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Faculté des sciences de la motricité

Cycling culture

A review of characteristics & Exploratory questionnaire among French-speaking pupils in Belgium

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Context

- Influence of culture on cycle use
  1. Review characteristics of cycling culture
  2. Questionnaire
     - Which items form factors of culture?
     - Are they related to a certain level of cycle use?









Which characteristics do we look for in our review?

- Mobility/cycling culture: no universal definition (1)
  - Haustein et al.: “a product of the official planning and policy work in a city and of the built environment, which includes inter alia the mobility infrastructure, urban density, connectivity of the infrastructure, and the way people perceive and experience mobility and the use of different transport modes” (2)
    - Institutions, rules
    - Built environment, material aspects
    - Perceptions and experiences, emotions, goals
  - Culturally loaded, not evenly distributed and pre-requisite to cycling: skills, know-how (3,4)
    - Competence

1. Stolze et al, 2025/2. Haustein et al, 2019/ 3. Cordovil et al., 2022/4.Ravensbergen et al., 2020





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Questionnaire

- Cycling frequency and demographics
- Competence
  - *Cycling skills inventory*
  - 4 items: Cycle lane, slippery conditions, traffic, downhill street
- Built environment
  - *Neighborhood environment walkability scale for youth*
  - **Aesthetics** (3), **security** (3), **infrastructure** (4)
- Emotions
  - **Positive** (2), **negative** (2), **neutral** (2)
- Goals
  - Identified in our review
  - **Environment** (2), **autonomy** (2), **health** (2), **efficiency/convenience** (3), **habit** (3), **political change** (2)
- Support to policies
  - *Bamberg et al., 2020*
  - **in favour of cycling** (8)/**car** (3)

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Two parts in the questionnaire

- Personal opinon
  - « When I cycle, I feel happy »
  - « I think we should build more cycle lanes, even if it means reducing the number of traffic lanes»

"When I cycle,…"

- Competence
- Built environment
- Emotions
- Goals
- Support to policies



- Perception of the norm (« culture »)
  - « When the other young people in my neighbourhood ride their cycle, they feel happy »
  - « Other young people in my neighbourhood think we should build more cycle lanes, even if it means reducing the number of traffic lanes»

"When the other youngsters in my neighborhood cycle, …"

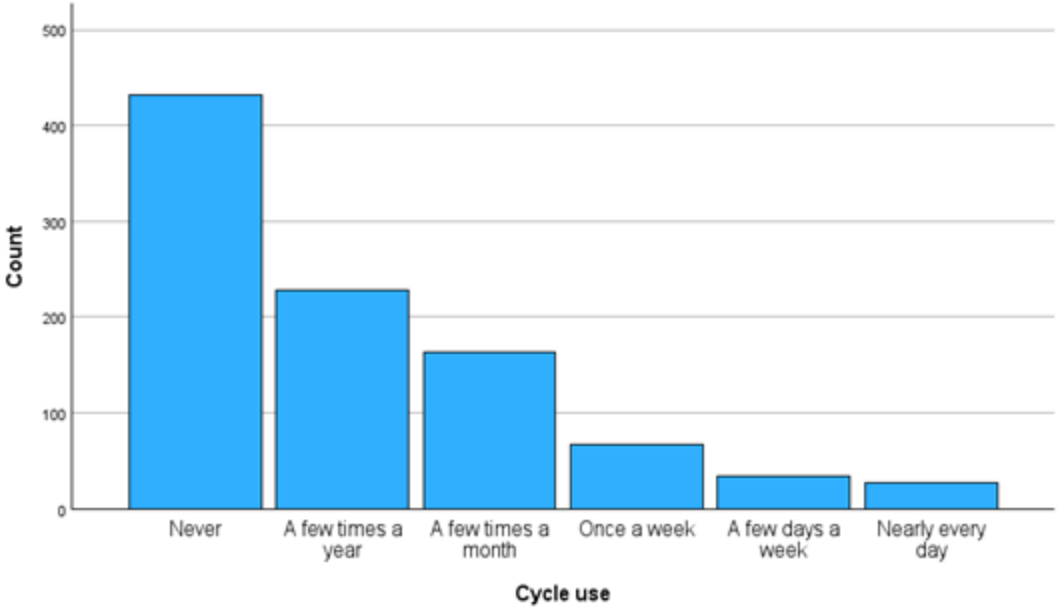
- Competence (1)
- Emotions
- Goals
- Support to policies





Sample

- 952 Respondents (54%F, 46%M)
  - March – June 2025
- Pupils in secondary school (≈ 12-18 y.o.)
  - Brussels and Wallonia
- 31% uses a cycle a few times a month or more
  - only 14 % once a week or more (car use once a week: 65%)



Cycle use

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	433	23,0	45,4	45,4
	A few times a year	228	12,1	23,9	69,4
	A few times a month	163	8,7	17,1	86,5
	Once a week	68	3,6	7,1	93,6
	A few days a week	34	1,8	3,6	97,2
	Nearly every day	27	1,4	2,8	100,0
	Total	952	50,6	100,0	
Missing	System	932	49,4		
Total		1884	100,0		



Identifying the factors that shape cycling culture

Reminder: questionnaire dimensions
Competence
Built environment
Emotions
Goals
Support to policies

- Exploratory factor analysis (EFA)
  - Items: perception of the norm (« culture »)
  - Suppress items with loadings <0,5
  - Number of iterations: 5
  - 39 items -> 15 items
  - 4 factors, 57% variance explained
    - Goals related to ecology and political change (4)
    - Environment: infrastructure for cyclists (3)
    - Support for cycling policies (5)
    - Goals related to health and autonomy (3)
  - No factor for perceived norm for emotions, for perceived norm for competence, some goals (conveniency, habit)



Pattern Matrix[a]

	Factor 1	2	3	4
Ecology	0,72	-0,056	-0,033	0,129
No pollution	0,663	0,081	0,05	0,039
Political change	0,625	0,052	0,085	-0,164
Change things	0,617	-0,008	0,034	0,134
Separated cycling lanes	0,028	0,637	0,049	-0,044
Signals for cyclists	-0,049	0,604	0,007	0,122
Cycle lanes	0,053	0,581	-0,061	-0,081
Policies Cycle Lanes	0,015	-0,013	0,619	-0,013
Policies Less car parks	0,089	-0,026	0,61	-0,126
Policies Better envi and less cars	-0,03	0,071	0,603	0,063
Policies No cars in residential areas	0,06	-0,025	0,548	0
Pol: Cycling enjoyable	-0,049	0,003	0,496	0,149
Physical activity	0,089	-0,01	-0,018	0,839
Health	0,288	-0,011	-0,054	0,587
Autonomy	-0,091	0,016	0,179	0,52

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a. Rotation converged in 8 iterations.

Predicting the probability to belong to the «regular cyclist» group: 2-level logistic regression

- Regular cyclist = uses the cycle at least a few times a month
- Variables in equation:
  - Demographic data: age, gender
  - Prerequisites for regular cycling: Possession of a cycle, competence
  - « Culture »: 4 factors from the EFA (environment equipped for cyclists, goals related to ecology and political change, goals related to health and autonomy, support for cycling policies,)
  - « Personal opinion »: score for the items related to these factors in the « personal opinion » part of the questionnaire
  - Characteristics of the school: SES, type of education (general or vocational)



Probability to cycle regularly:

- Gender: Men = +74%
- Age: 15-18 y.o. = - 35%
- Owning a cycle = *5,8
- Competence = +63% / 1 point extra (5 point Likert scale)
- Equipped environment = +30% / 1point extra
- Individual goals related to health = + 91% / 1 point extra
- Perception of norm: my neighbours cycle for health goals = 33%decrease / 1 point extra



Fixed Coefficients[a]

Model Term	Coefficient	Std. Error	t	Sig.	95% Confidence Interval Lower	95% Confidence Interval Upper	Exp (Coefficient)	95% Confidence Interval for Exp (Coefficient) Lower	95% Confidence Interval for Exp (Coefficient) Upper
Intercept	-4,281	1,2749	-3,358	<,001	-6,786	-1,775	,014	,001	,169
SEXE=M	,555	,2450	2,264	,024	,073	1,036	1,742	1,076	2,819
SEXE=F	0[b]	.	.	.	.	.	.	.	.
DE=3	-1,040	,3786	-2,746	,006	-1,784	-,296	,354	,168	,744
DE=2	-1,029	,3502	-2,940	,003	-1,718	-,341	,357	,179	,711
DE=1	0[b]	.	.	.	.	.	.	.	.
Possess=1	1,756	,6698	2,621	,009	,439	3,072	5,787	1,552	21,579
Possess=0	0[b]	.	.	.	.	.	.	.	.
CompositComp	,489	,1521	3,218	,001	,191	,788	1,631	1,210	2,200
Mat_Equip3items	,267	,1149	2,324	,021	,041	,493	1,306	1,042	1,637
NgGoal_envi4items	,253	,1524	1,662	,097	-,046	,553	1,288	,955	1,738
NgGoal_health3items	-,463	,1579	-2,934	,004	-,774	-,153	,629	,461	,858
NgPol_5items	,118	,1755	,671	,502	-,227	,463	1,125	,797	1,588
Goal_envi4items	-,082	,1499	-,544	,587	-,376	,213	,922	,687	1,237
Goal_health3items	,648	,1694	3,827	<,001	,315	,981	1,912	1,371	2,667
Pol_5items	,014	,1601	,087	,930	-,301	,329	1,014	,740	1,389
SSECategory=5	-,657	,9871	-,666	,506	-2,597	1,283	,518	,074	3,606
SSECategory=4	,207	1,0030	,206	,837	-1,764	2,178	1,230	,171	8,830
SSECategory=3	-,246	1,0223	-,240	,810	-2,255	1,763	,782	,105	5,832
SSECategory=2	-,417	1,1601	-,360	,719	-2,697	1,862	,659	,067	6,440
SSECategory=1	0[b]	.	.	.	.	.	.	.	.
Transition_Qualif=2	,025	,3286	,076	,939	-,621	,671	1,025	,538	1,956
Transition_Qualif=1	0[b]	.	.	.	.	.	.	.	.

Probability distribution: Binomial
Link function: Logit

a. Target: V3bin_ucyc

b. This coefficient is set to zero because it is redundant.

Discussion

- Significant
  - Age, gender -> corresponds to the literature (1)
  - Owning a cycle, competence -> cfr. some qualitative studies (2,3)
  - Personal opinion: only health -> Environment?

- « Culture »: only « material » factor significant
  - … and surprisingly, opposite relation norm health -> cycling frequency

- Difficult questions for teenagers
- Low cycling-region
- « Perception of the norm »: norm is cultural, perception is individual
  - To which extent relevant?

- Test in high-cycling localisations VS low-cycling localisations
  - With many respondents from same neighbourhood

Reminder: questionnaire dimensions
Competence
Built environement
Emotions
Goals
Support to policies

Reminder: 4 factors from EFA
Goals related to ecology and political change
Material: infrastructure for cyclists
Support for cycling policies
Goals related to health and autonomy

1 de Geus et al., 2014; 2 van der Kloof et al., 2014, 3 van Hoef et al., 2022



Need for inclusion in cycling

Cycle possession * SSECategory Crosstabulation

			SSECategory					
			1,00	2,00	3,00	4,00	5,00	Total
Cycle possession	Don't possess a cycle	Count	87	55	34	9	13	198
		% within SSECategory	45,8%	30,9%	17,7%	4,7%	6,8%	21,0%
	Possess a cycle	Count	103	123	158	184	179	747
		% within SSECategory	54,2%	69,1%	82,3%	95,3%	93,2%	79,0%
Total		Count	190	178	192	193	192	945
		% within SSECategory	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

21% of children don't possess a cycle
46% of children in the lowest SES group don't possess a cycle

SSECategory * Competence

			Competence					
			1,00	2,00	3,00	4,00	5,00	Total
SSECategory	1,00	Count	10	32	58	52	39	191
		% within SSECategory	5,2%	16,8%	30,4%	27,2%	20,4%	100,0%
	2,00	Count	13	33	65	53	18	182
		% within SSECategory	7,1%	18,1%	35,7%	29,1%	9,9%	100,0%
	3,00	Count	9	17	62	71	34	193
		% within SSECategory	4,7%	8,8%	32,1%	36,8%	17,6%	100,0%
	4,00	Count	1	13	50	88	40	192
		% within SSECategory	0,5%	6,8%	26,0%	45,8%	20,8%	100,0%
	5,00	Count	1	10	39	93	48	191
		% within SSECategory	0,5%	5,2%	20,4%	48,7%	25,1%	100,0%
Total		Count	34	105	274	357	179	949
		% within SSECategory	3,6%	11,1%	28,9%	37,6%	18,9%	100,0%

Cycle competence 4-5/5:
47% and 40% in lowest SES groups
73% in highest SES group



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Need for inclusion in cycling

SEXE * Cycle use Crosstabulation

		Cycle use						
		Never	A few times a year	A few times a month	Once a week	A few days a week	Nearly every day	Total
SEXE F	Count	248	135	93	28	6	5	515
	% within Cycle use	57,3%	59,2%	57,1%	41,8%	17,6%	18,5%	54,1%
M	Count	185	93	70	39	28	22	437
	% within Cycle use	42,7%	40,8%	42,9%	58,2%	82,4%	81,5%	45,9%
Total	Count	433	228	163	67	34	27	952
	% within Cycle use	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Cycle use: Among frequent cyclists, there are 5 times more men than women



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Conclusion

- Cultural components in (mostly) qualitative literature: institutions, material aspects, competence, perceptions/goals/emotions
- Cultural factors identified from questionnaire: goals related to ecology and political change, goals related to health and autonomy, infrastructure for cyclists, support for cycling policies
- Demographic variables (age, gender): again significant
- Importance of prerequisites of cycling (competence, possession of a cycle)
- Cultural variables measured as perception of the norm need further investigation
  - In adults?
  - In high-cycling neighborhoods?
  - Not using the perception of the norm?
- Need for more inclusion in cycling
  - SES



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