Study 1: What makes tennis fun for junior players? 120 fun determinants organized in 11 clusters

Final Report Prepared for the United States Tennis Association

GW | USTA

STUDY RATIONALE

- The immediate and consequent benefits of positive sport experiences are well established (Bailey et al., 2013; World Health Organization, 2020)
- One of the biggest challenges, though, facing sport national governing bodies (NGBs) is maximizing play and enjoyment in ways that drive participation, and in turn, retention
- Centering play and practice activities on having fun is among the key evidence-based recommendations for keeping individuals engaged in sport (Côté & Hancock, 2016)
- What makes sport fun has been the source of inquiry by team sport NGBs and empirically investigated in soccer, ice hockey, and basketball (e.g., Visek et al., 2015, 2020a, 2020b)
- However, individual sports, like tennis, vary considerably from team-based sports. Thus, individual sport NGBs, like the United States Tennis Association (USTA), need sport-specific information on which to position their action plans and retention strategies

OBJECTIVES

The objectives of this study were threefold:

1. Identify all things that make tennis fun, that is, fun determinants
2. Structure the determinants in an organized way to elucidate key themes
3. Assess each determinant's importance to having fun

STUDY DESIGN

- This study used group concept mapping, an innovative mixed-methodology that integrates qualitative ideas and quantitative inputs from participants through their completion of brainstorming, sorting, and rating tasks, to visually illustrate their collective thinking to provide insight and understanding on a phenomenon of interest (Kane & Trochim, 2007)

PROCEDURES

- IRB approval was obtained, and parents were informed of the study taking place at their child's tennis facility and given the opportunity to opt their child out
- Players who provided verbal assent, completed brainstorming, sorting, or rating around scheduled practices, during camps, or between match play at tournaments
- All study activities were conducted in person with data collected through manual procedures and data entered and analyzed using groupwisdom™ – a multifunctional group concept mapping platform
- Generation of the concept maps was an iterative process that used multidimensional scaling, followed by hierarchical cluster analysis using Ward's algorithm

RESULTS

Table 1. *Participant Characteristics*

	Brainstorming n = 262		Sorting n = 101		Rating n = 304	
	n	%	n	%	n	%
Tennis Facility						
Afterschool program	39	14.88	0	0	0	0
Pay-to-play parks and rec	188	71.76	65	64.36	175	57.57
Free/subsidized parks and rec	35	13.36	9	8.91	33	10.86
National training center	0	0	27	26.73	96	31.58
Sex						
Female	132	50.38	45	44.55	132	43.42
Male	130	49.62	56	55.45	172	56.58
Age						
6	10	3.82	0	0	5	1.64
7	8	3.05	1	0.99	19	6.25
8	23	8.78	3	2.97	26	8.55
9	23	8.78	6	5.94	25	8.22
10	34	12.98	5	4.95	16	5.26
11	42	16.03	8	7.92	28	9.21
12	29	11.07	13	12.87	46	15.13
13	24	9.16	12	11.88	32	10.53
14	24	9.16	14	13.86	28	9.21
15	20	7.63	17	16.83	27	8.88
16	13	4.96	12	11.88	25	8.22
17	8	3.05	5	4.95	18	5.92
18	4	1.53	3	2.97	7	2.30
19	0	0	2	1.98	2	0.66
Tennis Ball						
Red	41	15.65	0	0	16	5.26
Orange	32	12.21	11	10.89	43	14.14
Green	46	17.56	8	7.92	46	15.13
Yellow	143	54.58	82	81.19	198	65.13
Did not respond	0	0	0	0	1	0.33
Racial Ethnic identity						
Black or African American	89	33.97	26	25.74	67	22.04
White	66	25.19	36	35.64	97	31.91
Asian/Other Pacific Islander	58	22.14	16	15.84	78	25.66
Hispanic/Latino	17	6.49	10	9.9	18	5.92
American Indian/Alaska Native	3	1.15	1	0.99	11	3.62
Biracial or multiracial	28	10.69	11	10.89	32	10.53
Decline to answer	1	0.38	1	0.99	1	0.33

Note. ª Red, orange, and green ball = modified equipment; yellow ball = regulation equipment.

- 1,207 total statements were generated in response to "*One thing that makes playing tennis fun is…*", from which 120 unique determinants of fun were identified and thematized in 11 fun clusters

Figure 1. *Point Cluster Map*
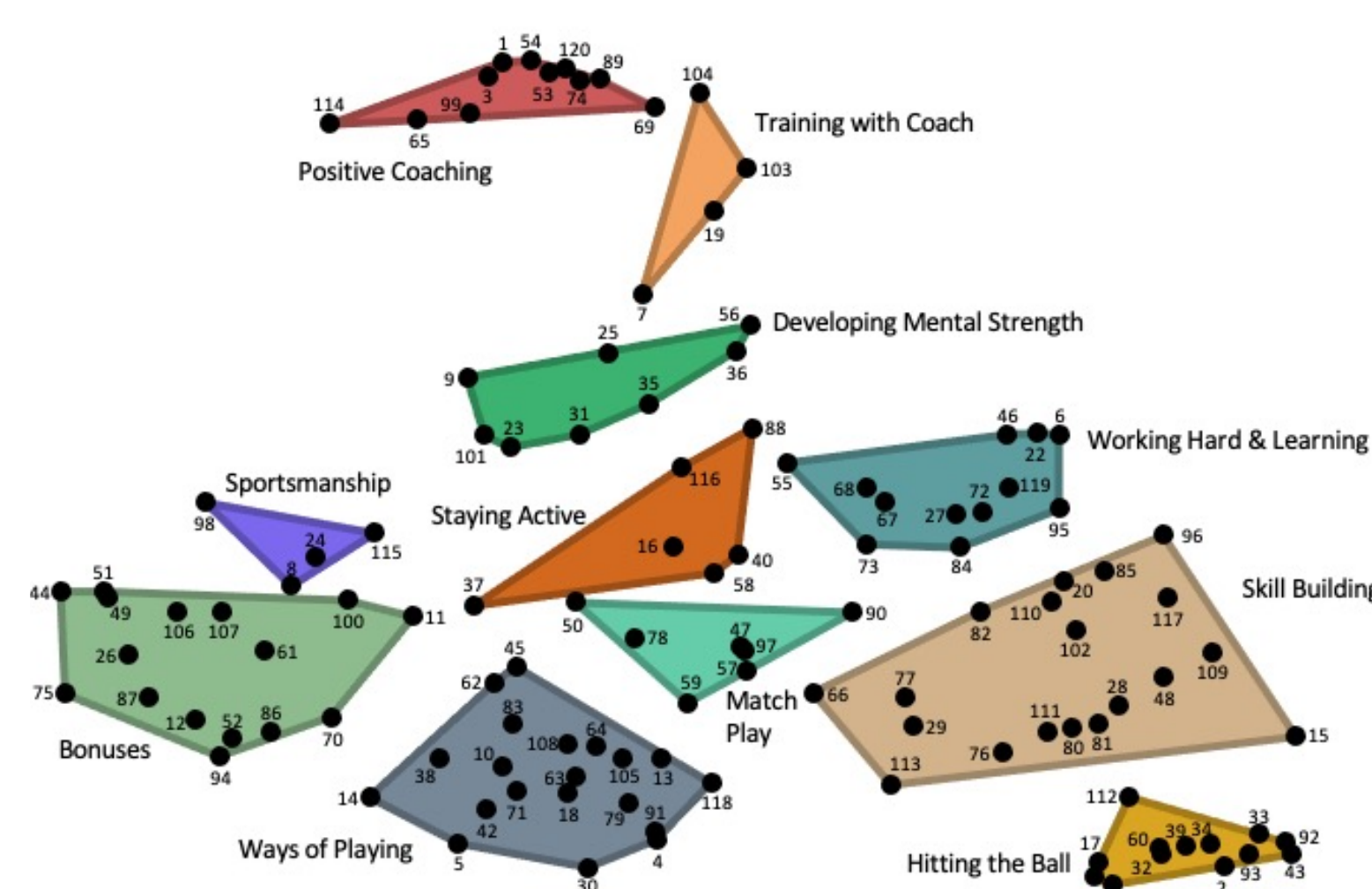
Note. The point no. identifies each of the 120 fun determinants; it does not denote value or significance. Points that appear closer to one another were sorted together more often = narrow thematic content. Points further apart were sorted less often = broader thematic content.

Figure 2. *Cluster Rating Map*
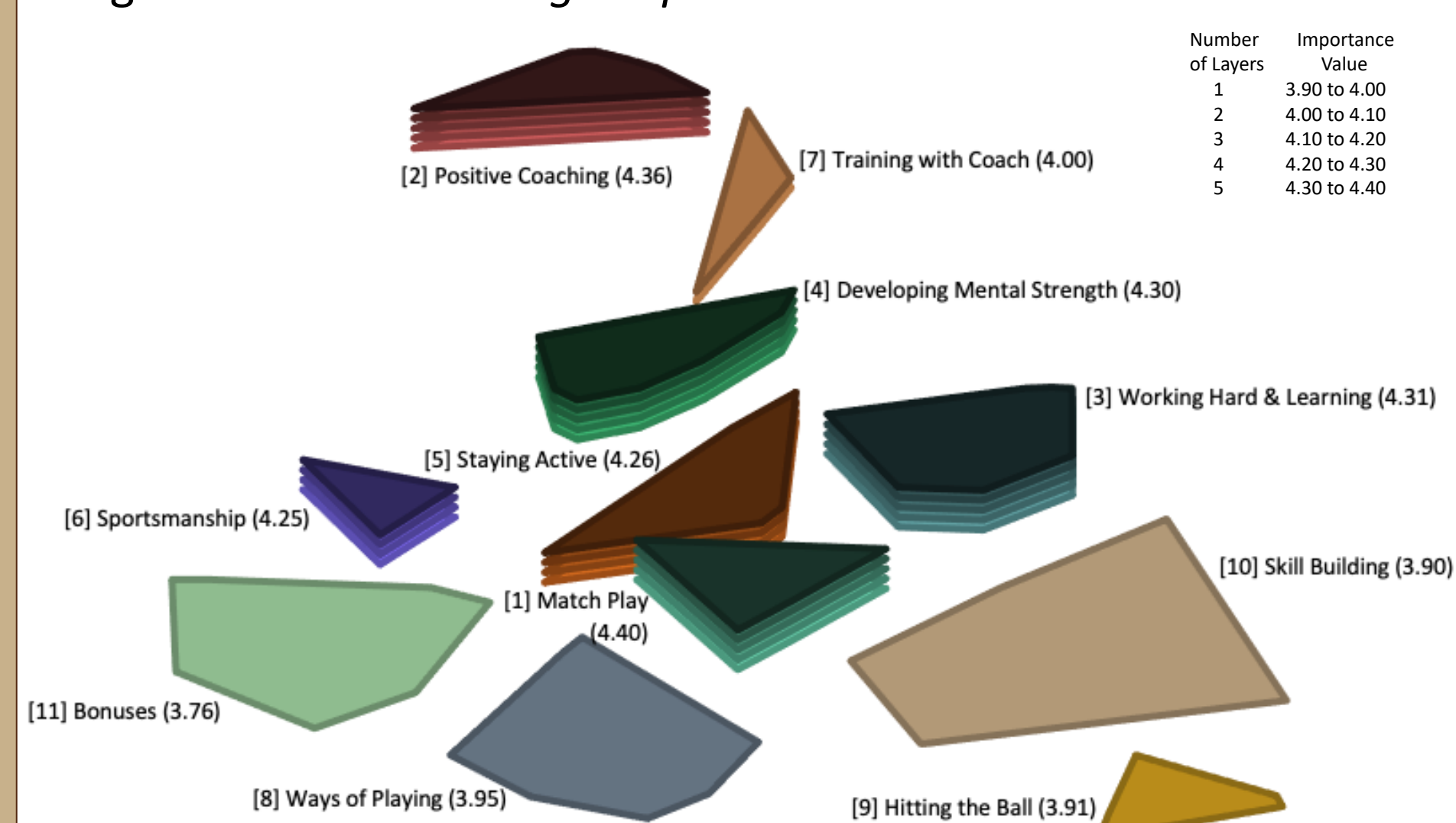
Note. The number in brackets represents the relative rank order from 1 (*most important*) to 11 (*least important*) based on participants' perceived importance on a 1-to-5 Likert-type scale from 1 (*not important*) to 5 (*extremely important*). Number in parentheses is the mean importance value.

RESULTS

Table 2. *Bridging Index and Mean Importance Rating*

Cluster	Point no.	Determinant	BI	M
Match Play			0.28	4.40
	47	Coming back from losing	0.26	4.53
	78	Winning against someone I have lost to before	0.29	4.53
	90	Improving through tournament play	0.33	4.49
	97	Playing against more skilled players and learning from them	0.24	4.47
	59	Competing	0.24	4.41
	57	Playing well even if I lose	0.22	4.40
	50	The unpredictability of the sport	0.40	3.98
Positive Coaching			0.14	4.36
	120	A coach that is easy to learn from to help master my skills	0.03	4.70
	99	A coach that cares about my progress and wants to see me succeed	0.21	4.61
	3	A coach that motivates and encourages me when I am doing poorly	0.07	4.53
	65	Having a good relationship with my coach	0.30	4.51
	69	A coach that challenges me	0.23	4.41
	54	A coach that checks in on how I am doing mentally	0	4.40
	1	A coach that is nice and respectful	0.03	4.37
	74	A coach that is patient	0.05	4.31
	89	A coach that congratulates me when I hit a nice shot	0.10	4.25
	53	A coach that is strict though positive	0.05	4.13
	114	A coach that makes jokes	0.48	3.75
Working Hard and Learning			0.45	4.31
	84	Trying my best by giving full effort	0.36	4.62
	72	Not giving up and persevering from setbacks	0.40	4.56
	27	Developing physical and mental strength	0.38	4.52
	119	Pushing my limits	0.44	4.50
	95	Using mental skills like focusing and emotion control	0.53	4.48
	22	Learning from mistakes	0.54	4.46
	73	Knowing that I am working harder than other people	0.29	4.41
	46	Taking responsibility for my mistakes	0.53	4.31
	6	Learning how to handle pressure	0.61	4.27
	67	Learning the rules of the game	0.46	4.02
	55	It helps me improve skills I use in other sports	0.44	3.89
	68	Relearning is easy if I do not play for awhile	0.39	3.70
Developing Mental Strength			0.54	4.30
	25	Being encouraged to try hard and play my best	0.58	4.57
	23	Encouraging myself	0.48	4.47
	35	Setting and achieving goals	0.43	4.36
	31	Learning life skills like leadership, discipline, patience	0.45	4.30
	101	Knowing it is okay to make mistakes or fail	0.58	4.28
	36	Making decisions in a match without a coach	0.57	4.16
	56	Coaching myself	0.58	4.11
	9	Helping me to relieve and escape from stress	0.66	4.11
Staying Active			0.45	4.26
	116	High and positive energy in practice	0.45	4.59
	58	Being active and exercising to stay	0.33	4.47
	37	Having water breaks	0.50	4.28
	16	New experiences, like training and playing in a new way	0.43	4.22
	40	Letting out my energy by moving my body	0.32	4.08
	88	Taking lessons in small classes	0.66	3.90
Sportsmanship			0.66	4.25
	8	When the match is called fairly	0.62	4.55
	24	When my opponent and I show good sportsmanship	0.62	4.40
	115	Helping my friends get better at tennis	0.61	4.10
	78	People cheering after I make a good shot	0.80	3.88
Training with Coach			0.58	4.00
	104	Listening to the coach	0.42	4.51
	103	Training with coach one on one	0.55	4.33
	19	Learning from different coaches	0.58	3.97
	7	Playing against my coach	0.94	3.20
Ways of Playing			0.38	3.95
	45	Working as a team while playing doubles	0.31	4.53
	83	Competing against new opponents	0.25	4.42
	105	Playing against players with different play styles	0.20	4.37
	38	Winning a tournament	0.43	4.24
	71	Winning a match	0.39	4.24
	91	Winning a set	0.42	4.23
	13	Playing close challenging matches	0.17	4.12
	18	Playing or rallying with friends	0.29	4.12
	64	Playing against those the same level as me	0.16	4.05
	118	Playing individually	0.26	3.97
	30	Playing doubles	0.36	3.95
	4	Playing singles	0.29	3.94
	5	Playing on a team	0.38	3.92
	63	Playing outside	0.25	3.89
	62	Going to camps	0.41	3.78
	79	Playing indoors	0.27	3.76
	108	Playing with and against opposite sex players	0.22	3.61
	10	Playing recreationally	0.27	3.43
	42	Playing against those the same age as me	0.28	3.36
	14	Playing with players the same sex as me	0.44	3.05
Hitting the Ball			0.22	3.91
	37	Hitting a clean, smooth shot	0.22	4.51
	43	Hitting forehands	0.17	4.34
	39	Hitting serves	0.29	4.19
	112	Hitting long rallies	0.24	4.17
	93	Hitting cross court shots	0.23	4.11
	33	Hitting volleys	0.23	4.06
	92	Hitting backhands	0.28	4.04
	21	Hitting winners	0.23	4.01
	60	Hitting aces	0.18	3.94
	34	Hitting a slice shot	0.18	3.74
	32	Hitting overheads	0.17	3.73
	2	Hitting drop shots	0.23	3.16
	41	Hitting tweeners	0.24	2.82
Skill Building			0.43	3.90
	110	Improving my skills through practices and matches	0.40	4.53
	85	Learning new techniques like footwork, playing styles, and shots	0.48	4.39
	15	Controlling and directing the ball	0.49	4.36
	96	Working on a technically challenging skill	0.59	4.35
	77	Playing practice matches	0.30	4.30
	102	Having challenging drills and exercises in practice	0.41	4.29
	76	Putting the ball back into play	0.31	4.24
	111	Running up and down the court to make the ball	0.32	4.20
	80	The number of different shots and skills involved in one point	0.39	4.17
	20	Developing hand-eye coordination	0.45	4.16
	109	Using targets in practice to improve my serve	0.54	4.13
	66	Playing practice games like King/Queen of the Court to develop skills	0.29	4.05
	48	Calculating angles and distances to gauge where to hit the ball	0.45	3.81
	82	Doing warmups like jumping rope and side shuffling	0.35	3.78
	81	Hitting against the wall	0.42	3.26
	28	Throwing and catching balls	0.40	3.11
	117	Running laps	0.63	3.04
	113	Picking up balls	0.50	2.97
	29	Playing with different kinds of balls	0.38	2.95
Bonuses			0.70	3.76
	107	Developing friendships and bonds with teammates	0.62	4.50
	51	Meeting other players who share a passion for tennis	0.76	4.23
	52	It is played by people of all ages	0.63	4.06
	87	Traveling to competitions with families	0.59	4.35
	49	Meeting other people of different backgrounds and ethnicities	0.78	4.02
	26	The possibilities it can afford, like scholarship, fame, pay	0.84	3.91
	86	Winning trophies and medals	0.58	3.89
	12	Traveling to new places to compete or play	0.64	3.85
	11	The outcome of a match is all mine, win or lose	0.49	3.69
	100	Seeing where I am ranked among my peers	0.54	3.65
	70	Playing with family members	0.53	3.63
	106	Having snack breaks	0.81	3.58
	94	Getting giveaways from competitions	0.70	3.56
	44	Kick-off and end-of-season parties	0.92	3.32
	61	It is a socially distanced sport	0.62	3.12
	75	Having cool tennis gear	1.00	3.09

Note. BI – bridging index value ranging from 0 to 1; values closer to 0 indicate narrower thematic content and values closer to 1 indicate broader thematic content. *M* = mean score on the 1 (*not important*) to 5 (*extremely important*) Likert-type scale.

MAIN FINDINGS

- What makes tennis fun is vast and multifactorial, spanning individual, interpersonal, structural, and community levels of the tennis ecosystem
- The 120 determinants within the 11 clusters offer turn-key solutions for putting fun, player-centered experiences at the core of tennis programming
- Notably, this study offers the first evidence that building mental strength plays a role in having fun and underscores the importance of keeping players active, energized, and moving. These findings, coupled with established physical activity guidelines for children's overall growth and development, have important implications for their health promotion through sport-based physical activities
- Other key findings, including clusters and determinants of highest importance, provide the USTA and tennis NGBs worldwide with an evidence-base to guide and support their action plans and retention strategies to provide play and practice activities that are, importantly, fun
- Altogether, the findings from this study augment previous research in team sports and advance empirical understanding of fun through new insights

FUTURE DIRECTIONS

- In tennis, children's participation lasts on average 1.9 years, and most will dropout by age 10.9. Across youth sports, dropout is largely attributed to children not having fun. Therefore, future research should examine players' prioritization of the fun clusters and determinants as an effect of their age
- Research should also examine their prioritization as an effect of skill level; age and skill level are factors in long-term athlete development models that currently guide youth sport programming, including tennis
- Additionally, the extent to which girls and boys are similar or different in their fun priorities should be examined because biological sex is a cue from which quick inferences are drawn about what is fun for girls and boys; i.e., the social aspects being the most fun for girls, competing and winning being most fun for boys
- In sum, these areas for future research would provide a more nuanced understanding of juniors' priorities that would position tennis NGBs to deliver play and practice activities that are designed to attract, engage, and retain them in childhood and through adolescence

CORRESPONDENCE

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RESEARCH SPONSOR

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USTA

THE GEORGE WASHINGTON UNIVERSITY

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Study 2: What are junior players' fun priorities?
# Similar findings across sex, age, & ball color
Final Report Prepared for the United States Tennis Association

GW | USTA

STUDY RATIONALE

- The United States Tennis Association's (USTA) American Development Model (ADM) aims to provide clear, stage-based pathways for skill development, facilitated by quality coaching and training and competition experiences that are fun and athlete centered

The USTA ADM Pathways for Skill Development
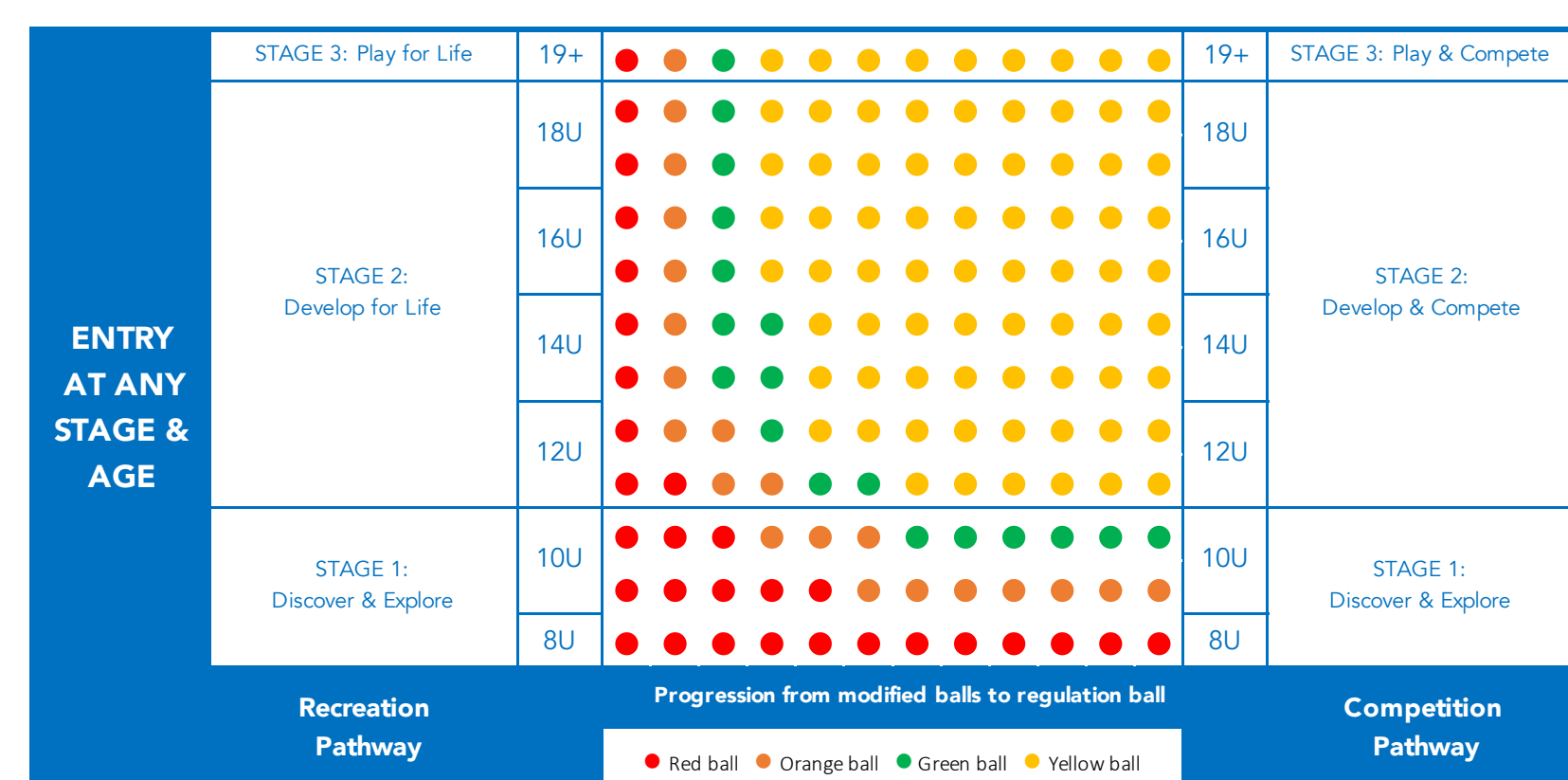
Note. Stages are loosely associated with biological age, though a player can enter tennis at any stage or age. The color ball is meant to facilitate players' skill acquisition across varying skill levels through modification of the regulation yellow ball. Players early in their skill development start with a red ball, which is larger and moves slower through the air. The orange ball is similar in size to the red ball, and travels slightly faster and rebounds higher than the red ball. Green balls are similar in size to the regulation yellow ball but have a slightly lower rebound height

- Questions facing the USTA and other tennis NGBs worldwide are: (a) to what extent does fun vary as a function of biological markers, such as age and sex, which are associated with maturation and gendered expectations for girls and boys, and (b) to what extent does fun vary based on players' skill level?

- A study conducted by Visek et al. (see USTA Study 1), in which junior tennis players identified 11 clusters of fun, defined by 120 fun determinants, provides an evidence-base from which to answer these questions

OBJECTIVES

- The objectives of this study were to explore the importance of what makes tennis fun, as function of: (a) biological sex, (b) age, and (c) skill level

STUDY DESIGN

- A cross-sectional analysis of extant data involved a participant subset (*n* = 304), drawn from a larger mixed-method study (Visek et al., see USTA Study 1) that included junior tennis players, who rated the importance of 120 determinants of fun on a Likert-type scale from 1 (*not important*) to 5 (*extremely important*)

- The participant subset included: girl players (*n* = 132, 43.42%) and boy players (*n* = 172; 56.58%), ages 6-19 (*M* = 12.17, *SD* = 3.12). Among them, 34.65% (*n* = 105) used a modified red, orange, or green ball, and 65.35% (*n* = 198) used a regulation yellow ball, and 0.33% did not respond (*n* = 1)

PROCEDURES

- The group concept mapping license, groupwisdom™, was used to generate pattern match displays, i.e., ladder graphs, and go-zone displays, i.e., bivariate plots

- R was used for descriptive statistics and to conduct tests of significant group differences

RESULTS

Pattern Match Comparisons, Figures 1a, 2a, 3a

- Pattern matches use ladder graphs to visually and statistically display group comparisons that illustrate degree of consensus, or discordance between groups

- Mean values for two groups were placed along the vertical axes of the ladder graph, and lines were drawn across the axes to illustrate the slope between the two groups based on how a fun cluster was rated

Go Zone Comparisons, Figures 1b, 2b, and 3b

- Go-zones displays compare groups across all 120 determinants using bivariate x- and y-plots

- A line was drawn at the mean rating value for a group on the x-axis and y-axis to partition the plot into four quadrants. The upper right quadrant displays determinants of greater importance for both groups; the lower left displays determinants of less importance for both. The upper left quadrant displays determinants of greatest importance for the y-axis group, and the lower right the greatest importance for the x-axis group

*Correlation Coefficient, r, and Effect Size of Differences*

- Correlation coefficient (*r*) provided a measure of the overall relationship in how two groups rated the clusters and determinants; values closer to *r* = 1.0 indicate high consensus

- The effect sizes of group differences were interpreted using Cohen's (1988) parameters: 0.1 a small effect, 0.3 a medium effect, and 0.5 a large effect

Figure 1a. Sex
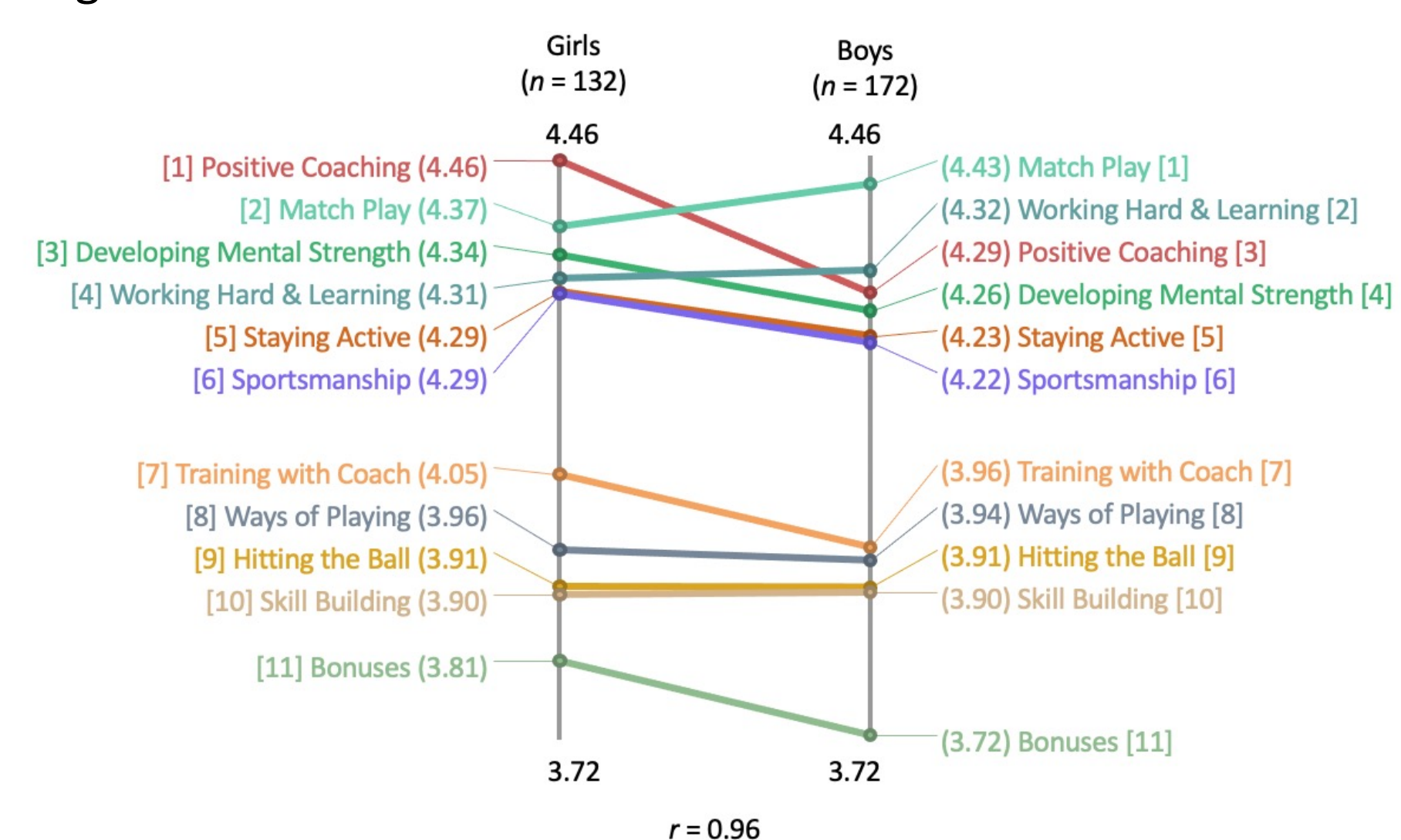
Note. Relationship between girls' and boys' reported importance of the 11 fun clusters was extremely high; no statistically significant differences were observed
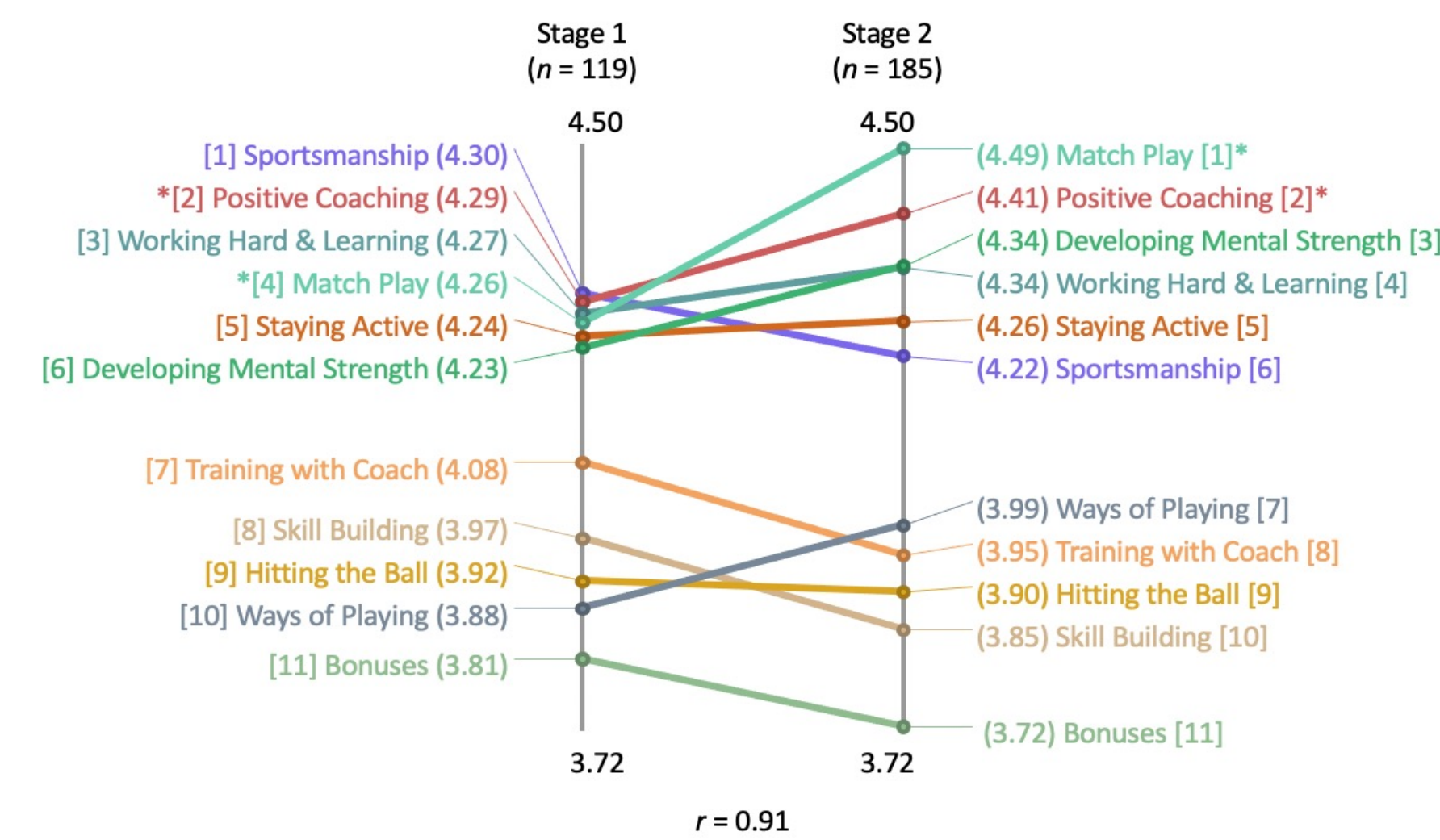
Figure 1b. Sex
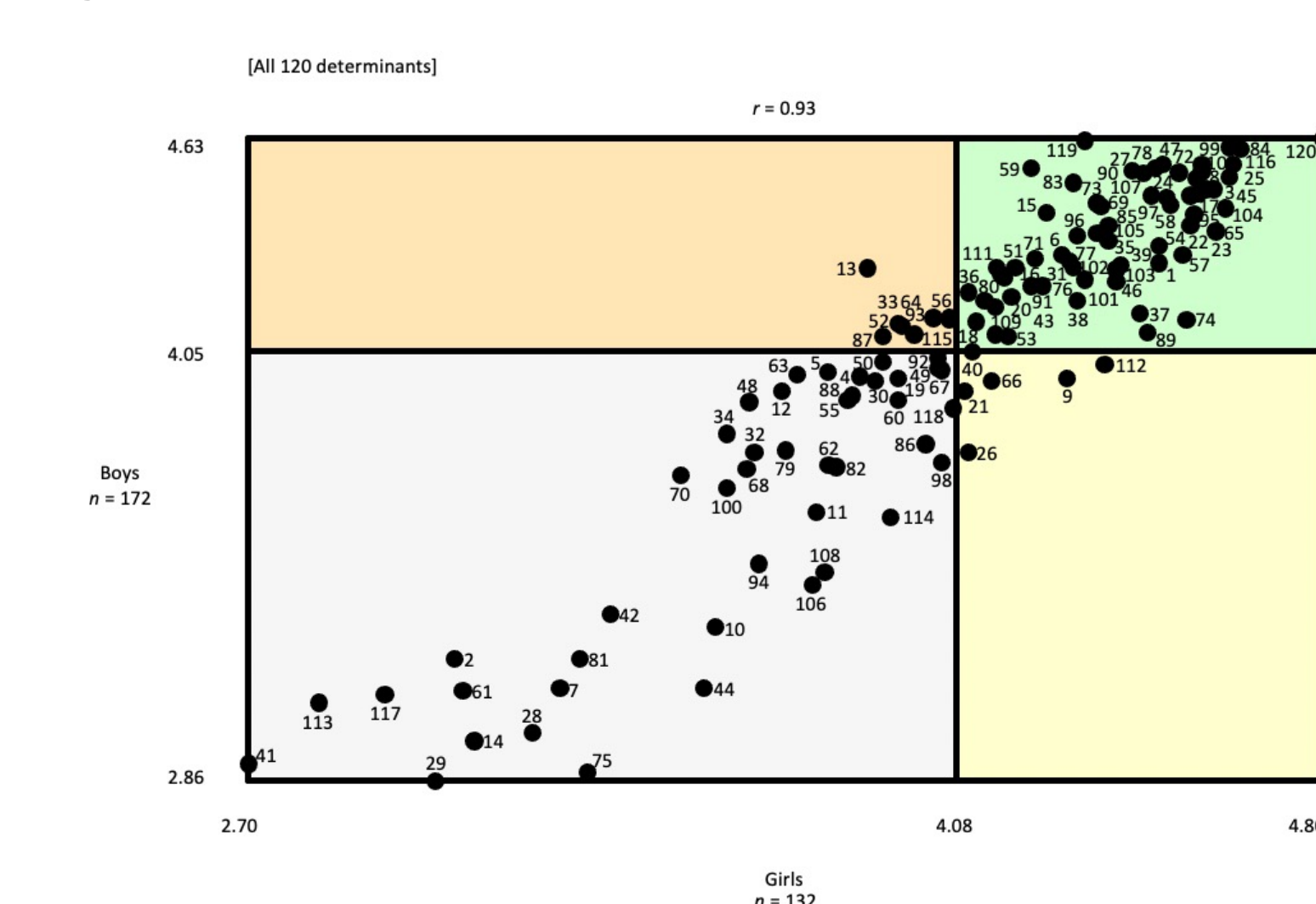
Note. Girl players and boy players were incredibly similar in reported importance of the 120 fun determinants. One significant difference was observed (see Table 1), however, the effect size of the difference observed was small
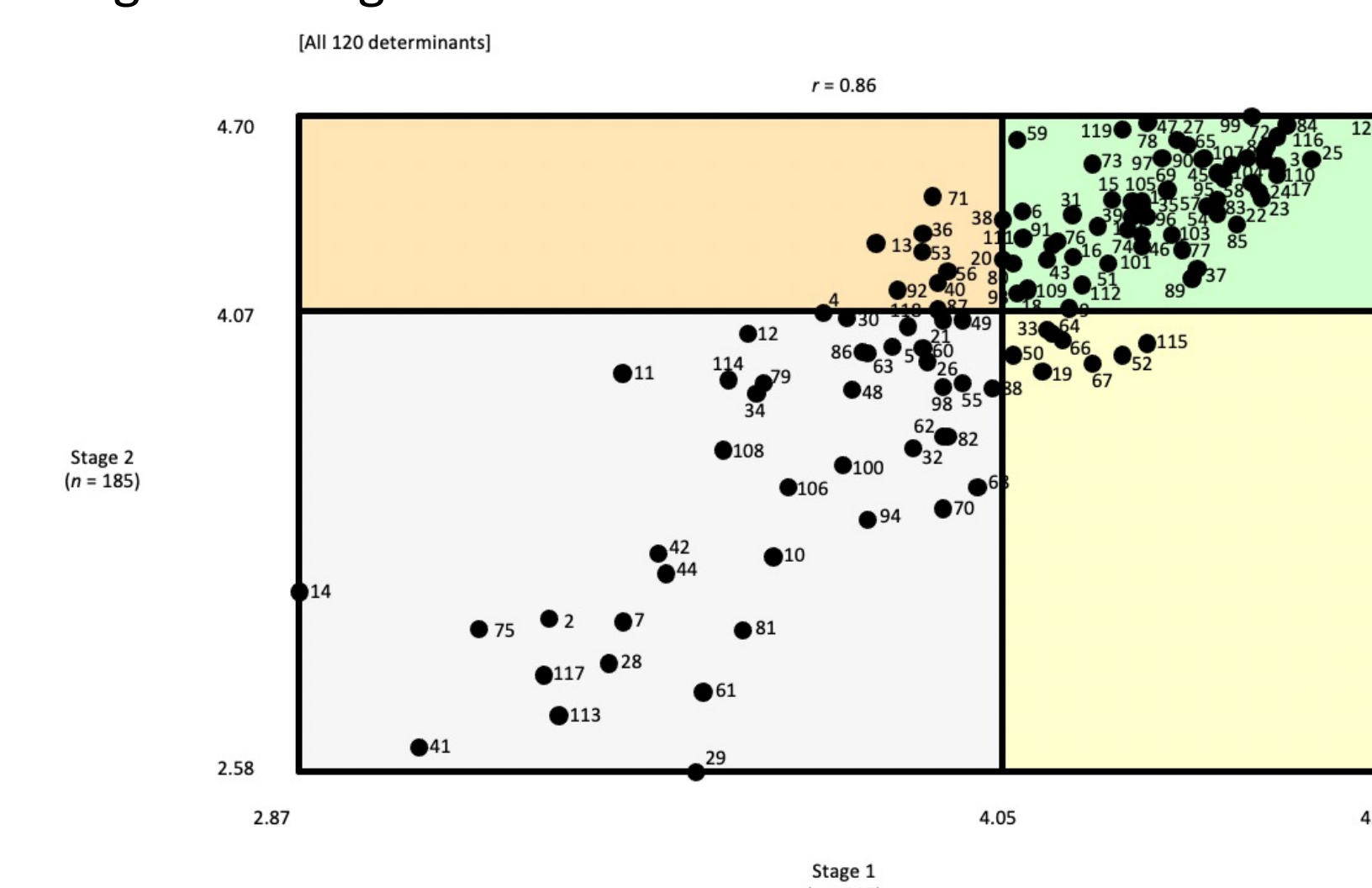
RESULTS

Figure 2a. Age

Note. Relationship among younger and older players reported importance was very high. Two significant differences, * *p* <.01., were observed: *Match Play* and *Positive Coaching*; however, the effect size differences observed were small, 0.19 and 0.18, respectively

Figure 2b. Age

Note. Across age groups, stage 1 (ages 6-11) and stage 2 (ages 12-19), reported importance of the 120 fun determinant was very similar; 19 significant differences were observed, see Table 1. The effect size of differences observed were generally small. Where moderate effects would be expected were observed, i.e., competing, using different color balls

Figure 3a. Skill Level
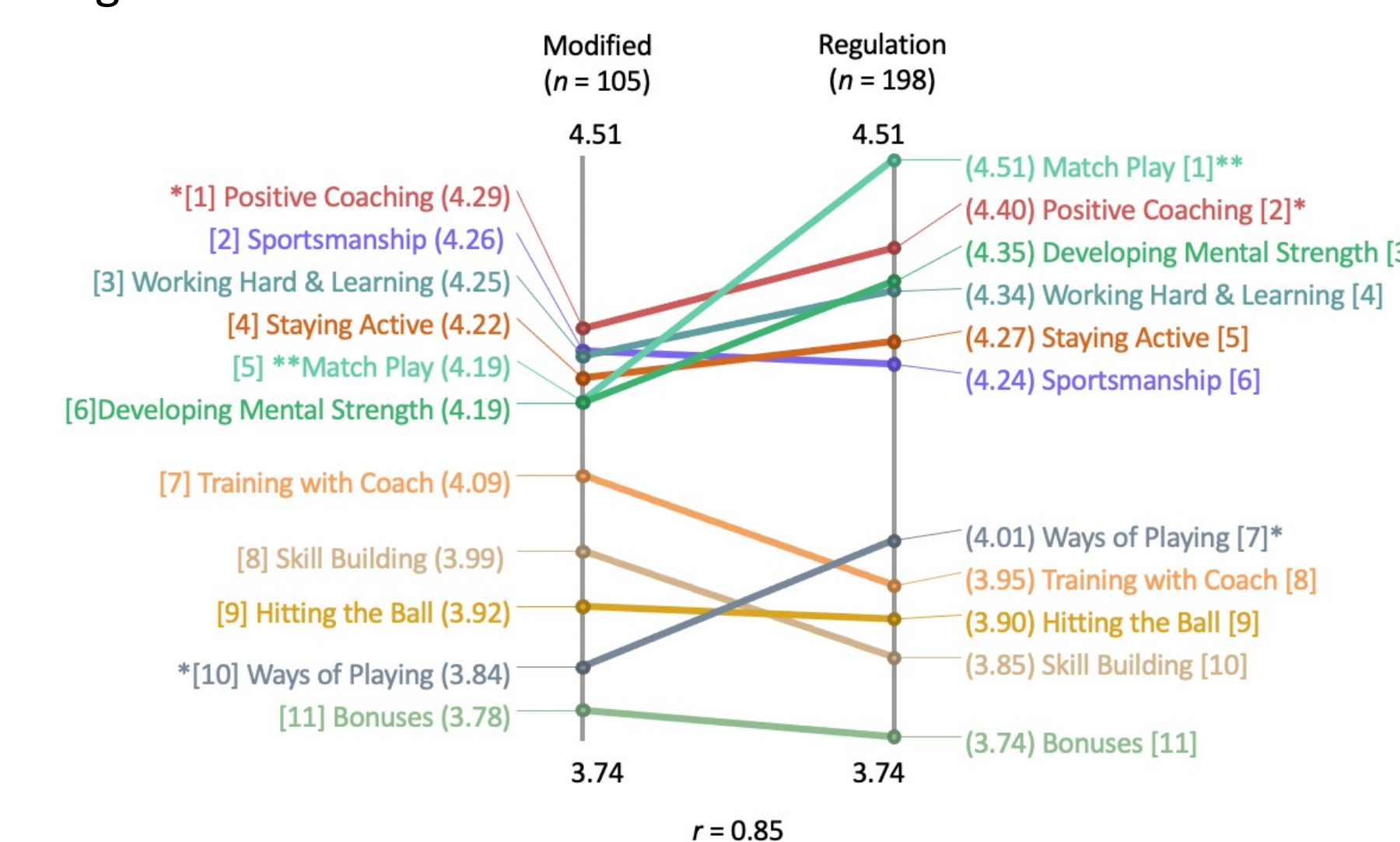
Note. Relationship among red, orange, and green ball players using modified balls, and their reported importance of the 11 clusters, was very similar to regulation yellow ball players; 2 significant differences observed, * *p* < .05, ** *p* <.001. Effect sizes were small: *Positive Coaching*, 0.15; *Ways of Playing*, 0.15; and *Match Play*, 0.25, respectively

Figure 3b. Skill Level
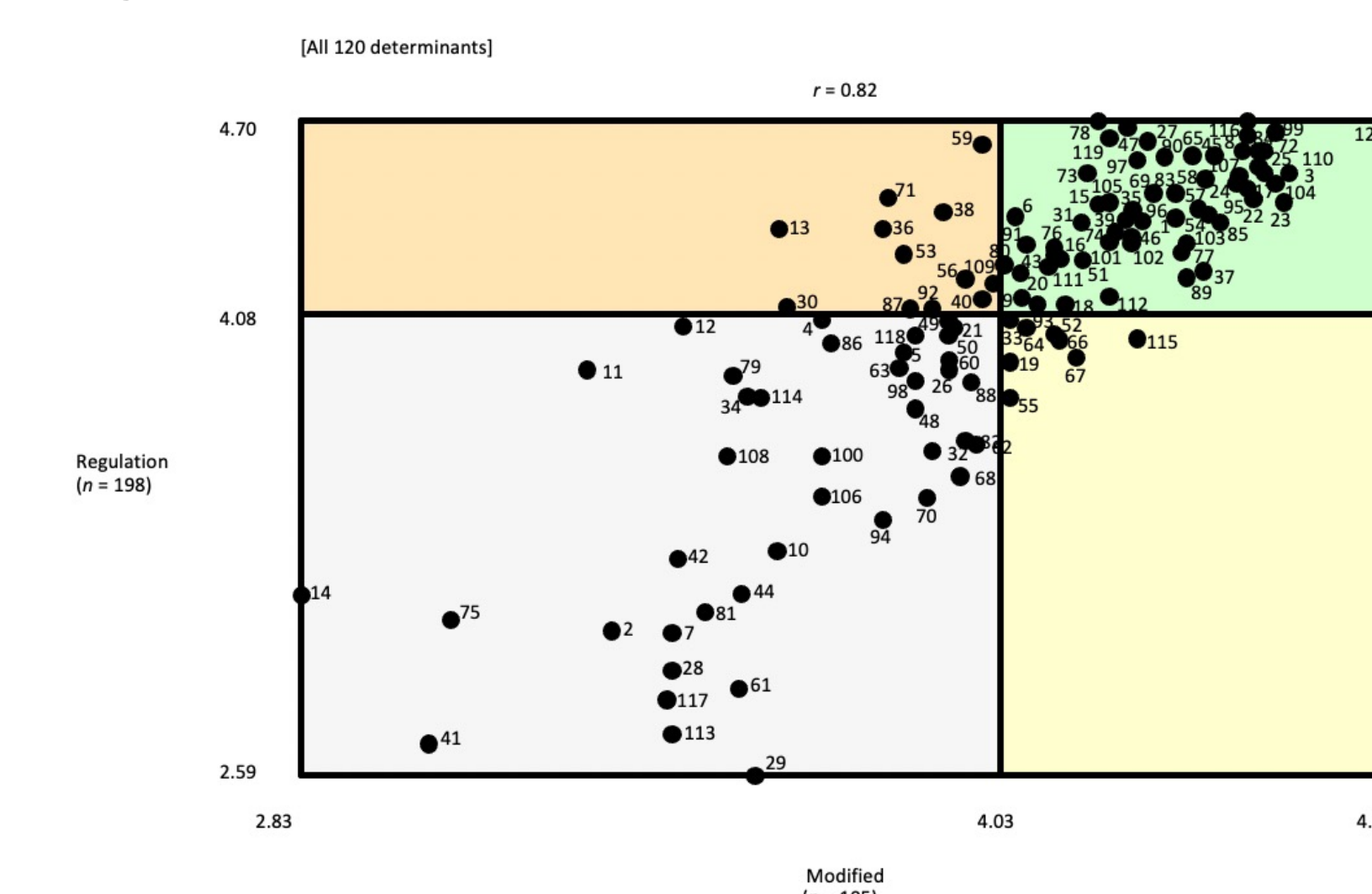
Note. Players using modified and regulation balls were very similar in reported importance of the 120 fun determinants; 29 significant difference were observed, see Table 1. Small effects sizes of difference were observed, and moderate effects observed where expected

RESULTS

Table 1. *Significant Differences by Effect Size of Difference (r)*

Determinant (Point no.)	Girls *n* = 132 M	SD	Boys *n* = 172 M	SD	*r*	Cluster
A coach that is patient (74)	4.53*	0.80	4.13	1.05	0.21	PC
	Younger *n* = 119		Older *n* = 185			
Playing with different kinds of balls (29)	3.53***	1.51	2.58	1.40	0.30	SB
Playing recreationally (10)	3.66*	1.28	3.28	1.20	0.14	WOP
Competing (59)	4.08***	1.17	4.63	0.81	0.28	MP
It is a socially distanced sport (61)	3.55***	1.36	2.84	1.42	0.24	B
Hitting against the wall (81)	3.61**	1.26	3.04	1.30	0.23	SB
Winning against someone I have lost to before (78)	4.29**	1.08	4.68	0.69	0.21	MP
Playing with family members (70)	3.95**	1.32	3.43	1.37	0.20	B
Pushing my limits (119)	4.25**	1.14	4.66	0.76	0.20	WHL
Knowing that I am working harder than other people (73)	4.20**	1.05	4.55	0.87	0.20	WHL
Relearning is easy if I do not play for awhile (68)	4.01**	1.11	3.50	1.29	0.19	WHL
Winning a match (72)	3.93*	1.34	4.44	0.90	0.19	WOP
Picking up balls (113)	3.30*	1.51	2.76	1.48	0.17	SB
Throwing and catching balls (28)	3.39*	1.32	2.93	1.29	0.17	SB
Having a good relationship with my coach (65)	4.36*	0.84	4.61	0.73	0.17	PC
The outcome of a match is all mine, win or lose (11)	3.41*	1.35	3.87	1.18	0.17	B
Playing close challenging matches (13)	3.84*	1.27	4.29	0.91	0.17	WOP
Coming back from losing (47)	4.30*	1.20	4.69	0.68	0.17	MP
Making decisions in a match without a coach (36)	3.92*	1.23	4.32	0.93	0.16	DMS
Playing against more skilled players and learning from them (97)	4.32*	0.98	4.57	0.87	0.15	MP
	Mod *n* = 105		Reg *n* = 198			
Playing with different kinds of balls (29)	3.61***	1.53	2.59	1.37	0.31	SB
Competing (59)	4.00***	1.19	4.63	0.80	0.31	MP
Playing close challenging matches (13)	3.65***	1.27	4.35	0.88	0.28	WOP
Winning against someone I have lost to before (78)	4.20***	1.13	4.70	0.67	0.26	MP
It is a socially distanced sport (61)	3.58***	1.39	2.87	1.40	0.24	B
Picking up balls (113)	3.47***	1.49	2.72	1.47	0.23	SB
Winning a match (72)	3.84***	1.37	4.45	0.89	0.23	WOP
Pushing my limits (119)	4.22***	1.14	4.65	0.79	0.21	WHL
Running laps (17)	3.46***	1.46	2.83	1.40	0.21	SB
The outcome of a match is all mine, win or lose (11)	3.32***	1.37	3.90	1.16	0.21	B
Throwing and catching balls (28)	3.47**	1.25	2.93	1.32	0.20	SB
Making decisions in a match without a coach (36)	3.83**	1.29	4.35	0.88	0.19	DMS
Playing against more skilled players and learning from them (97)	4.27**	1.00	4.58	0.84	0.19	MP
Winning a tournament (38)	3.93**	1.27	4.41	0.91	0.19	WOP
Knowing that I am working harder than other people (73)	4.18**	1.09	4.53	0.86	0.18	WHL
Traveling to new places to compete or play (12)	3.49*	1.42	4.04	1.05	0.18	B
Developing physical and mental strength (27)	4.29*	1.01	4.64	0.76	0.17	WHL
Coming back from losing (47)	4.25*	1.23	4.68	0.70	0.17	MP
Playing with family members (70)	3.90*	1.38	3.48	1.34	0.17	B
A coach that is strict though positive (53)	3.87*	1.24	4.27	1.00	0.17	PC
Playing doubles (30)	3.66*	1.26	4.10	0.98	0.16	WOP
Hitting against the wall (81)	3.52*	1.35	3.12	1.27	0.16	SB
Playing recreationally (10)	3.65*	1.34	3.31	1.17	0.15	WOP
Having a good relationship with my coach (65)	4.36*	0.83	4.59	0.75	0.15	PC
Relearning is easy if I do not play for awhile (68)	3.96*	1.13	3.56	1.28	0.15	WHL
High and positive energy in practice (116)	4.46*	0.82	4.66	0.76	0.15	SA
Playing against my coach (72)	3.47*	1.38	3.05	1.26	0.15	TWC
Going to camps (62)	3.99*	1.20	3.66	1.21	0.15	WOP
Improving through tournament play (90)	4.31*	0.98	4.59	0.73	0.15	WOP

Note. M = mean, *SD* = standard deviation, *r* = effect size of difference interpreted using the parameters: 0.1 small effect, 0.3 medium effect, and 0.5 large effect; Cluster abbreviations: MP = Match Play, PC = Positive Coaching, WHL = Working Hard & Learning, DMS = Developing Mental Strength, SA = Staying Active, SP = Sportsmanship, TWC Training with Coach, WOP = Ways of Playing; HTB = Hitting the Ball; SK = Skill Building; BO = Bonuses; Younger = ages 6-11, Older = ages 12-19. Mod = red, orange, and green modified ball players; Reg = regulation yellow players* *p* ≤ .05, ** *p* ≤ .01, *** *p* ≤ .001

MAIN FINDINGS

- Existing sex and gender stereotypes predispose expectations that girls and boys experience fun differently. Further, how sports organize players by sex, age, and ball color can contribute to perceived and thus expected differences. However, this study debunks group stereotypes that influence everyday thinking, and instead substantiates that what makes tennis fun is more universal for players than it is different

- Specifically, what makes tennis fun is largely the same across all junior players, regardless of sex, age, or ball color. Where differences were found, the magnitude of difference was generally small, further indicating greater similarity than difference among players

- Backed by previous research in team sports including soccer, ice hockey, and basketball – this study underscores the need to de-essentialize differences when making fun a focal point in tennis programming

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