grades, and beginning of the year experiences. Based on previous literature on disparities at recess, we hypothesized that more positive trajectories in reported affect would be evidenced for students who identified as girls or non-gender binary, students who identified as a race other than White/Caucasian, younger students, and students with lower beginning of the year scores.

Methods

Participants

Participants in the current study included 1,022 students across nine schools within a large metropolitan area in the Mountain West region of the U.S.A. The Playworks partnership with the school district allowed for any school to gain access to a part-time Playworks coach to assist with recess. The nine schools that were recruited as data collection sites were chosen due to their overall representativeness of the district as a whole. The majority of participants were in 4th grade ($n = 516$) and 5th grade ($n = 457$), with a small cohort from the 3rd grade ($n = 40$) due to the organizational structure of one of the schools. In total, 48% of the sample identified as boys, 41% of the sample identified as girls, and 10% of the sample identified as gender non-conforming. Self-report data from study participants showed 21% of students identified as Hispanic, 22% of students identified as Black, 19% of students identified as White, and 37% of students identified as other races or multi-racial. The questionnaire was administered only for the English and Spanish speakers.

District level data showed that the racial make-up of the nine schools with students in the current study included 56.1% Hispanic students, 17.1% Black students, 14.3% White students, 5.9% of students as having two or more races, and 4.8% of students as Asian. On average, as an indicator of socioeconomic status, 71.27% of students qualified for free and reduced-priced meals (range = 38.2%-89.7%); academic proficiency ranged from 6.5% to 78.9% in math and ranged from 12.7% to 86.4% in English and language arts. Demographic information for participants and schools can be found in Table 1.

Instrumentation

Demographic information

At each of the timepoints, students were asked to self-report about their school, classroom teacher, grade, gender identity, and racial identity.

Affective experiences at recess

To assess positive and negative affect at recess, a shortened version of the Positive and Negative Affect Schedule (PANAS) that was specifically modified to capture affective states common to recess was

Table 1. Demographics.

Variable	Number	Percentage
Grade		
Third	40	4%
Fourth	516	51%
Fifth	457	45%
Gender		
Boy	474	48%
Girl	407	41%
Non-conforming	97	10%
Race		
Hispanic	199	21%
Black	205	22%
White	176	19%
Other	346	37%

used (McNamara et al., 2018). Previous research has shown the positive and negative sub-scales to be independent constructs (Crawford & Henry, 2004; McDonough & Crocker, 2007) and thus positive affect and negative affect were analyzed separately. Positive affect items included perceptions of feeling happy, safe, accepted, and confident at recess. Model based reliability coefficients at all four timepoints ranged from omega (ω) = .728–.778. Negative affect items included perceptions of feeling nervous, bored, embarrassed, and lonely at recess. Model based reliability coefficients at all four timepoints ranged from ω = .638–.691.

Changes in recess

Data on observable changes to the recess environment were measured to assess whether an actual change in the recess environment occurred as a function of the presence of a recess coach. This was done using the Great Recess Framework – Observational Tool (GRF-OT). The GRF-OT contains 17 items that each describe in short detail critical aspects of a quality recess environment. Items include questions about the safety of the recess environment, number of adult supervisors, access to equipment, availability of play/games during recess, student initiation of play, levels of activity, physical conflicts, communication, conflict resolution, adult support for play, and transitions. Data collection was completed by a trained data assessor who (1) conducted an audit of the recess environment prior to recess; (2) observed live recess sessions, while completing process notes for each scored item; and (3) provided an overall score for each scored item. The range of possible scores on the GRF-OT is 17 (i.e., “1” for each item) to 68 (i.e., “4” for each item). Previous findings have supported the reliability and validity of the GRF-OT (Massey, Stellino, Mullen, et al., 2018).

Procedures

Data were collected during the 2022–2023 academic school year. Prior to data collection, all procedures were approved by the Institutional Review Boards of the authors’ institutions, the school district, and principals at individual schools. At each school, informed parental consent forms were translated into nine languages (Spanish, French, Somali, Arabic, French, Vietnamese, Swahili, Dari, and Burmese) and distributed to all 3rd- through 5th-grade students’ families. Students whose parents/guardians opted out of consent did not participate in this study. For those who did not opt out, verbal assent was obtained prior to any participation in study procedures. All students for whom parental consent and assent was obtained were eligible to participate in survey data collection. Surveys were administered at four timepoints across the academic year (late September, early December, late February, early May). Members of the research team administered the survey at each timepoint to eligible students in their classrooms using either a paper-pencil or electronic (via iPad) version of the survey. All students were assigned a unique identifier that allowed their data to be matched across the four timepoints.

Students in the participating school were allotted one scheduled daily recess for 20 minutes on the official schedule. While discouraged by the partnering organization, schools were able to withhold recess from children for both behavioral or academic reasons. However, it was beyond the scope of the current study to track recess withholdings of individual students. In an effort to monitor any changes in the recess environment over the course of the year, recess observations were conducted by the research team at each of the four data collection timepoints. Prior to data collection, all data assessors read the complete GRF-OT training manual and completed both didactic training that covered GRF-OT protocols and procedures, inclusive of video and picture examples and explicit scoring instructions, and live training during a recess session with one of the PIs. Each of the nine schools involved in this study were compensated with a \$250 Amazon gift card for study participation.

Data analysis

Prior to analysis, all data were screened for patterns of missingness. Data were then organized and matched by participant across timepoints. All analyses were then conducted in MPlus version 8.9 using full information maximum likelihood to handle missing data.

Primary analyses used a latent growth curve model that was computed using a maximum likelihood estimator with robust standard errors. Latent growth curve modeling allows for an examination of the trajectories of change over time, while being able to compare both intra- and inter-person change. In the baseline analyses, a latent growth curve was modeled for the total sample to examine change trajectories in positive and negative affect at recess across the school year. Then sub-group analyses were conducted and modeled the trajectory of change for (1) high vs low responders at beginning of the year (i.e., those who scored below or above the midpoint of the scale); (2) gender (boy, girl, non-gender conforming); (3) grade (3rd, 4th, and 5th); and race (Hispanic, Black, White, all others). In the model for grade, 3rd-grade students were excluded due to their low sample size and problems with model convergence. Within the model for race, there was no variance in the slope for the Hispanic sub-group. As such, we set the variance of the slope to 0 within MPLUS to allow for model convergence and interpretation of the data.

Decisions about model fit were guided by a multi-method approach using the chi square (χ^2) statistic, the root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker-Lewis index (TLI), and the standard root mean square residual (SRMR; Marsh et al., 2004). Cut-off values $> .90$ for the CFI and TLI have been considered indicative of adequate model fit, while values $\geq .95$ are preferred for an acceptable model fit, and cutoff values $< .08$ have been considered indicative of adequate model fit for the SRMR and RMSEA, while values of $\leq .06$ for the RMSEA are preferred for an acceptable model fit (Hu & Bentler, 1999; Marsh et al., 2004). However, it is worth noting that others have argued against the use of cutoff criteria for model fit, as model fit indices may be sensitive to model type, and thus universal criteria may not be appropriate (Fan & Sivo, 2007).

Results

In total, 100 observations of recess were completed across the nine schools and four timepoints. Data suggested an overall positive change in the observed recess environment across the school year. Average GRF scores were 52.40 (SD = 5.12) at Time 1, 53.69 (SD = 4.05) at Time 2, 55.96 (SD = 5.58) at Time 3, and 53.94 (SD = 4.10) at Time 4. Change scores from Time 1 to Time 4 were small ($d = .376$) and statistically significant ($p = .036$). Removal of the four schools with the highest beginning of the year scores (i.e., those with a higher quality recess at Time 1, and thus less room for observed positive measurement changes) increased in the overall magnitude of change between Time 1 and Time 4 ($d = .974$).

Table 2. Descriptive data for positive affect across the school year.

	Time 1			Time 2			Time 3			Time 4		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Overall	994	3.727	0.957	773	3.873	0.9	796	3.866	0.92	705	3.839	0.911
Grade												
Third	40	3.372	1.042	27	3.466	0.978	32	3.625	0.927	30	3.783	0.771
Fourth	501	3.677	0.981	393	3.865	0.902	407	3.773	0.942	367	3.751	0.94
Fifth	450	3.821	0.906	351	3.91	0.884	355	3.992	0.879	307	3.947	0.876
Gender												
Boy	458	3.86	0.927	358	3.953	0.953	376	3.942	0.878	331	3.95	0.911
Girl	405	3.724	0.914	317	3.853	0.813	316	3.876	0.921	286	3.798	0.876
Non-conforming	97	3.157	1.054	76	3.508	0.952	77	3.485	1.031	62	3.52	1.03
Race												
Hispanic	197	3.721	0.971	138	3.929	0.803	154	3.969	0.872	119	3.924	0.839
Black	204	3.831	0.892	163	3.88	0.898	154	3.886	0.954	139	3.755	0.968
White	174	3.781	0.898	142	3.964	0.872	146	3.874	0.913	130	3.926	0.83
Other	336	3.665	1.011	261	3.841	0.907	270	3.824	0.919	249	3.808	0.958
Beginning of the year												
Low	183	2.138	0.513	134	3.083	0.972	137	3.154	1.027	121	3.112	0.924
High	811	4.076	0.636	623	4.074	0.778	641	4.024	0.821	565	3.992	0.831

Positive affect

Table 2 shows the sample size, means, and standard deviations for positive affect at each timepoint across all primary and sub-group analyses. Model fit indices for each latent growth curve analysis are presented in Table 3. Results showed a statistically significant positive slope for change in positive affect at recess for the entire sample across the school year ($\beta = 0.170$, $p = .020$).

Gender

No significant changes were observed for positive affect at recess among participants who identified as boys ($\beta = 0.166$, $p = .093$), girls ($\beta = 0.111$, $p = .306$), and non-gender conforming ($\beta = 1.112$, $p = .730$).

Grade

A statistically significant change in positive affect at recess was observed in 5th-grade students ($\beta = 0.215$, $p = .031$) throughout the school year. The slope for change in 4th-grade students' positive affect at recess throughout the school year was not statistically significant ($\beta = 0.060$, $p = .737$).

Race

No significant changes were observed in positive affect at recess for students who identified as White ($\beta = 0.147$, $p = .362$), students who identified as Hispanic ($\beta = 0.000$, $p = .999$), students who identified as a race/ethnic group in the other category ($\beta = 0.313$, $p = .104$), or students who identified as Black ($\beta = -0.127$, $p = .347$).

Table 3. Model fit indices for positive affect.

	χ^2	p	CFI	TLI	RMSEA	SRMR
Overall	619.875	<.001	.982	.979	.046	.020
Grade	715.955	<.001	.985	.977	.051	.031
Gender	660.678	<.001	.974	.968	.059	.065
Race	625.081	<.001	.982	.982	.044	.085
Beginning of year Value	465.362	<.001	.872	.872	.098	.117

Beginning of the year response

Students who reported low positive affect at Time 1 showed a positive and statistically significant slope for the change in positive affect across the school year ($\beta = 0.340, p < .001$). For those with high Time 1 scores, a negative and statistically significant slope was observed ($\beta = -0.033, p = .003$).

Negative affect

Table 4 shows the sample size, means, and standard deviations for negative affect at recess at each timepoint across all primary and sub-group analyses. Model fit indices for each latent growth curve analysis are presented in Table 5. Results showed a statistically significant slope for change in negative affect at recess for the entire sample across the school year ($\beta = -0.040, p < .001$).

Gender

For participants who identified as girls, there was a statistically significant change across the school year that indicated decreasing levels of negative affect at recess ($\beta = -0.497, p = .040$). No significant changes in negative affect at recess were observed for participants who identified as boys ($\beta = -0.118, p = .280$) or non-gender conforming ($\beta = -0.578, p = .210$).

Grade

No significant changes were observed in negative affect at recess among 4th- ($\beta = -0.453, p = .185$) or 5th-grade students ($\beta = -0.136, p = .157$).

Race

There was a statistically significant change observed that indicated lower levels of negative affect at recess for students who identified as Black ($\beta = -0.080, p = .003$). No significant changes were observed

Table 4. Descriptive data for negative affect across the school year.

	Time 1			Time 2			Time 3			Time 4		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Overall	988	2.351	0.967	767	2.255	0.882	794	2.208	0.888	705	2.226	0.911
Grade												
Third	39	2.626	1.092	27	2.503	0.957	31	2.484	0.952	30	2.058	0.85
Fourth	500	2.351	0.974	390	2.242	0.873	406	2.248	0.866	367	2.244	0.898
Fifth	446	2.324	0.945	348	2.247	0.88	355	2.137	0.903	307	2.225	0.929
Gender												
Boy	455	2.142	0.896	356	2.088	0.861	376	2.054	0.831	331	2.111	0.906
Girl	403	2.482	0.943	313	2.369	0.831	314	2.307	0.887	286	2.294	0.868
Non-conforming	97	2.771	1.113	76	2.577	0.929	77	2.557	1.021	62	2.484	1.073
Race												
Hispanic	197	2.289	0.961	137	2.15	0.794	154	2.114	0.844	119	2.205	0.85
Black	203	2.385	0.976	163	2.346	0.947	154	2.181	0.934	139	2.191	0.95
White	172	2.251	0.88	141	2.161	0.789	146	2.178	0.822	130	2.194	0.825
Other	336	2.403	1.011	260	2.293	0.91	270	2.283	0.914	249	2.291	0.958
Beginning of year												
Low	544	1.628	0.43	412	1.941	0.738	433	1.932	0.76	378	1.935	0.754
High	444	3.237	0.658	337	2.632	0.879	340	2.569	0.918	304	2.582	0.947

Table 5. Model fit indices for negative affect.

	χ^2	<i>P</i>	CFI	TLI	RMSEA	SRMR
Overall	521.054	<.001	1.000	1.000	.000	.014
Grade	614.164	<.001	1.000	1.000	.000	.037
Gender	521.915	<.001	1.000	1.000	.000	.032
Race	814.220	<.001	.999	.999	.010	.045
Beginning of year Value	364.670	<.001	.655	.655	.143	.100

in negative affect at recess in children who identified as White ($\beta = -0.013, p = .611$) and children who identified as other race/ethnicity groups ($\beta = -0.030, p = .115$).

Beginning of the year response

Students who reported high negative affect at recess at Time 1) had a statistically significant slope for the change across the school year that indicated lower levels of negative affect ($\beta = -1.253, p < .001$). A statistically significant slope was also observed for those who reported low levels of negative affect at recess at Time 1; however, this indicated increasing levels of negative affect at recess across the school year ($\beta = 0.539, p < .001$).

Discussion

The primary objective of this study was to investigate the changes in elementary school students' affective states during recess over four timepoints throughout a school year. The focus was more specifically to understand affective experiences at recess within distinct subgroups, and consideration of variations according to gender, grade levels, racial backgrounds, and beginning of the year scores. Hypotheses were partially supported, with the largest areas of change observed in students who reported low levels of positive affective experiences at recess and high levels of negative affective experiences at recess at the beginning of the year.

For a majority of students in the current study, recess was a generally favorable time and context to be in during the school day, as more than 80% scored higher than the scale mid-point when assessed on positive affective states (i.e., feeling happy, safe, accepted, confident) during recess. However, these findings also raise concern in that at the beginning of the year/time 1, roughly 20% of current study participants reported rarely feeling positive states during recess.

Previous research has shown that children's goals for recess include the ability to play and take on challenges, having fun, and socializing with others (Caro et al., 2016; Knowles et al., 2013). These goals align with tenets of Basic Psychological Needs Theory (Vansteenkiste et al., 2023), which contend that the need to experience a sense of choice and freedom in their activities (i.e., autonomy), the ability to strive for mastery in tasks (i.e., competence), and a sense of connection with others (i.e., relatedness) are essential for well-being and self-determined motivated behavior. When basic psychological needs of autonomy, competence, and relatedness needs are satisfied, individual well-being is enhanced and affective experiences in an environment skew positively (Fattore et al., 2016). Yet, previous research findings have indicated that recess does not always or inherently satisfy these basic psychological needs for all students, but rather can serve as an environment in which social development can meaningfully be impacted (Massey et al., 2020). For example, when bullying, victimization, or social isolation occur, particularly because of particular aspects of one's personal or social identity (e.g., McNamara et al., 2017; Pawlowski, Ergler, et al., 2014) or level of physical competence (e.g., Rodriguez-Navarro et al., 2014), the experience of recess is likely to be perceived or reported less positively. Further, while not directly assessed in the current study, recess withholding patterns can also infringe upon students' basic psychological need satisfaction and thus their affective experiences at recess. While less studied from the perspective of students, researchers have reported that recess withholding typically leads to more negatively valenced emotional experiences (Fink & Ramstetter, 2018). Thus, future research should continue to investigate how recess withholding changes both child experiences and outcomes.

While approximately 20% of participants in the current study reported low levels of positive affect at recess at the beginning of the school year, approximately 45% of participants reported scores higher than the scale mid-point for negative affective experiences during recess (i.e., nervous, bored, embarrassed, lonely). Scanlan et al. (2005) contended that positive and negative emotions in sport environments have a multitude of interpersonal, intrapersonal, and contextual sources and are orthogonal in nature. Their synthesis of research on emotions in sport revealed that experiences of positive (i.e., enjoyment) and negative (i.e., stress) emotions can occur concurrently, and are to various extents separate from one another as opposed to at opposite ends of one continuum (e.g., high positive

emotion and high negative emotion). The findings from the current study establish further evidence of the independence of positive and negative affective states and suggest that indicators of various emotions can exist simultaneously when students engage in social environments and in the school recess context in particular.

While recess has been identified as a crucial component of the school day, with contributions to social-emotional growth, cognitive growth, and academic achievement (Barros et al., 2009; Murray & Ramstetter, 2013), it is unlikely these benefits reach students who report little enjoyment and high rates of negative feelings while on the playground (Uhl et al., 2019). Thus, targeted interventions may be needed for those students who either do not benefit from, or experience harm during, recess. In the current study, all schools were partnered with Playworks who provided an on-site staff member 2–3 days per week to assist with building a positive culture around recess. While there was a small overall benefit to student affect across the entire sample, and within some distinct sub-groups, evidence emerged of a pronounced trend of increased positive affect and decreased negative affect across the school year for those who struggled the most at the beginning of the school year. The provision and implementation of a recess coach, even part-time, to promote inclusive play, conflict resolution, and positive culture aligned with students' reports of the roles that adults should play during recess. Notably, adult support (Haerens et al., 2010; Pawlowski, Tjørnhøj-Thomsen, et al., 2014; Stanley et al., 2012) and adult engagement (Hyndman, 2016; Parrish et al., 2012; Powell et al., 2016) have been cited by children as positive aspects of recess. Specific to Playworks, previous research also has shown that, when compared to control schools, schools with Playworks had increased levels of positive interactions between adults and students and decreased levels of conflict (Massey et al., 2017). While some children may benefit from recess regardless of the social environment, for those who report worse levels of affective states (i.e., high negative and/or low positive), adult support that establishes and supports a safe and welcoming environment is likely needed. It is also important to note that adult support may be viewed differently based on the context and the structure of play opportunities within a school. For example, recess interventions focused on free play without adult interference during recess still rely heavily on adult support in facilitating the social and emotional skills in the classroom needed to be successful in the recess environment (Rhea & Bauml, 2018).

Strengths and limitations

The interpretation of the study's findings required a nuanced consideration of both its strengths and limitations. One of the notable strengths of this study lies in the diversity of participants which included students of varied genders, grades, and racial and ethnic backgrounds. It is noteworthy that many studies in the existing literature have traditionally employed a dichotomized approach to gender, categorizing participants as either boys or girls. In contrast, our study breaks away from this binary framework and includes students who identify themselves as non-conforming to a gender binary. Critical to this is the observation that students who report their gender identity outside of a gender binary had the lowest levels of positive affect and highest levels of negative affect at the beginning of the school year. It is also worth noting that while the change in affect for gender non-conforming students was not statistically significant, it was larger than any other demographic subgroup, with non-significant p-values likely due to the small sub-sample size and large variability within this group. However, it is critical that future researchers endeavor to better understand the needs of gender non-conforming students, particularly given the data that already exists on gender disparities at recess (e.g., Pawlowski, Ergler, et al., 2014).

The use of a longitudinal design is another noteworthy strength of this study. Collection of data on the same variables over four timepoints enabled a dynamic observation of changes in students' affective states during recess across an entire academic year, in contrast to the more static nature of cross-sectional designs often employed in extant recess research literature. The longitudinal design not only captured the evolution of student affective experiences at recess but also facilitated more meaningful and contextual interpretations of observed changes over time.

Despite these strengths of this study, limitations must be recognized. The high mobility levels within the school district contributed to a significant attrition rate over the academic year that posed challenges to the continuity of data collection. Further, the varied and diverse multi-identities nature of the students in the current study may have contributed to differences in the understanding and answering of survey questions, thus leading to some potential inconsistency or misinterpretation of the results that would be challenging to detect. It is possible that this accounts for lower reliability coefficients for the negative affect scale, and thus caution should be taken when interpreting these results. Finally, it is worth noting that the results focused on examination of high versus low scores on affect at the beginning of the school year may be biased by a regression to the mean effect. However, given the strength of the changes revealed from the low groups that were low at the beginning, or Time 1, of the school year, we believe the changes observed exceed any actual natural regression of scores.

Conclusion

School recess continues to be a meaningful and relevant area of interest as this context pertains to children's holistic development. While a plethora of research findings suggest that recess confers social and emotional benefits for children, confirmation of these findings has remained elusive in more rigorous investigations. Findings from the current study suggest the need to move beyond aggregating all scores within recess interventions and toward the targeting of specific student sub-groups of need with both intervention strategies and analytical approaches. Data in the current study show a likely ceiling effect for recess interventions on affective states during recess in the general population; however, significant areas of growth for children who struggle at the beginning of the year were evidenced. The changes occurred in the context of overall improvements at recess, facilitated by a Playworks coach who facilitated organized and inclusive games, in addition to the regularly occurring free play activity during recess. Moreover, the results from the present study point to the need for future research to examine the experiences of children who do not identify within a gender binary at recess, as data indicated this may be a marginalized group on the playground.

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