Assessing influence of peer interaction on physical activity among youth by measuring peer proximity with mobile technology.

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ISPAH 2016, Bangkok



Are youngsters more active when they are together?





- Promoting a healthy lifestyle for children and adolescents.
- Focus on physical activity →Social network intervention





Wearable lab









Fitbit









- Communication with Fitbit and server









- Assessment of social network
 - Friendship nominations







Questionnaires (e.g. Daily food intake)







- Social platform







Pictures (e.g. media exposure or food)







- Objective measure of social network
 - We termed this *the beacon network*















Beacon network



SOCIAL













Beacon network



MY 22 MOVEZ VOOR EEN GEZONDE LEEFSTIJL BIJ KINDEREN



Nominated Beacon network









Are youngsters more active together vs. alone?



MY 22 MOVEZ VOOR EEN GEZONDE LEEFSTIJL BIJ KINDEREN



The big differences

- Automatic detected peer presence
 - 297533 observations
 - Max classmates = 85

- Self nominated peer presence
 - 12787 observations
 - Max classmates = 29

Beacon network			
Nominated beacon network	detected	undetected	
detected	10695	2092	80.44%
undetected	286838	0	
	3.73%		





- N=994 (467 boys, 534 girls)
- Mean age = 11.51 (SD = 1.35)



>80% participation per classroom

At least:

- Fitbit data
- Friendship nominations

- N= 235 (82 boys, 153 girls)
- Mean age = 11.90 (SD = 1.10)





Average steps boys vs. girls







Average steps per minute per age category





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	Estimate (SD)	t value	p
Sex	-3.79 (.42)	-8.94	<.001
Age	-1.46 (. <i>16</i>)	-9.03	<.001





Three research questions

- 1 Are youngsters more active when they are together?
 - social facilitation
- 2 When together, does group size reduce physical activity?
 - impression management
- 3 When together, what is the influence of friends vs non-friends?





Question 1

- Are youngsters more active when they are together compared to when they are alone?
- Compare PA at timeslots when youngsters are together vs. alone







Average steps per minute per time category





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Beacon data

Average steps alone vs. together







Nominated Beacon data

Average steps alone vs. together







Beacon		Nominated Be	Nominated Beacon	
Alone (N=802)	Together (N=3849)	Alone (N=287)	Together (N=235)	
20,81	20,04	10,67	18,87	
t = -1.356,	p = 0.175	t = 8.203,	р < .001	

Based on self nominations, youngsters who are together are more active.





Question 2

- Are youngsters less active when group size increases?
- Compare PA and the number of classmates around







Beacon data







Distribution of Beacon data







Beacon data





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Distribution of Beacon data







Beacon data

	Estimate (SD)	t value	p
Number of classmates	.06 <i>(.01)</i>	3.35	<.001
Gender	-4.24 (.47)	-9.05	<.001
Age	-1.72 (.19)	-8.87	<.001

Mean number of classmates = 13.16





Nominated Beacon data





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Distribution of nominated Beacon data







Nominated Beacon data







Nominated Beacon data

	Estimate (SD)	t value	p
Number of classmates	.02 <i>(.07)</i>	.33	.75
Gender	-5.23 (1.70)	-3.08	<.001
Age	18 (.72)	25	.80

Mean number of classmates = 10.98





Question 3

• And does it matter whether the peers are friends or not?







Beacon data

	Estimate (<i>SD</i>)	t value	p
Number of classmates	.08 <i>(.02)</i>	3.15	.001
Gender (0=boy,1=girl)	-4.26 <i>(.47)</i>	-9.01	<.001
Age	-1.77 <i>(.20)</i>	-8.94	<.001
Number of friends	.05 <i>(.21)</i>	.23	.82
#classmates* #friends	004	.006	.44



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Nominated Beacon data

	Estimate (<i>SD</i>)	t value	p
Number of classmates	.02 <i>(.13)</i>	1.16	.25
Gender (0=boy,1=girl)	-4.26 <i>(1.71)</i>	-2.50	.013
Age	48 <i>(.76)</i>	65	.52
Number of friends	.92 (.52)	1.69	.09
#classmates* #friends	04 <i>(.02)</i>	-1.55	.12



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Conclusions and discussion

- Based on self nomination, youngsters are more active when they are together vs. alone.
- The more classmates are detected, the more active youngsters are. Indication of more crowded places/places that you are more active?
- No effect of the number of friends who are close.

- The automatic detection of classmates heavily overestimates the classmates which they spend time with
- The influence of the time categories
- Missing participants because of low participation in the class.
- Cycling data





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Cycling activities (not in this data yet)





