

zIReN 2025

Comparing school experience across Brazilian, Swiss, and Uruguayan adolescents: A measurement invariance study

César D. Luquine Jr., Roberta C. Astolfi, Clarissa Janousch, Lukas Eggenberger, Nico Trajtenberg, Manuel Eisner, Lilly Shanahan, Denis Ribeaud, Maria Fernanda Tourinho Peres

prologue

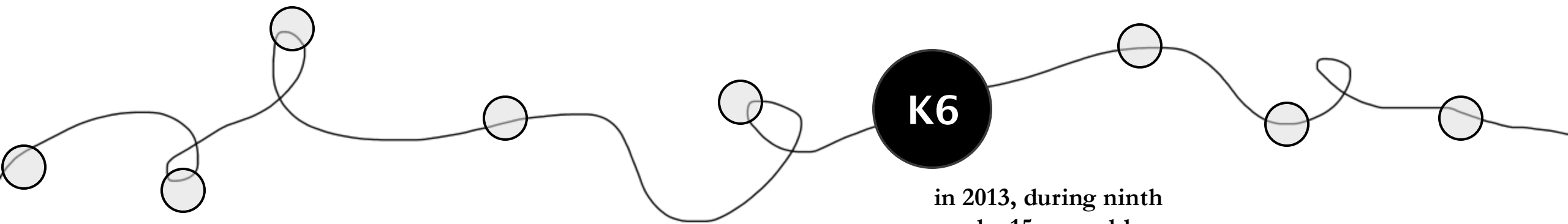


Zurich, CH

São Paulo, BR

*school
environments*

*health
behaviors*



K6

in 2013, during ninth
grade, 15-year-olds
participated in z-proso's
6th wave of data collection

K6

in 2013, during ninth
grade, 15-year-olds
participated in z-proso's
6th wave of data collection
Nico Trajtenberg
m-proso
Montevideo
Uruguay

2017
Prof. Maria
Fernanda
Tourinho Peres
sp-proso
São Paulo
Brazil

the cities

	z-proso	m-proso	sp-proso
Design	cohort	cross-sectional	cross-sectional
Year	2013	2013	2017
Schools at enrollment	56	85	119
Participants	1,447	2,204	2,680
Age mean (<i>sd</i>)	15.44 (0.36)	15.15 (0.91)	14.88 (0.68)
Female (%)	48.17	50.82	47.78

	Switzerland	Uruguay	Brazil
Sociodemographic			
<i>GDP per capita PPP (2023)</i>	\$89,546	\$34,426	\$21,107
<i>Human Capital Index (2020), productivity potential</i>	76%	60%	55%
<i>Gini index</i>	Moderate inequality (33.8%)	Moderate inequality (40.9%)	Extreme inequality (51.6%)
Academic performance (PISA 2022)			
<i>Mathematics (average 472)</i>	508	409	379
<i>Reading (average 476)</i>	483	430	410
<i>Science (average 485)</i>	503	435	403
Educational facts			
<i>Government expenditure on educational institutions per student (PPP) (2021)</i>	\$17,333	Limited data available	\$3,583
<i>Private school enrollment (2022)</i>	12%	11%	14%
<i>Students per teacher (secondary)</i>	9.8 (2017)	12.7 (2010)	16.7 (2017)
<i>Teacher starting salary in upper secondary public institutions (PPP)</i>	\$76,318	Limited data available	\$20,261

Education	Switzerland	Uruguay	Brazil
System structure	Early tracking system (age 12) with high stratification, significant cantonal variation, and limited track mobility	Centralized three-level system with modest technical pathways and persistent secondary completion challenges	Highly stratified dual system with fragmented governance and inverse public-private accessibility
Tracking/streaming	Formal early tracking (ages 10-13) with limited permeability between academic and vocational tracks	Later differentiation with some flexibility between academic-technical pathways from secondary level	Informal tracking through school quality stratification and early grade retention patterns
Educational segregation	Early tracking creates ability-based segregation; high between-school segregation through tracking system and residential patterns	Moderate territorial segregation with limited school choice and centralized assignment	Extreme public-private segregation with minimal social mixing between school types

*school
environments*

*health
behaviors*

**School experience and adolescent risk behaviors:
a cross-cultural study in Brazil, Switzerland and Uruguay**

school experience

Item label	z-proso		m-proso		sp-proso	
	School (English)	Die Schule (German)	La escuela (Spanish)	Escola (Portuguese)		
Bond to class	Sense of community in class	We have a really good sense of community within the class.	Wir haben eine richtig gute Klassengemeinschaft.	Tenemos un grupo muy bueno en mi clase.	Nós somos bem unidos na nossa turma.	
	Get along with classmates	I have a good relationship with the other adolescents in my class.	Ich komme mit den Jugendlichen in meiner Klasse gut aus.	Me llevo bien con la gente de mi clase	Eu me dou bem com os adolescentes da minha turma.	
	Classmates are nice to me	The other adolescents in my class are nice to me.	Die anderen Jugendlichen in meiner Klasse sind nett zu mir.	La gente de mi clase se porta bien conmigo	Os outros adolescentes da minha turma são legais comigo.	
Bond to teacher	Teacher treats me fairly	My teacher treats me fairly.	Meine Lehrerin/mein Lehrer behandelt mich gerecht.	Mi profesor/a es justo/a conmigo.	No geral, meus professores me tratam de forma justa.	
	Get along with teacher	I have a good relationship with my teacher.	Ich komme mit meiner Lehrerin/meinem Lehrer gut aus.	Me llevo bien con mi profesor/a.	No geral, eu me dou bem com meus professores ou minhas professoras.	
	Teacher helps when needed	My teacher helps me when necessary.	Wenn es nötig ist, hilft mir meine Lehrerin/mein Lehrer.	Cuando es necesario, mi profesor/a me ayuda	No geral, meus professores me ajudam quando eu preciso deles.	
Future orientation	Working towards interesting job	When I grow up I want to have an interesting job, and I'm doing everything now to work towards that goal.	Ich möchte später eine interessante Arbeit haben und mache jetzt schon alles dafür, was ich kann.	Me gustaría tener un trabajo interesante más adelante, y ahora trato de hacer todo lo que puedo para conseguirlo	Eu gostaria de ter um emprego interessante quando for mais velho e agora faço de tudo para conseguir isso.	
	Try hard at school for future job	I try hard at school to have a good job later in life.	Ich gebe mir in der Schule Mühe, um später einen guten Job zu haben.	En el centro de estudios me esfuerzo para poder tener un buen trabajo después	Eu me esforço na escola para conseguir um bom emprego no futuro.	
	Doing well at school is important	Doing well at school is important to me.	Gute Schulleistungen sind für mich sehr wichtig.	Para mí es muy importante que me vaya bien en los estudios	O bom desempenho escolar é importante para mim.	
School commitment	Likes going to school	I enjoy going to school.	Ich gehe gern in die Schule.	Me gusta ir al centro de estudios.	Eu gosto de ir à escola.	
	Likes doing homework	I enjoy doing my homework.	Ich mache gern Hausaufgaben.	Me gusta hacer la tarea domiciliaria.	Eu gosto de fazer lição de casa.	
	Finds school useless (r)	I think school is useless.	Ich finde die Schule nutzlos.	Creo que estudiar no sirve para nada.	Eu acho que a escola não serve para nada.	
School difficulties	Often has bad grades (r)	I make a lot of mistakes in my homework	Ich mache bei den Hausaufgaben viele Fehler.	Cometo muchos errores en la tarea/deberes que hago en casa	Eu erro muito nas lições de casa.	
	Makes mistakes in homework (r)	I often have bad grades.	Ich habe oft schlechte Noten.	A menudo tengo malas notas	Eu frequentemente tiro notas ruins.	
	Struggles to follow lessons (r)	I often struggle to follow what is going on in the lesson.	Ich habe oft Schwierigkeiten, dem Unterricht zu folgen.	A menudo tengo dificultad para seguir la clase	Eu frequentemente tenho dificuldades para acompanhar a aula.	



measurement invariance

measurement invariance

Configural Invariance

This step establishes whether the basic structure of the school experience scale is comparable across São Paulo, Montevideo, and Zurich. It suggests that respondents in the different cultural groups conceptualize the construct similarly.



Metric Invariance

This allows for valid comparisons of relationships between constructs across cultural contexts.



Scalar Invariance

Achieving scalar invariance indicates that observed differences in school experience scores reflect true differences in latent constructs rather than measurement artifacts, therefore it is possible to compare latent means across groups meaningfully.

+1

≈

+1

CFA model fit indices by city

	n (% total)	χ^2 (df)	CFI	TLI	RMSEA (95% CI)	SRMR
Full						
z-proso	1392 (96.2)	613 (80)	.966	.955	.069 (.064; .074)	.052
m-proso	1832 (83.1)	973 (80)	<u>.928</u>	.906	.078 (.074; <u>.083</u>)	.057
sp-proso	2327 (86.8)	857 (80)	.957	.944	.065 (.061; .069)	.045

School commitment

<i>I enjoy going to school.</i>	Ich gehe gern in die Schule.	Me gusta ir al centro de estudios.	Eu gosto de ir à escola.
<i>I enjoy doing my homework.</i>	Ich mache gern Hausaufgaben.	Me gusta hacer la tarea domiciliaria.	Eu gosto de fazer lição de casa.
<i>I think school is useless.</i>	Ich finde <u>die Schule</u> nutzlos.	Creo que <u>estudiar</u> no sirve para nada.	Eu acho que <u>a escola</u> não serve para nada.

CFA model fit indices by city

	n (% total)	χ^2 (df)	CFI	TLI	RMSEA (95% CI)	SRMR
Full						
z-proso	1392 (96.2)	613 (80)	.966	.955	.069 (.064; .074)	.052
m-proso	1832 (83.1)	973 (80)	<u>.928</u>	.906	.078 (.074; <u>.083</u>)	.057
sp-proso	2327 (86.8)	857 (80)	.957	.944	.065 (.061; .069)	.045
Shortened						
z-proso	1395 (96.3)	416 (50)	.973	.964	.073 (.066; .079)	.055
m-proso	1864 (84.6)	526 (50)	.952	.937	.072 (.066; .077)	.052
sp-proso	2360 (88.1)	581 (50)	.964	.953	.067 (.062;.072)	.048

Full

Model	χ^2 (df)	CFI	RMSEA	SRMR	$\Delta\chi^2$	ΔCFI	ΔRMSEA	ΔSRMR
Configural	1813 (240)	.952	.071	.051	NA	NA	NA	NA
Metric	1948 (260)	.957	.064	.052	135	.005	-.006	.001
<i>Scalar</i>	<i>2760 (310)</i>	<i>.934</i>	<i>.073</i>	<i>.051</i>	<i>812</i>	<i>-.023</i>	<i>.009</i>	<i>-.001</i>

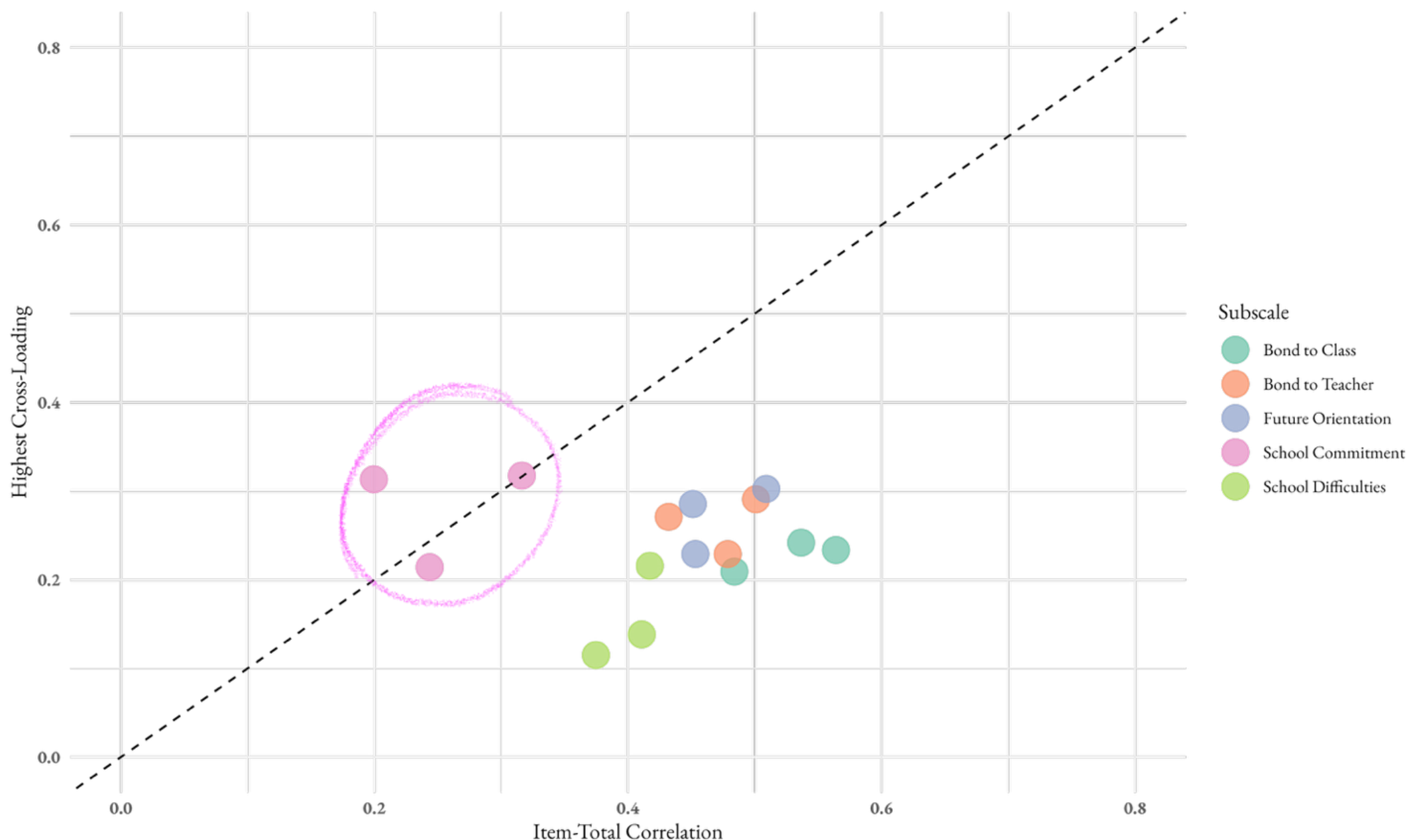
Full

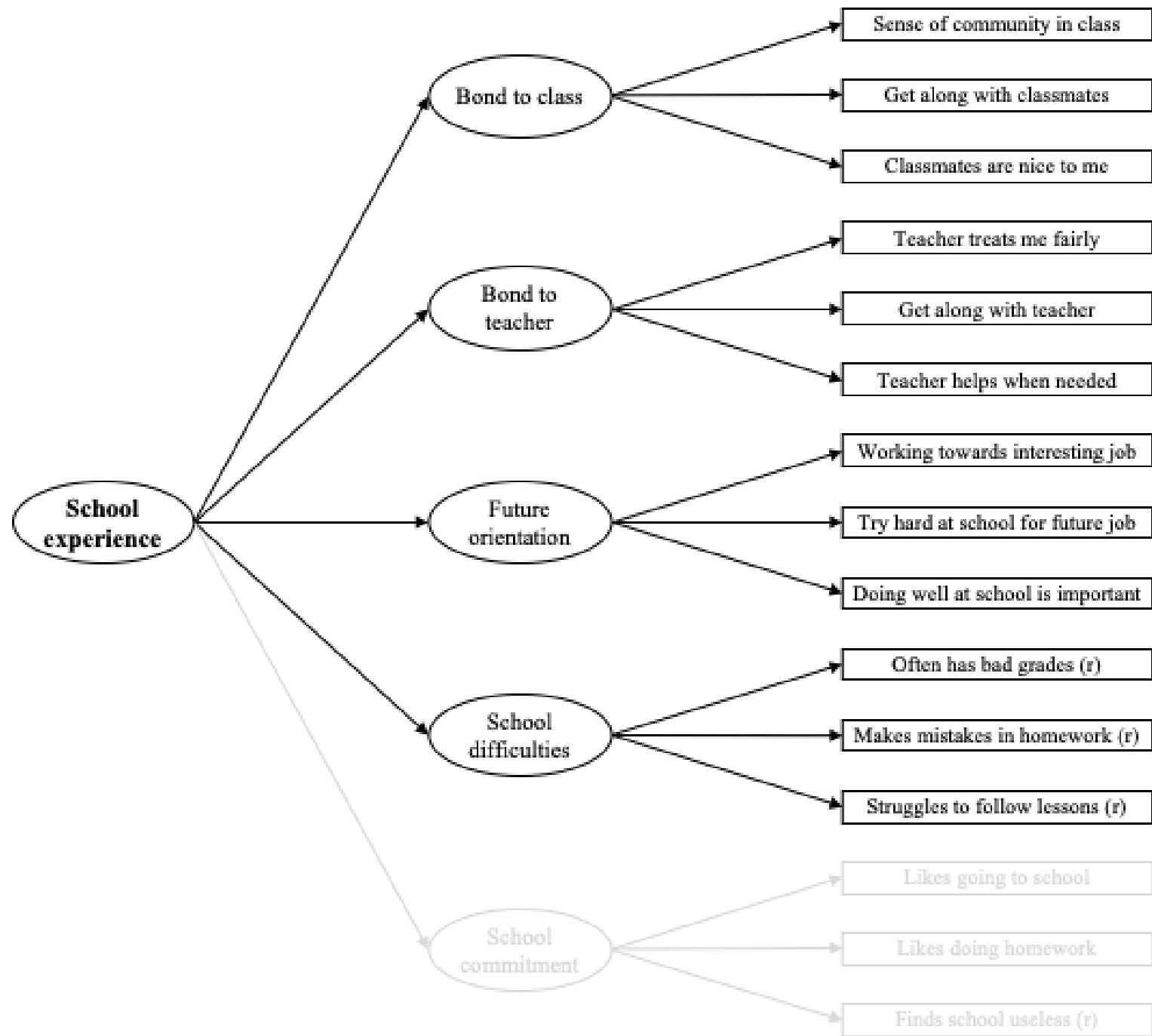
Model	χ^2 (df)	CFI	RMSEA	SRMR	$\Delta\chi^2$	Δ CFI	Δ RMSEA	Δ SRMR
Configural	1813 (240)	.952	.071	.051	NA	NA	NA	NA
Metric	1948 (260)	.957	.064	.052	135	.005	-.006	.001
Scalar	2760 (310)	.934	.073	.051	812	-.023	.009	-.001

Shortened

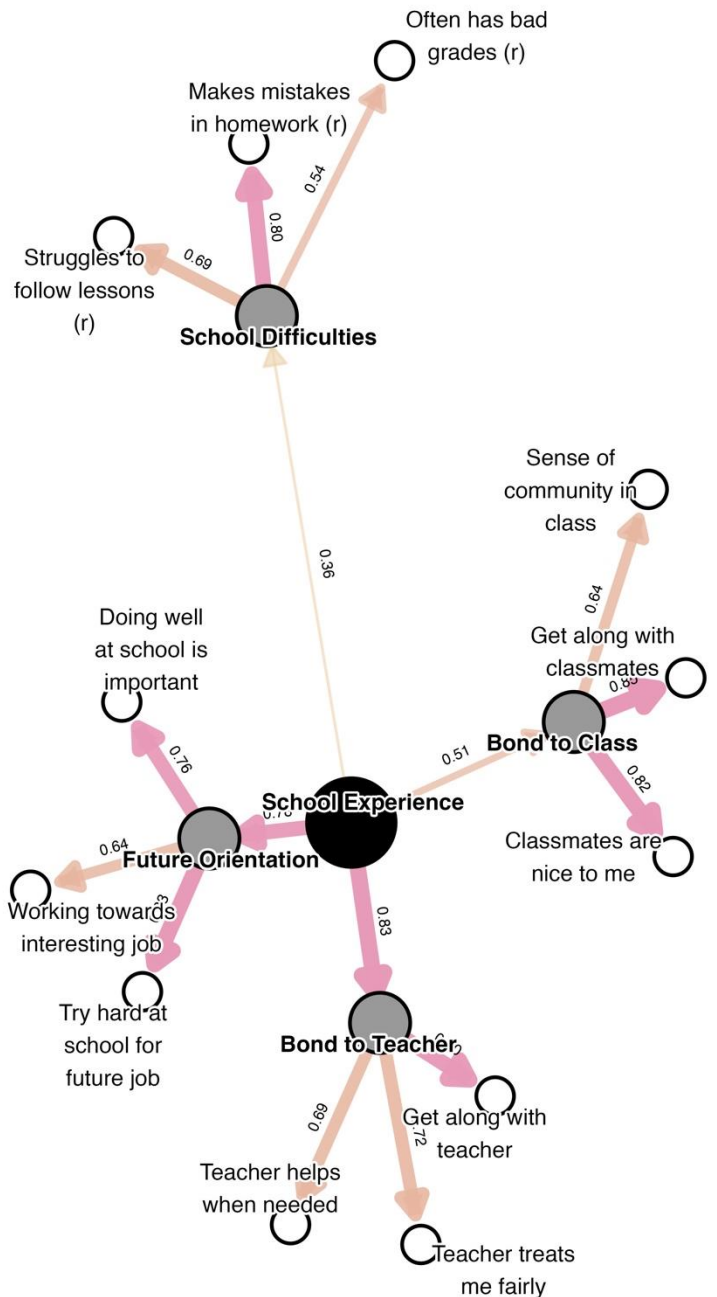
Model	χ^2 (df)	CFI	RMSEA	SRMR	$\Delta\chi^2$	Δ CFI	Δ RMSEA	Δ SRMR
Configural	1239.217 (150)	.964	.070	.051	NA	NA	NA	NA
Metric	1862.207 (172)	.963	.067	.062	622.990	-.001	-.004	.011
Scalar	2175.929 (210)	.953	.068	.057	313.722	-.010	.002	-.005

Item *discriminant validity* based on subscale cross-loading and total item correlation.

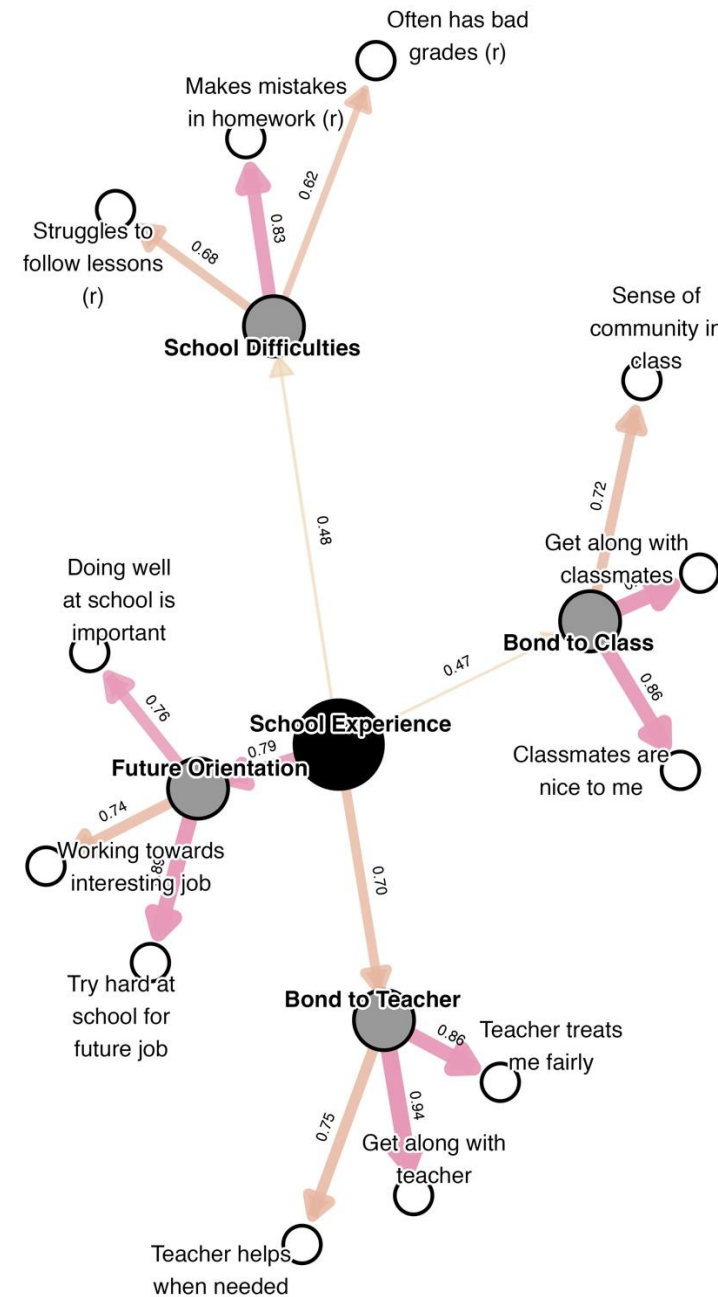




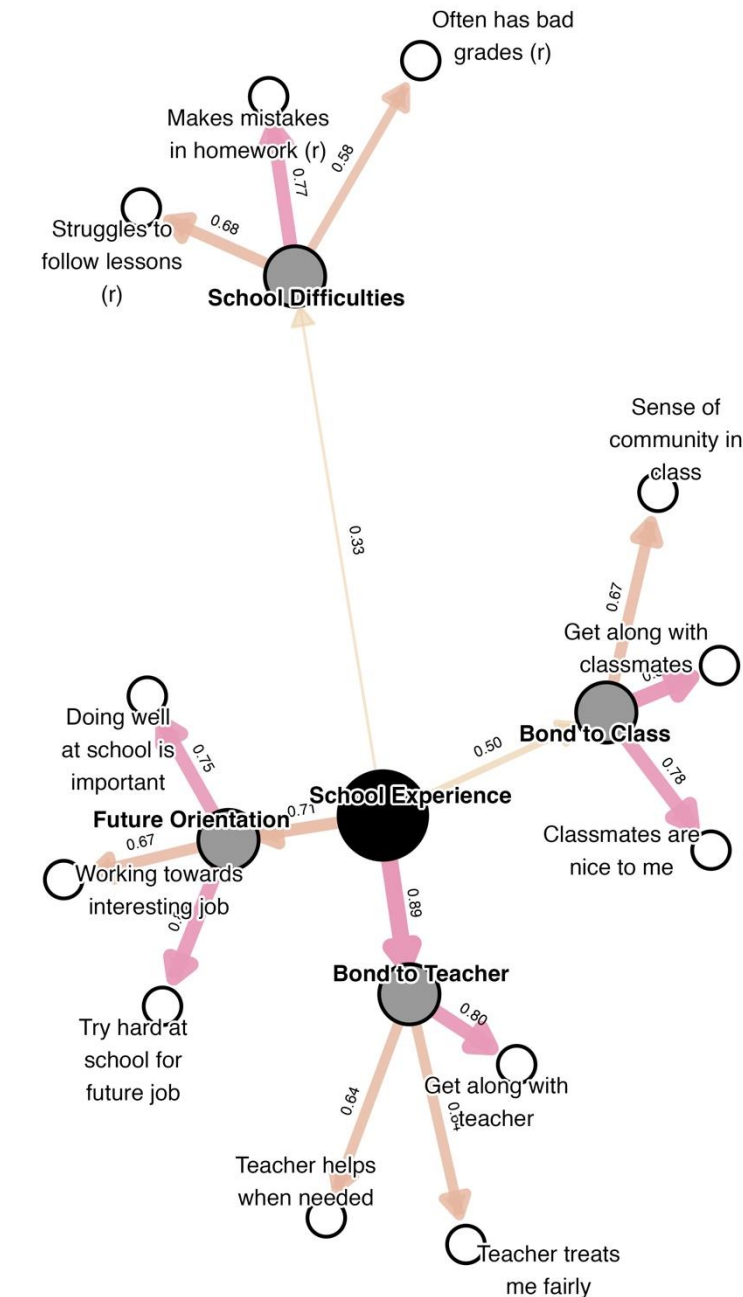
Zurich



Montevideo



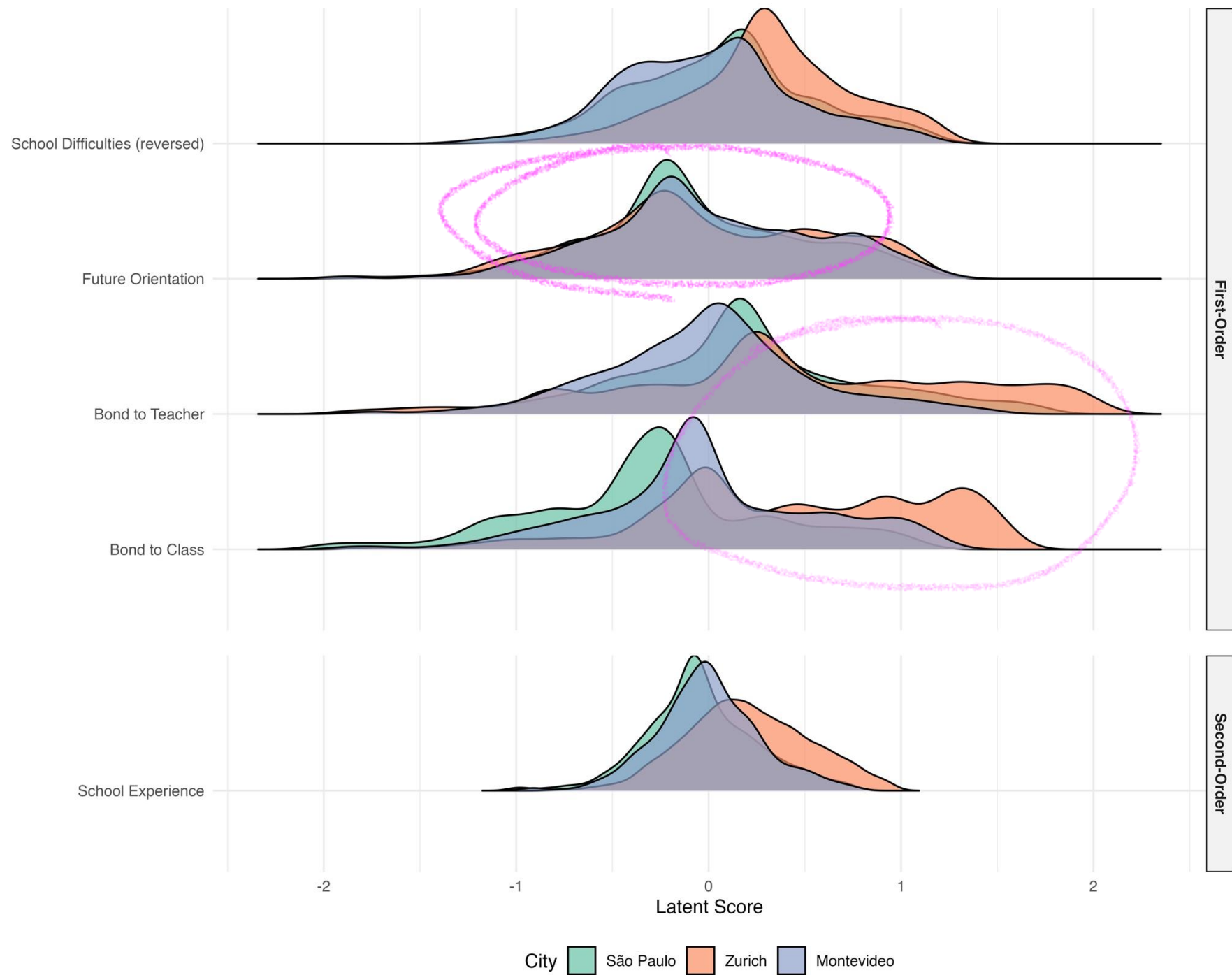
São Paulo



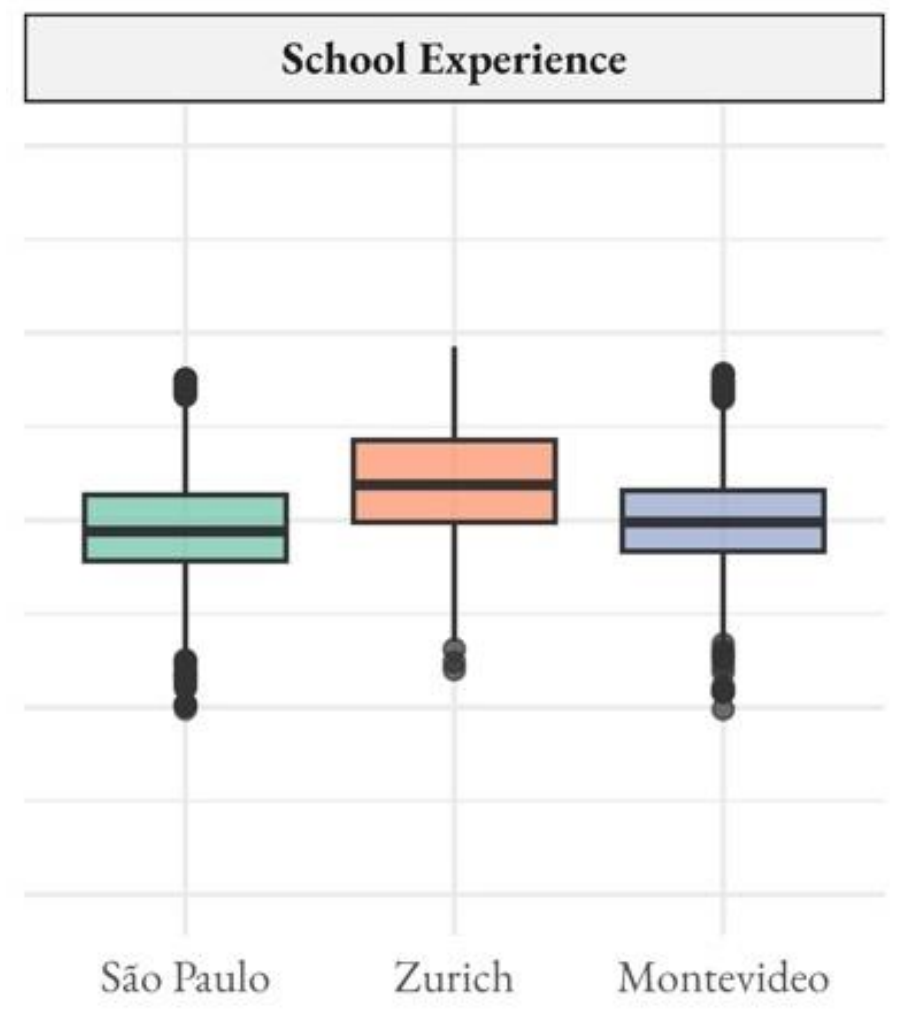
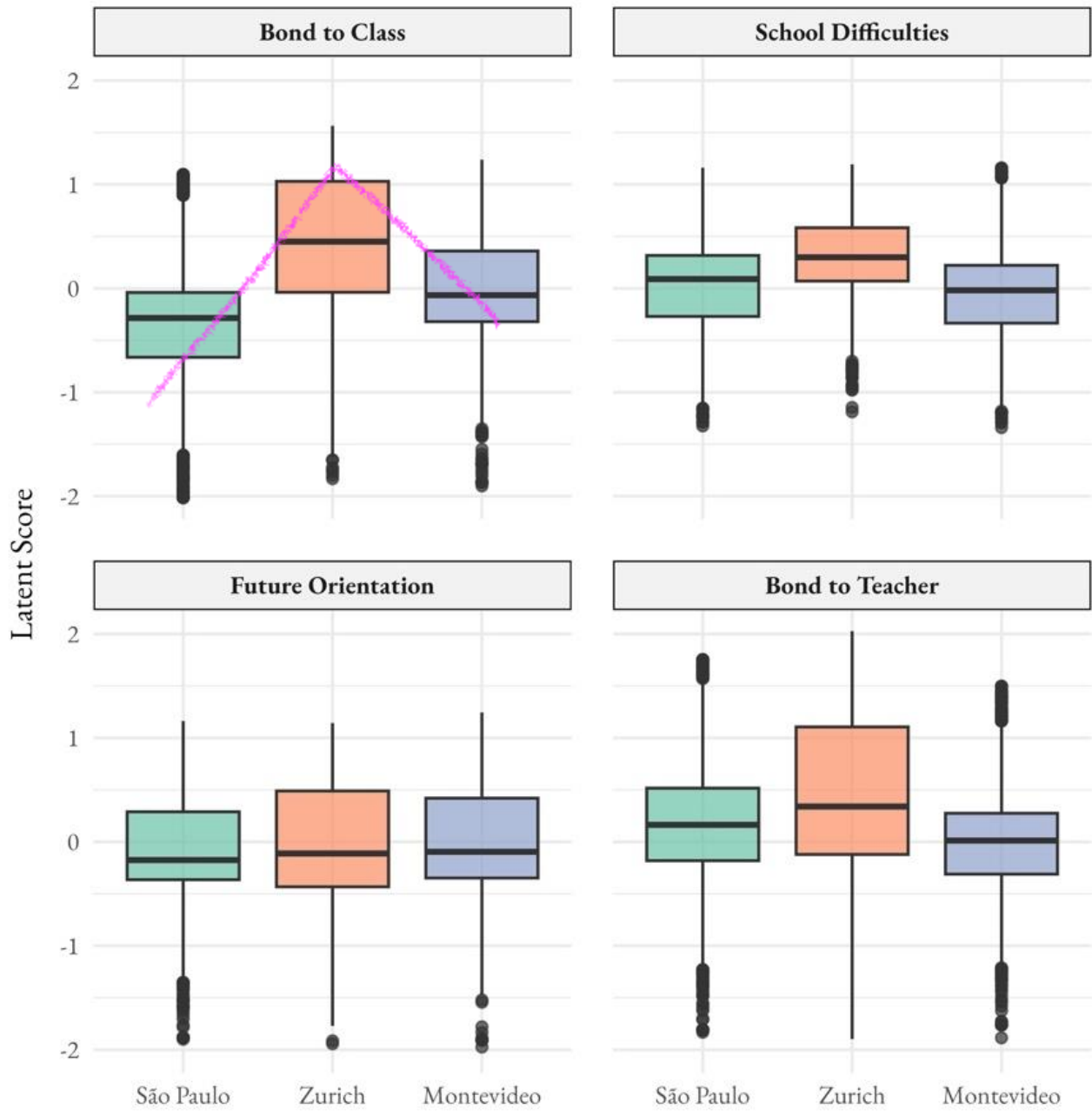
latent mean scores

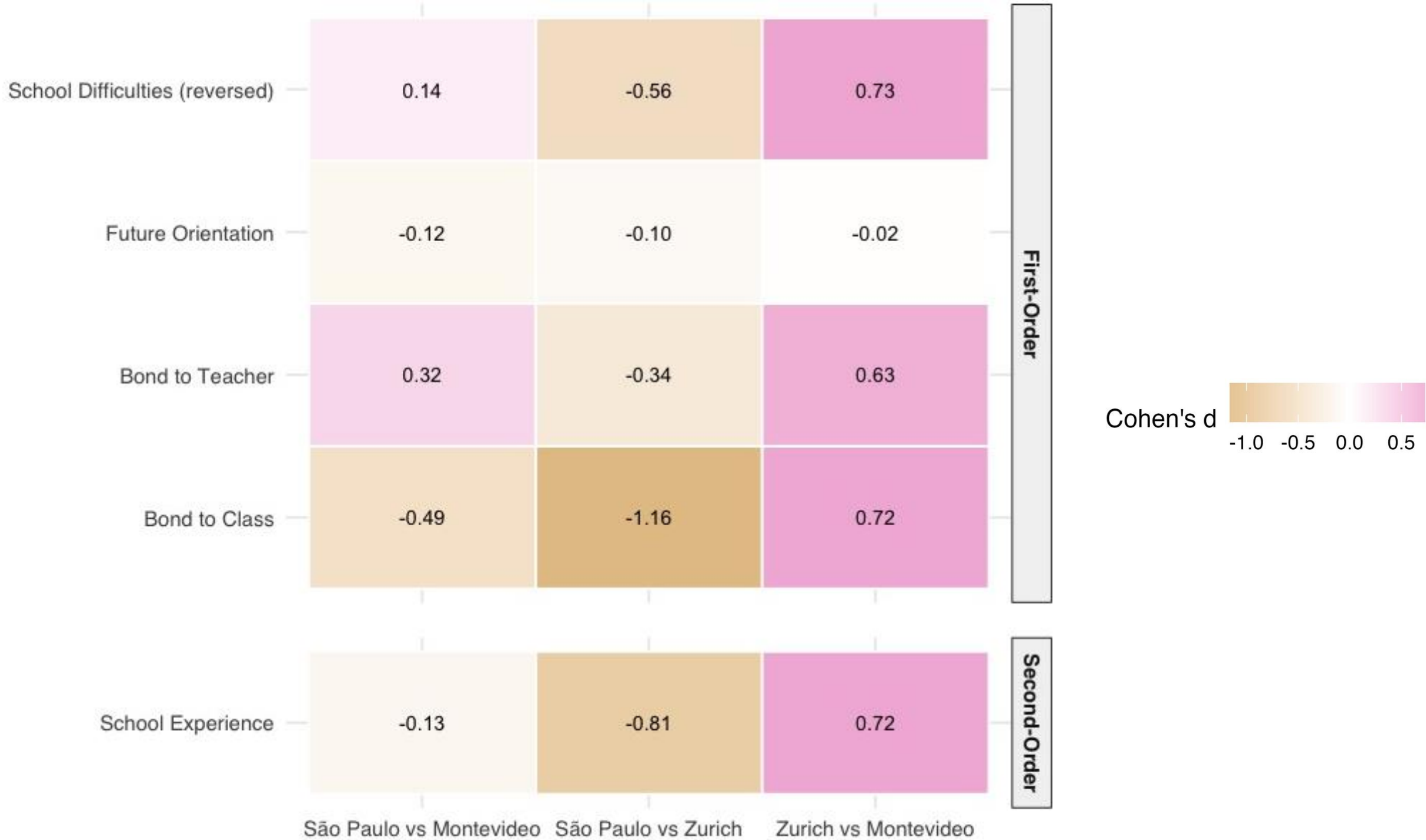
Means, 95% confidence intervals, and standard deviations of **latent scores** by dimension and city.

Factor	São Paulo	Zurich	Montevideo
	mean score (95% CI); <i>sd</i>		
School experience	-0.040 (-0.051, -0.029); 0.290	0.203 (0.187, 0.220); 0.318	-0.004 (-0.016, 0.007); 0.270
<i>Bond to class</i>	-0.304 (-0.327, -0.281); 0.608	0.445 (0.408, 0.481); 0.707	-0.012 (-0.036, 0.013); 0.582
<i>Bond to teacher</i>	0.181 (0.157, 0.205); 0.634	0.429 (0.384, 0.474); 0.874	-0.008 (-0.030, 0.015); 0.537
<i>School difficulties</i>	0.060 (0.042, 0.078); 0.475	0.317 (0.295, 0.339); 0.427	-0.007 (-0.026, 0.013); 0.456
<i>Future orientation</i>	-0.075 (-0.096, -0.055); 0.551	-0.019 (-0.050, 0.013); 0.612	-0.007 (-0.031, 0.017); 0.573

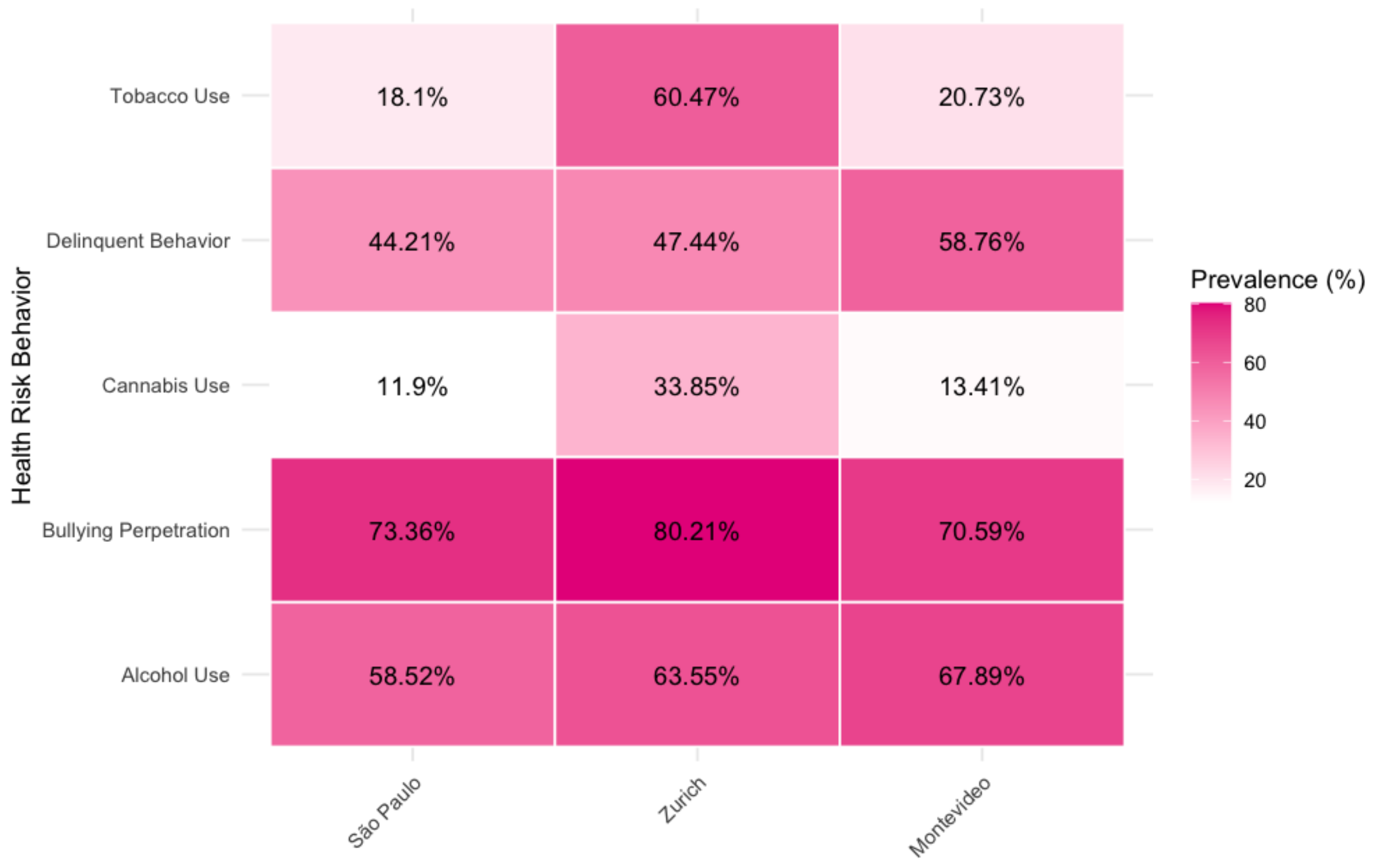


City ■ São Paulo ■ Zurich ■ Montevideo





a sneak peek



Montevideo

São Paulo

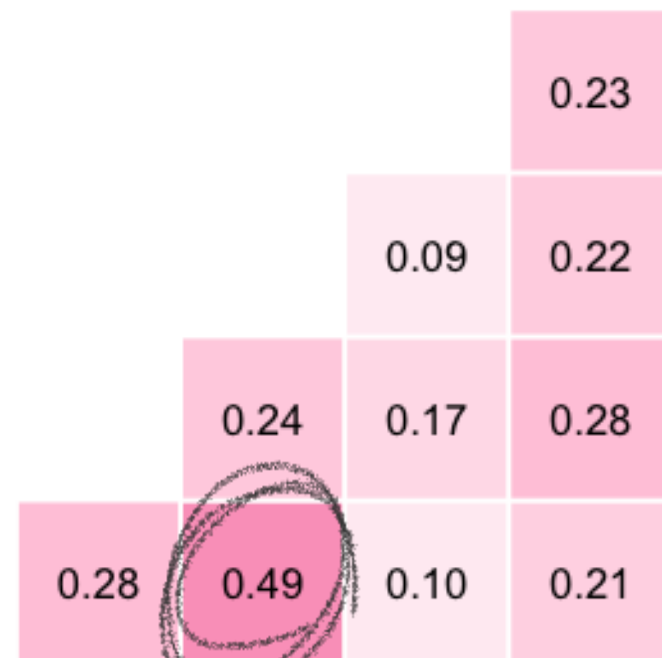
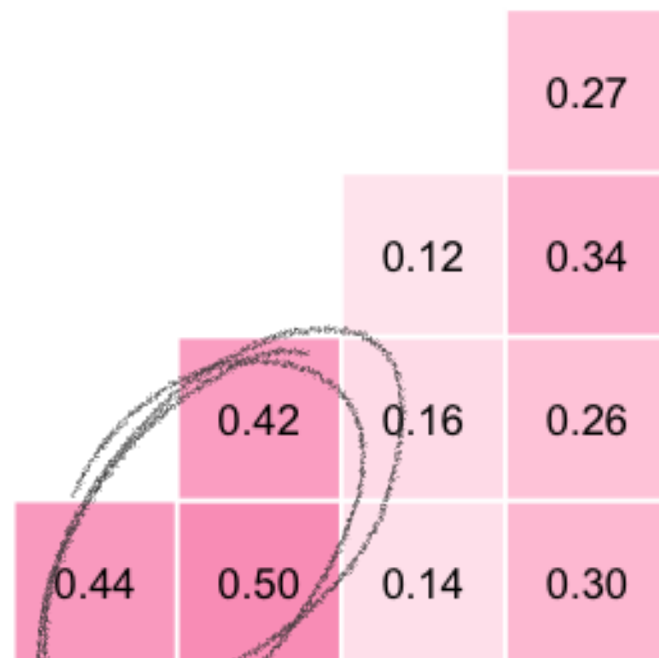
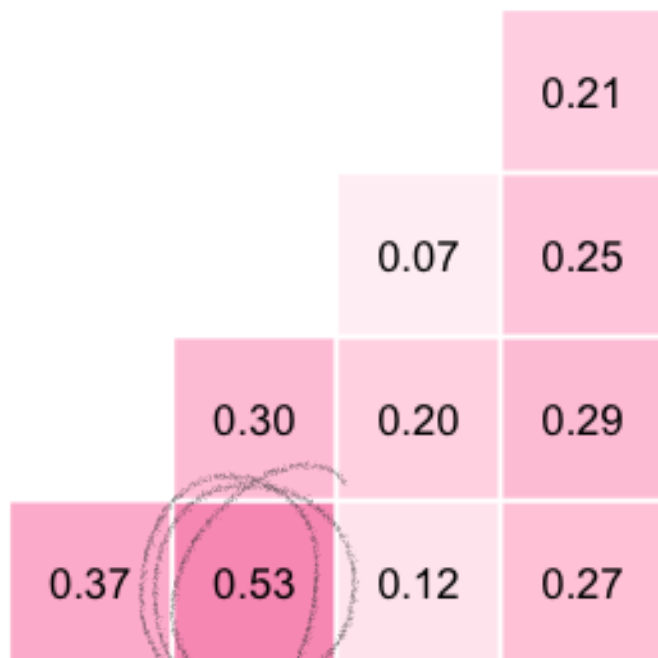
Zurich

Bullying perpetration

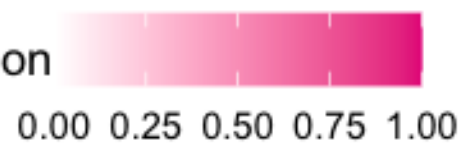
Cannabis use

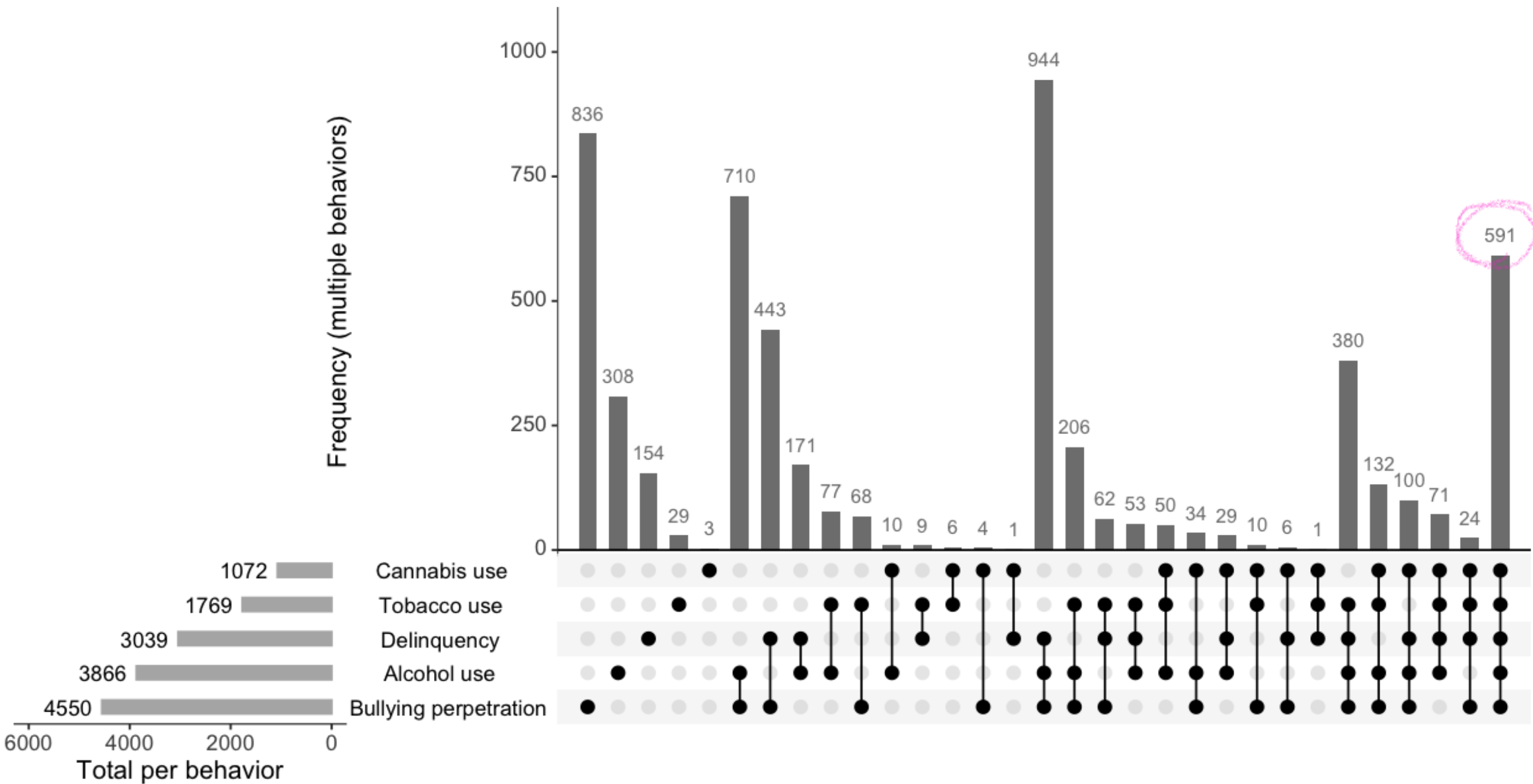
Alcohol use

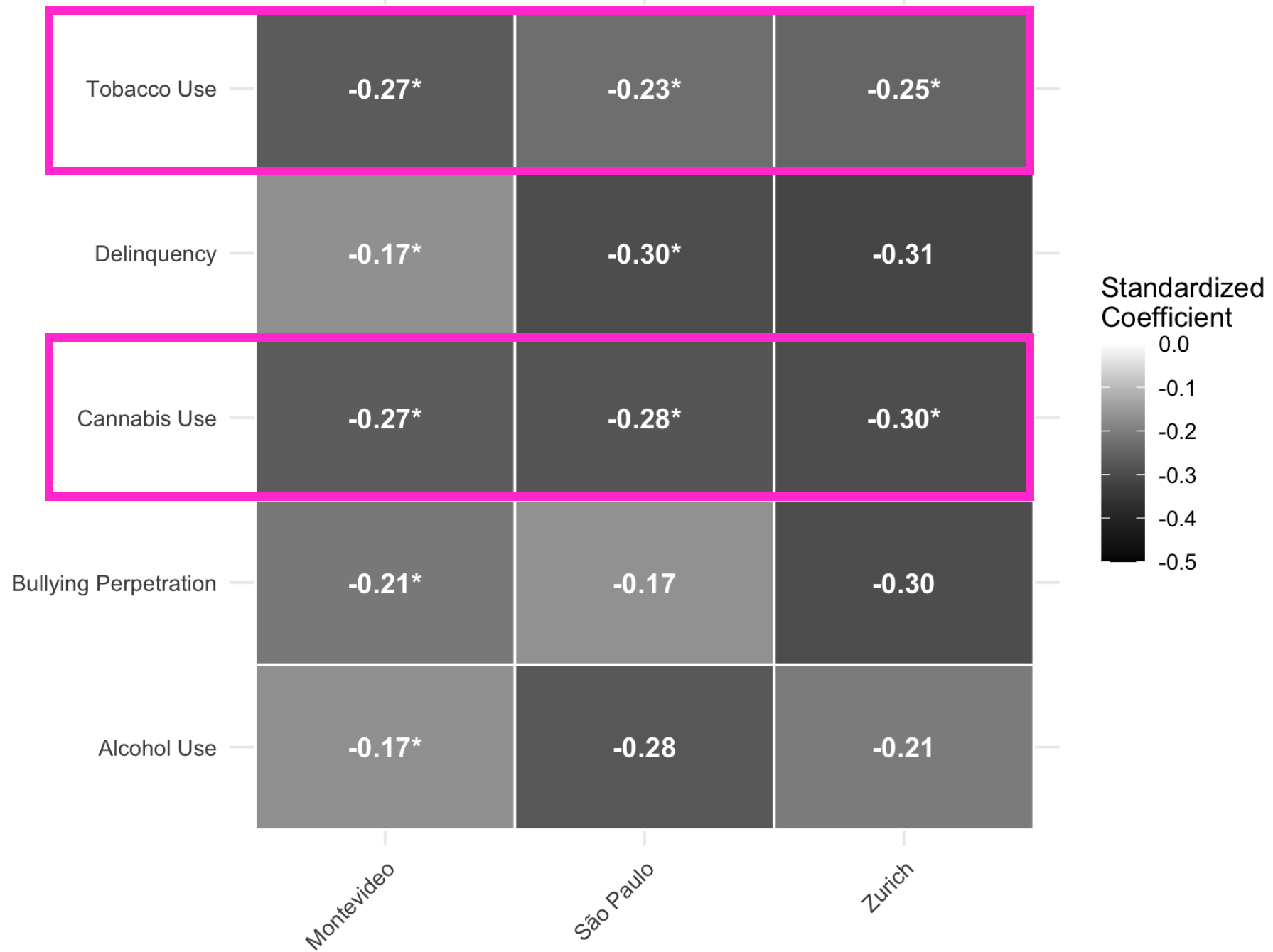
Tobacco use



Correlation







zIReN 2025

thank you!

school experience across Brazilian,
Swiss, and Uruguayan adolescents: A measurement
invariance study

Cézar D. Luquine Jr., Roberta C. Astolfi, Clarissa Janousch, Lukas E.

cezar.luquine@usp.br

Trautwein, Manuella Siqueira, Willy Shanaban, Denis Ribeaud, Maria Fernanda Tomazinho Peres



2021/02334-0, 2024/08208-4