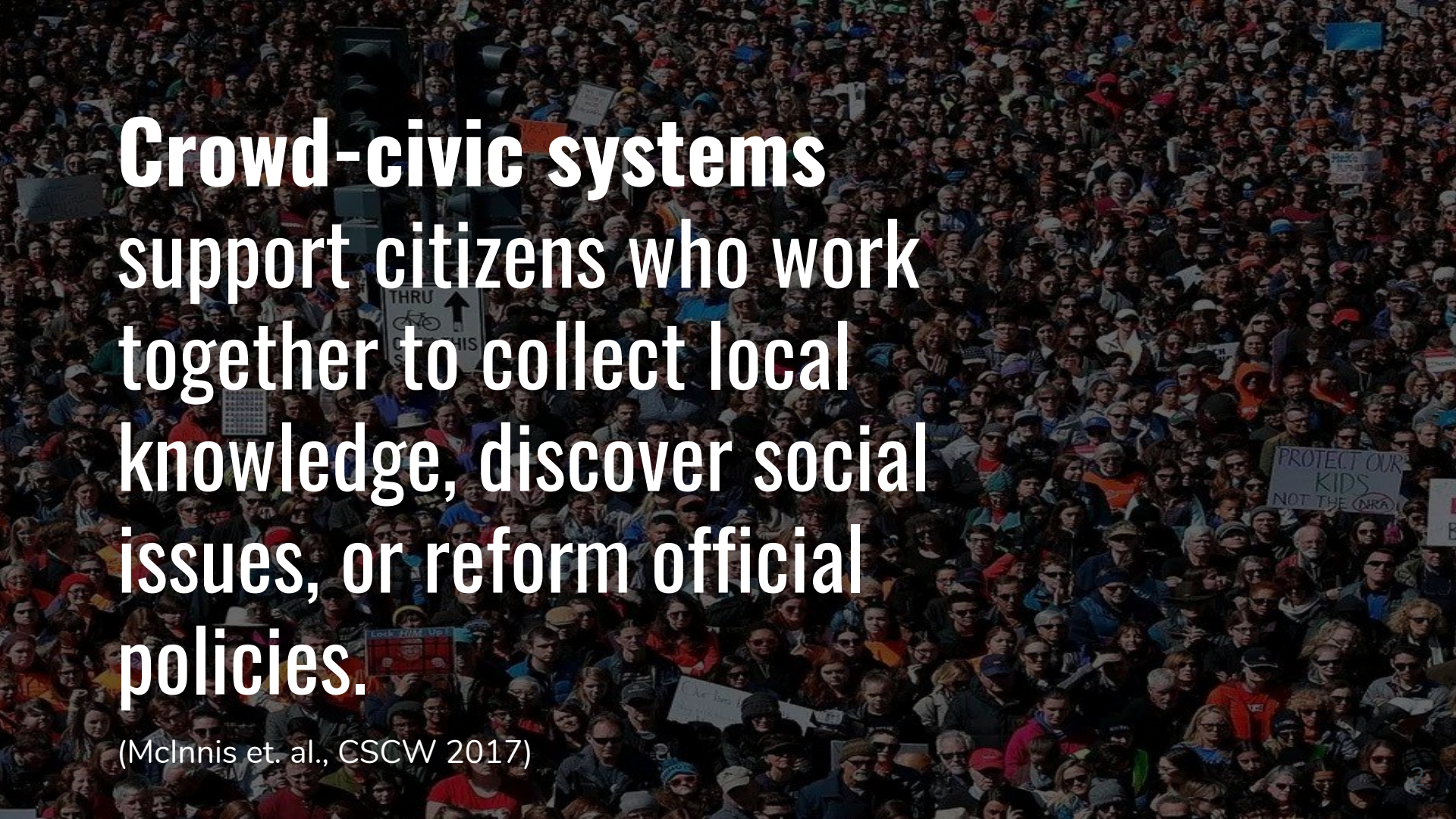


# Personalized Motivation-supportive Messages for Increasing Participation in Crowd-civic Systems

Paul Grau (KAIST, TUB), Babak Naderi (TUB), Juho Kim (KAIST)

CSCW 2018




A high-angle, wide shot of a massive crowd of people, likely at a protest or public demonstration. The crowd is dense and fills the entire frame. Many individuals are holding up signs, though most are small and illegible. A few larger signs are visible, such as one that says "PROTECT OUR KIDS NOT THE NRA" and another that says "THRU" with a bicycle symbol. The overall atmosphere is one of a large-scale public gathering.

**Crowd-civic systems**  
support citizens who work  
together to collect local  
knowledge, discover social  
issues, or reform official  
policies.

(McInnis et. al., CSCW 2017)



# Local Problem Reporting



Report a problemSign inAll reportsLocal alertsHelp


CLICK MAP TO REPORT A PROBLEM

Show All reports about Everything


Sort by Newest

1 to 100 of 516Next

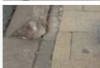
Large number of cigarette ends on pavement  
10:40, Thursday, last updated 17:35, Thursday



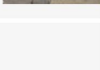
Drug paraphernalia  
10:03, Tuesday




Flickering lamppost  
14:31, 2 Jun 2018




Kerbstone displaced at bus stop (route 9, 10, 140)  
20:21, 14 May 2018

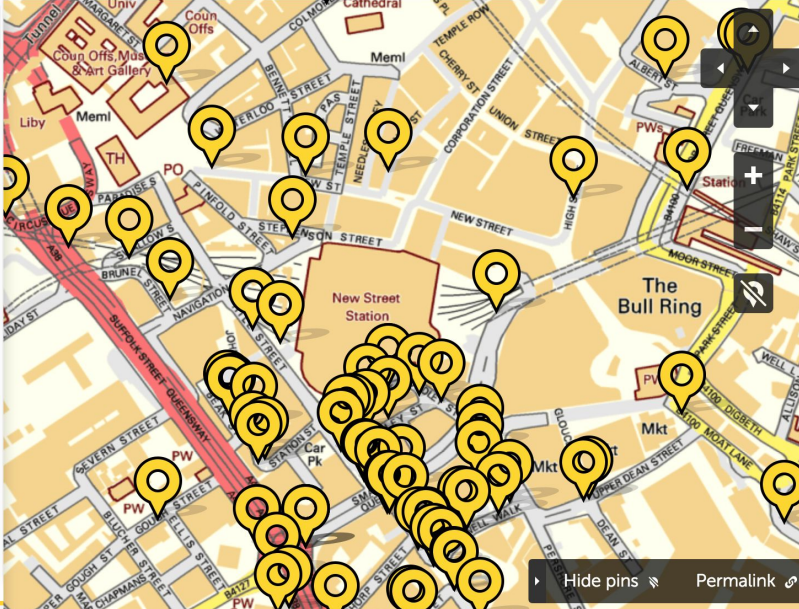


Rubbish  
13:45, 14 May 2018



Partial collapse of manhole





Hide pinsPermalink

FixMyStreet.com

Introduction 3

# Crowdsourced Policymaking

## Maastoliikennelaista.

### About off-road traffic

[Koti](#) | [Jatkokeskustelun aiheita](#) | [Ihmetteletkö tätä?](#) | [Yhteystiedot](#)

## Tervetuloa Joukkoistamista Suomessa -yhteisöön!

Tervetuloa keskustelemaan maastoliikenteestä ja sitä säätelevästä maastoliikennelaista.

What is this about? What will happen now? How does this work? Instructions

Mistä on kysymys?

Mitä nyt tapahtuu?

Miten tämä toimii?

Ohje



### Mistä on kysymys? What is this process about?

Ympäristöministeriö uudistaa maastoliikennelakia ja haluaa siksi kuulla mahdollisimman laajasti näkemyksiä asiasta. Maastoliikenteellä tarkoitetaan mm. moottorikelkkailua ja mönkijälläajoa luonnossa. Laki säätelee esimerkiksi sitä, missä moottorikelkalla saa ajaa ja kuinka kelkkareittejä perustetaan. Lisää maastoliikenteestä ja nykyisestä laista voit lukea [maastoliikennelaki-sivustolla](#).

### Vaikuta!

### Have a say!

Pyydämme sinua jakamaan ajatuksesi siitä, kuinka maastoliikennettä pitäisi parhaiten säännellä. Kysymykset perustuvat edellisen vaiheen keskusteluun. Etsimme nyt ratkaisuja maastoliikenteen ja sen sääntelyn ongelmiin. Osallistu valitsemalla kysymyskategoria vasemmalta palkista. Klikkaa sitten keltaista 'Lähetä idea' -nappulaa. Ideointi jatkuu 21.6. asti.

1. vaihe:  
Keskustelu



2. vaihe:  
Koonti ja palaute



3. vaihe:  
Jatkokeskustelu



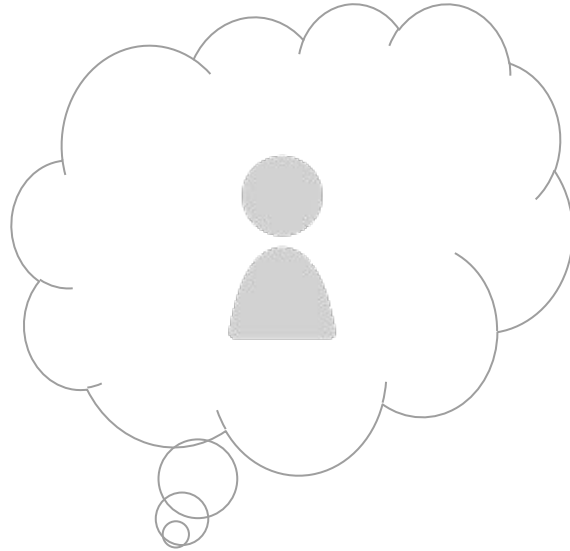
4. vaihe:  
Koonti ja palaute

Lähetä uusi idea

Send a new idea!

Off-road traffic law crowdsourcing in Finland [Aitamurto 2016]

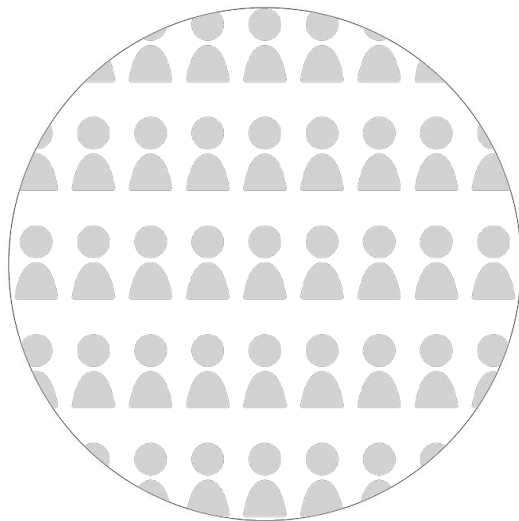
# A Crowd-Civic Challenge: Recruitment and Participation



# A Crowd-Civic Challenge: Recruitment and Participation

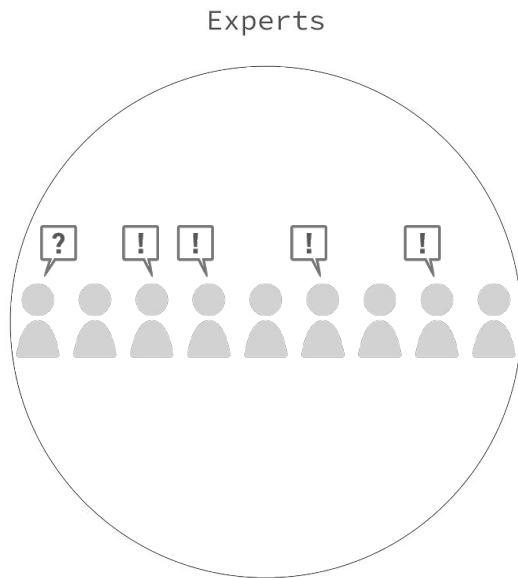
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Critical mass



# A Crowd-Civic Challenge: Recruitment and Participation

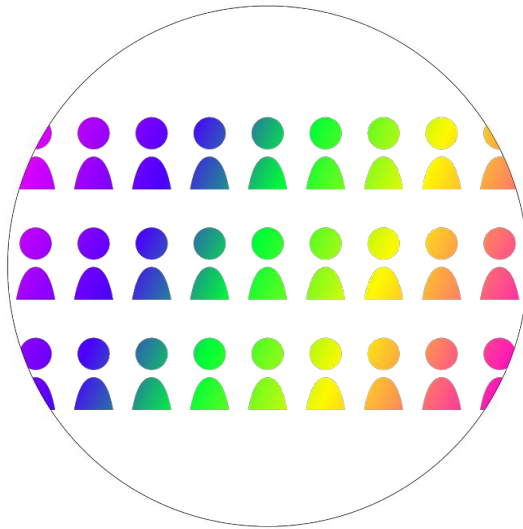
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# A Crowd-Civic Challenge: Recruitment and Participation

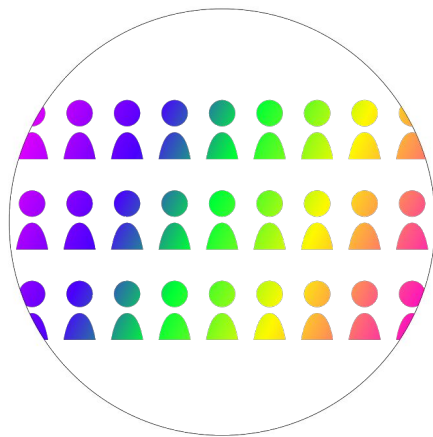
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Diverse personalities





# A Crowd-Civic Challenge: Recruitment and Participation



Self-selection bias

[Aitamurto 2016]

## Democratic Representativeness?

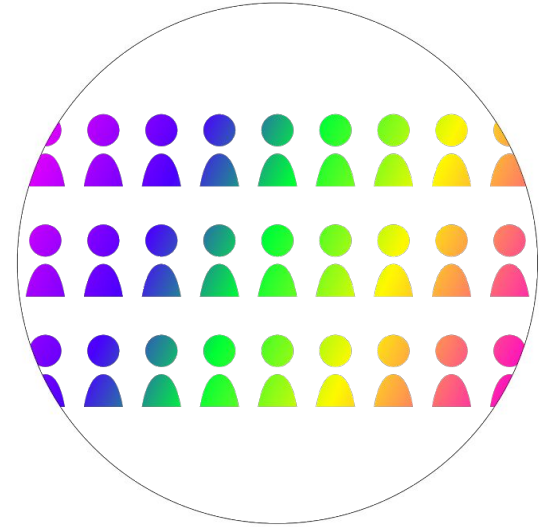
# Diverse Motivations to Participate Voluntarily



How to move on from  
“one size fits all”?

[Aitamurto & Saldivar 2017]

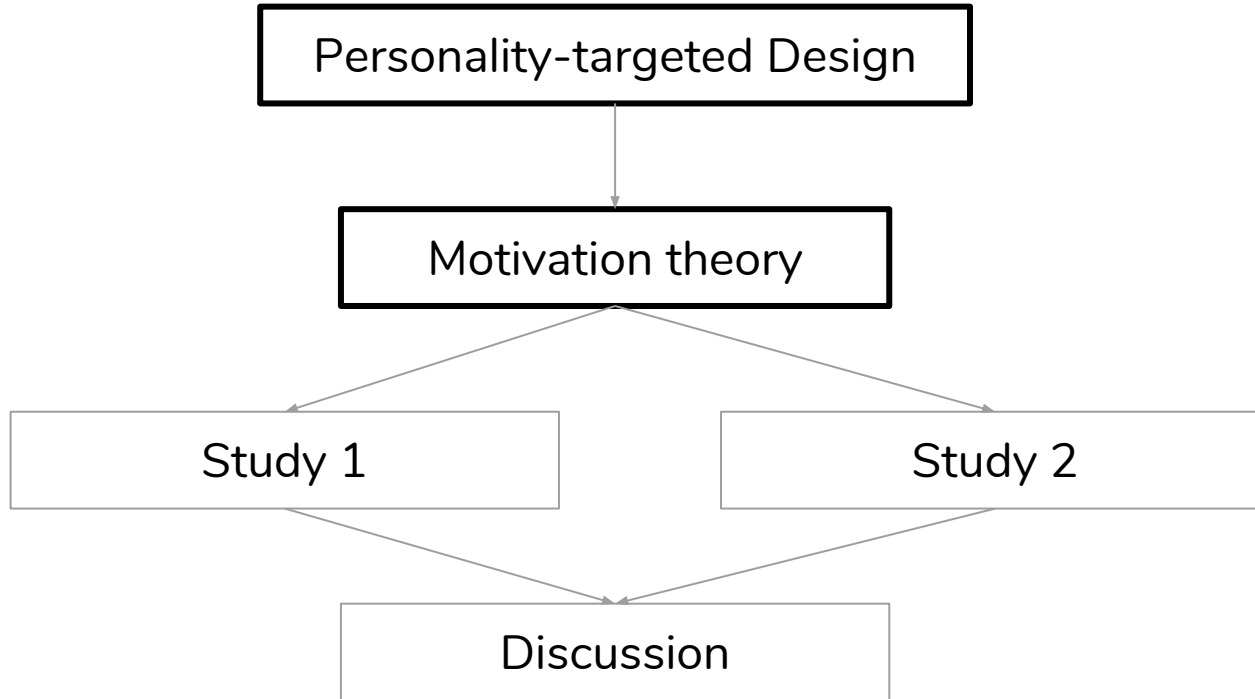
Diverse personalities



# Research Question

Can  
motivation-supportive design,  
especially when personalized,  
increase participation  
in a crowd-civic system?

# Approach: Theory-based Interface Design



# Personality-targeted Design

UI personalized to match a user's *personality*



Moon 2002, Nov & Arazy 2013, Jia et al. 2016

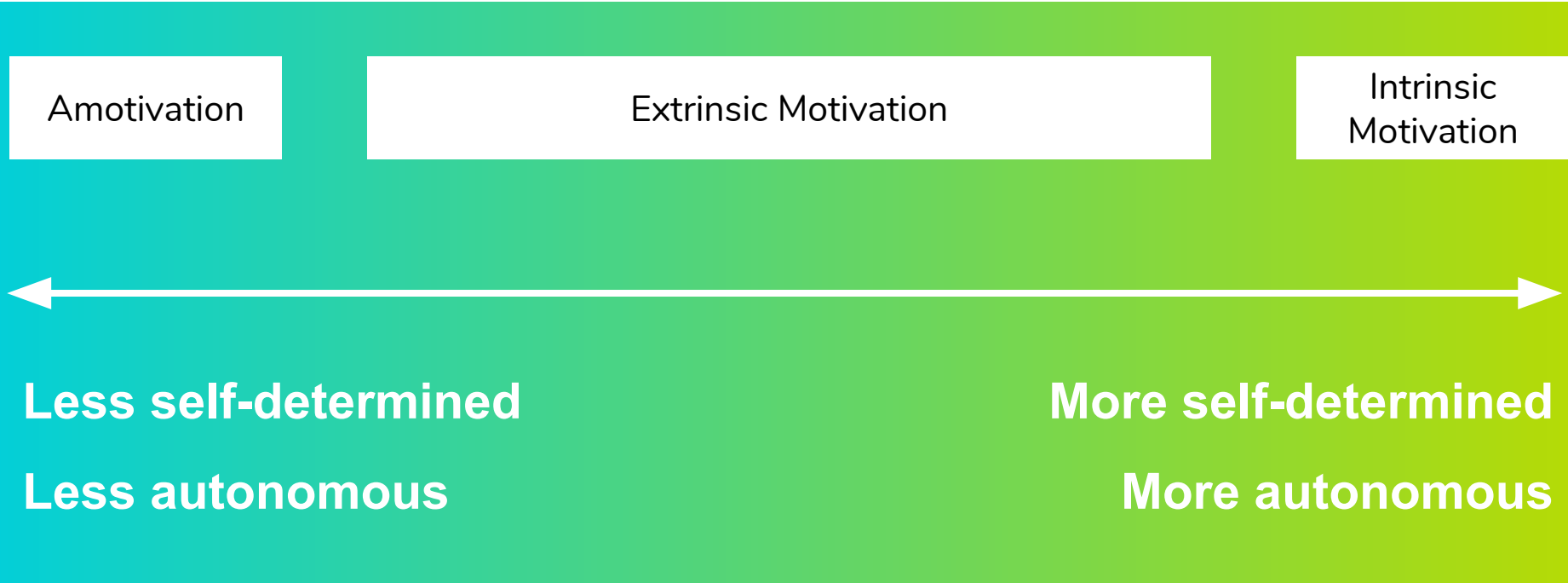
# Self-Determination Theory (SDT)

Motivational orientations = lasting aspects of one's personality

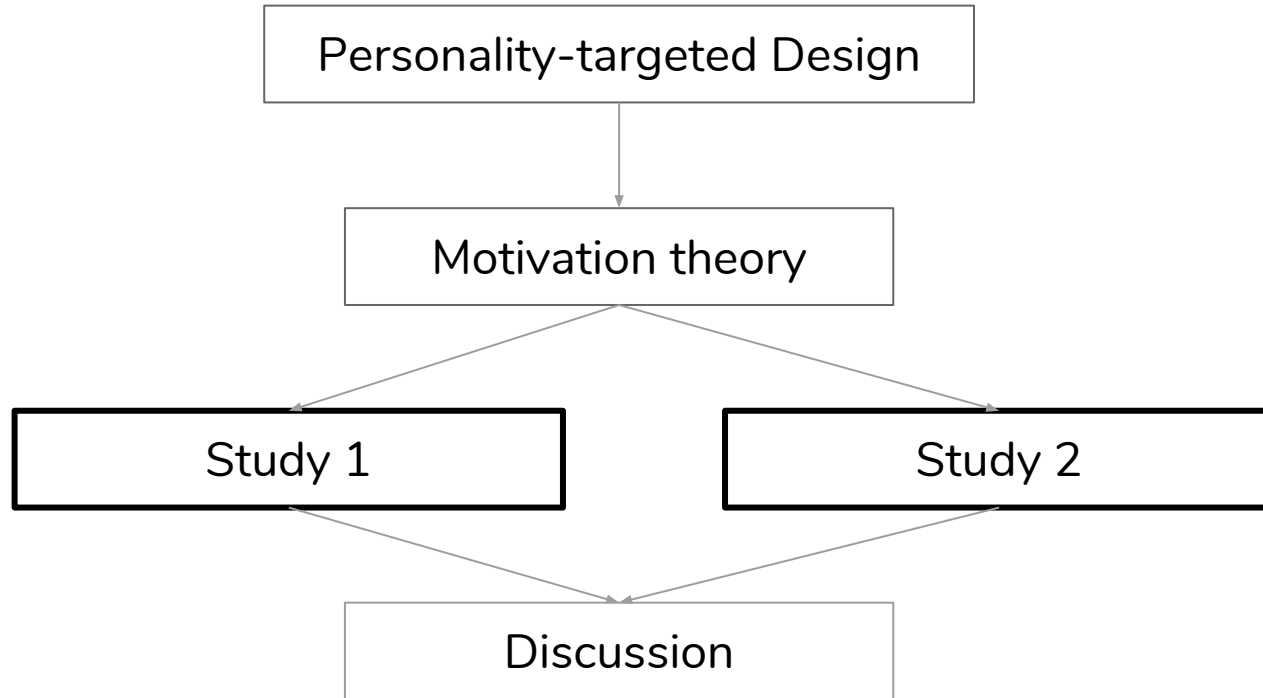
How task, environment, and user factors affect motivation differences



# Gradient of Self-Determination and Autonomous Motivation



Simplified excerpt from Figure “Taxonomy of human motivation” [Ryan 2000]



# Two-part Investigation

## Study 1: Online Survey

Self-reported preferences

Amazon Mechanical Turk  
(N=150)

Paid

## Study 2: Field Study

Engagement measures

KAIST members  
(N=120)

Voluntary

# Two-part Investigation

## Study 1: Online Survey

Self-reported preferences

Amazon Mechanical Turk  
(N=150)

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Engagement measures

KAIST members  
(N=120)

Voluntary

# Design

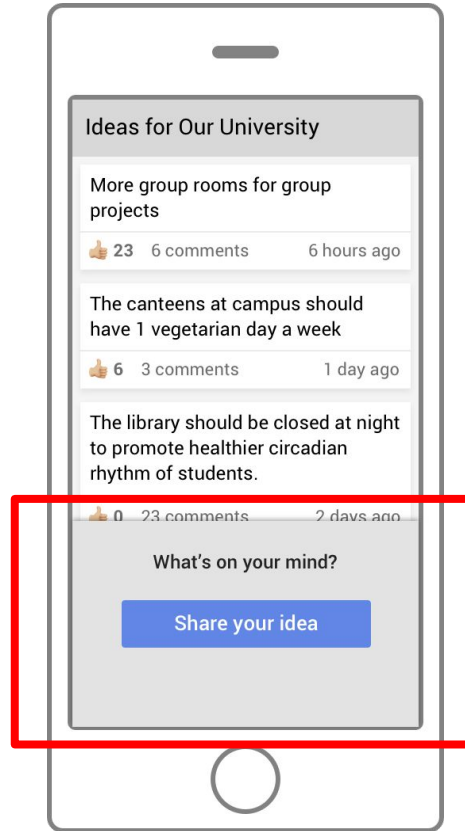


Image for baseline version.

# Design Versions

6 alternative versions  
based on different concepts from SDT

Need for <b>Autonomy</b>	Need for <b>Competence</b>	Need for <b>Relatedness</b>
<b>Autonomous</b> orientation	<b>Impersonal</b> orientation	<b>Controlled</b> orientation

+ Baseline



# Pairwise Comparison Survey

“In which version would you personally be more likely to contribute an idea?”

Comparison 1 of 22

**Version 1**

**Version 2**

Next

# Pairwise Comparison Survey

“In which version would you personally be more likely to contribute an idea?”

Sharing ideas matters!

Share your idea

Express your opinion,  
let everyone hear your voice!

☐ Version 1

Your community needs your input!

Share your idea

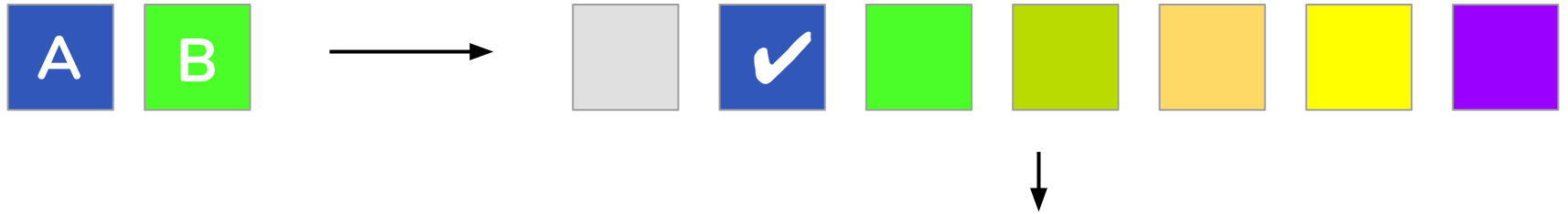
24 other people contributed today.

☐ Version 2

Next

# Data Collection (N=150)

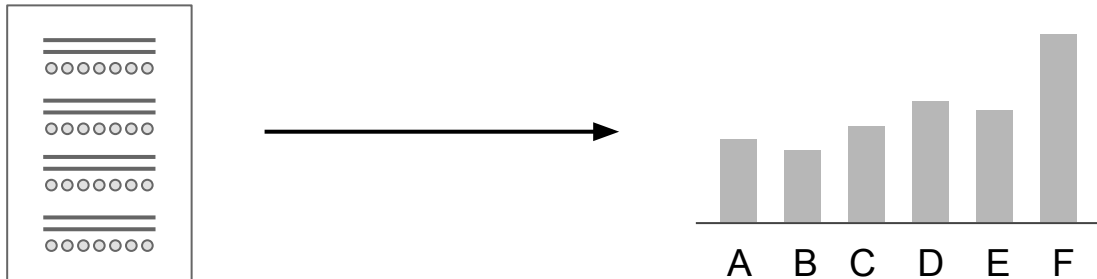
## 1. Preferences



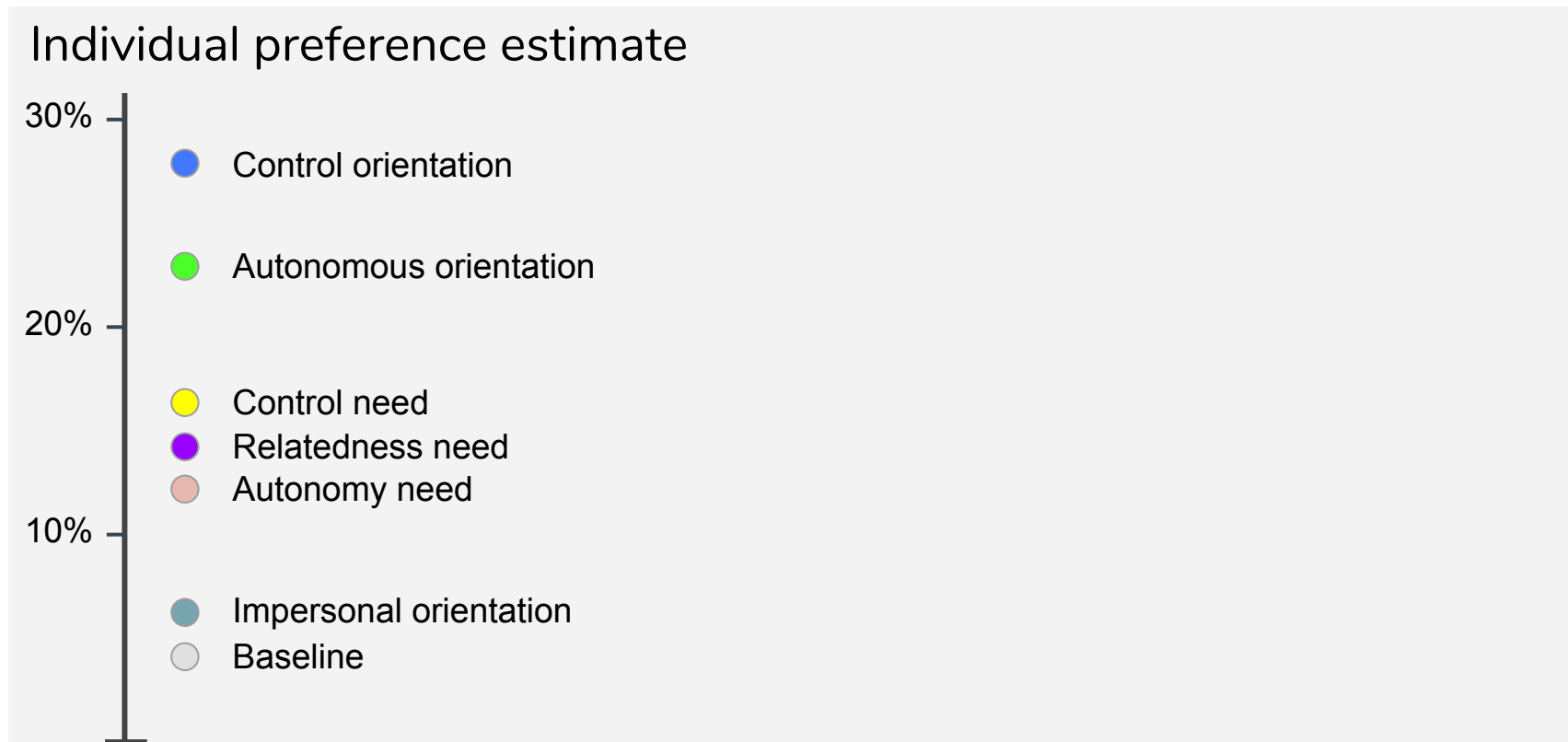
Why did you choose that?

---

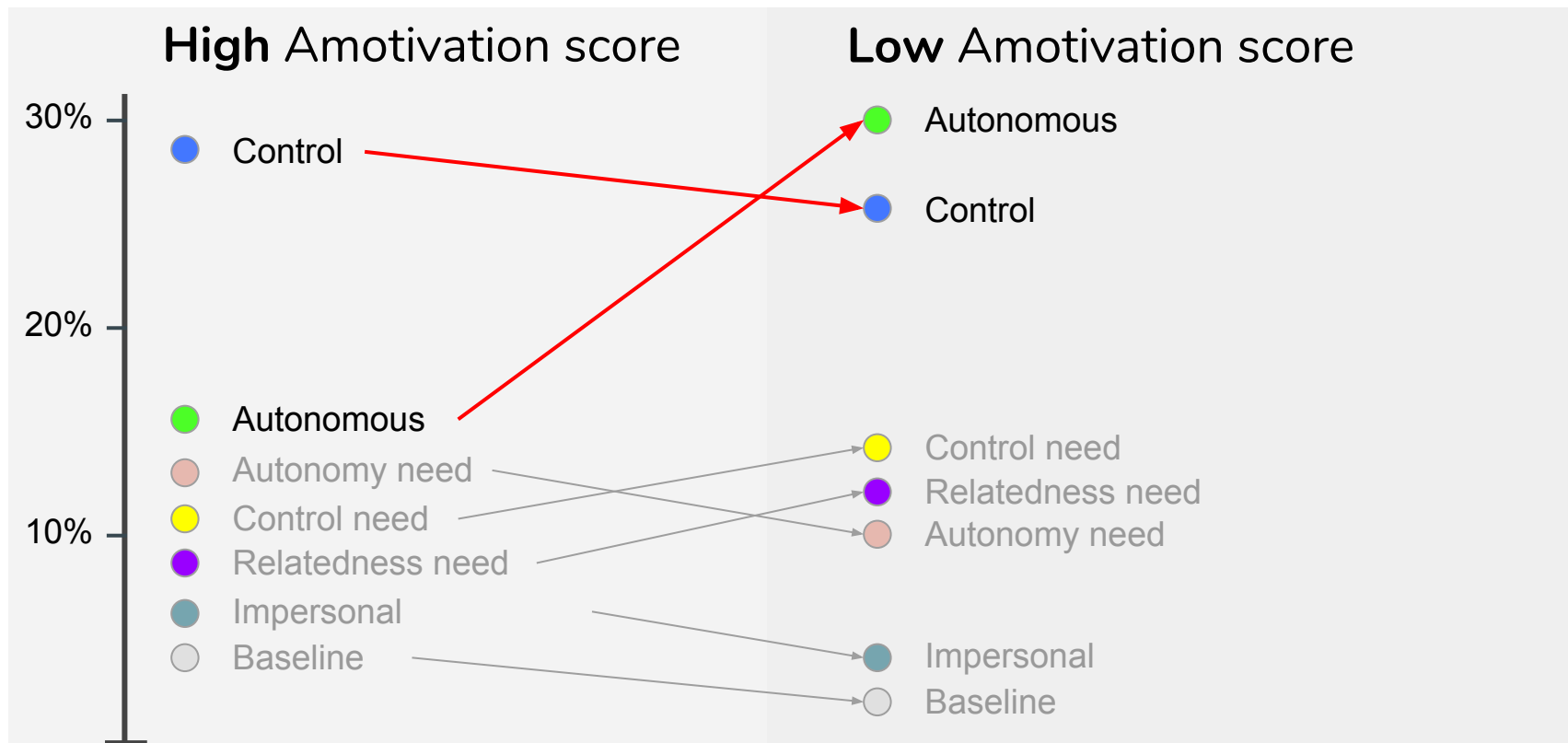
## 2. Motivation questionnaires



# Participants have diverse preferences



# Preferences correlate with motivation scores



# Study 1 Limitations

Self-reporting (hypothetical bias)

Paid workers, possibly not representative of the general population



# Two-part Investigation

## Study 1: Online Survey

Self-reported preferences

Amazon Mechanical Turk  
(N=150)

Paid

## Study 2: Field Study

Engagement measures

KAIST members  
(N=120)

Voluntary

# KAIST Many Ideas



Join us in collecting important issues  
and ideas for the future of our  
university. We need everyone's  
contribution!

Sign up

Log in



## RECENT IDEAS

Attach a 1000 W, 700 W label on the front (or  
side) of microwaves on campus

♡13 💬1

9 hours ago @akrso

Please eliminate the unnecessary advisor  
approval procedures

♡12 💬4

12 hours ago @kim

I wish there was an air purifier in every  
classroom

♡15 💬3

1 day ago @jeeeee

Shuttle bus time adjustment (+ extend on  
weekends)

♡9 💬2

1 day ago @moon

We need everyone's contribution!

Share your idea

6 other people contributed today.  
Your ideas matter.



## IDEA DETAILS

@jeeeee 1 day ago



I wish there was an air purifier in every  
classroom

I saw that the classrooms have a very high  
concentration of fine dust, but none of them have  
air purifiers. Do all the labs have them? It think  
there are many labs without air cleaners ...! I hope  
installation of air purifiers would increase.

♡15 💬3

Not just in the lecture rooms, I want to have air  
purifiers in the dorms as well. Corridors, toilet and  
shower windows are almost always open for  
ventilation. I use a mask when going out, but it is  
too troublesome to wear a mask every time I go to  
the bathroom or throw away garbage.

9 minutes ago

nya-ong

Let's share our diverse viewpoints!

Leave a comment

# Treatment Conditions

Baseline

Autonomy  
support

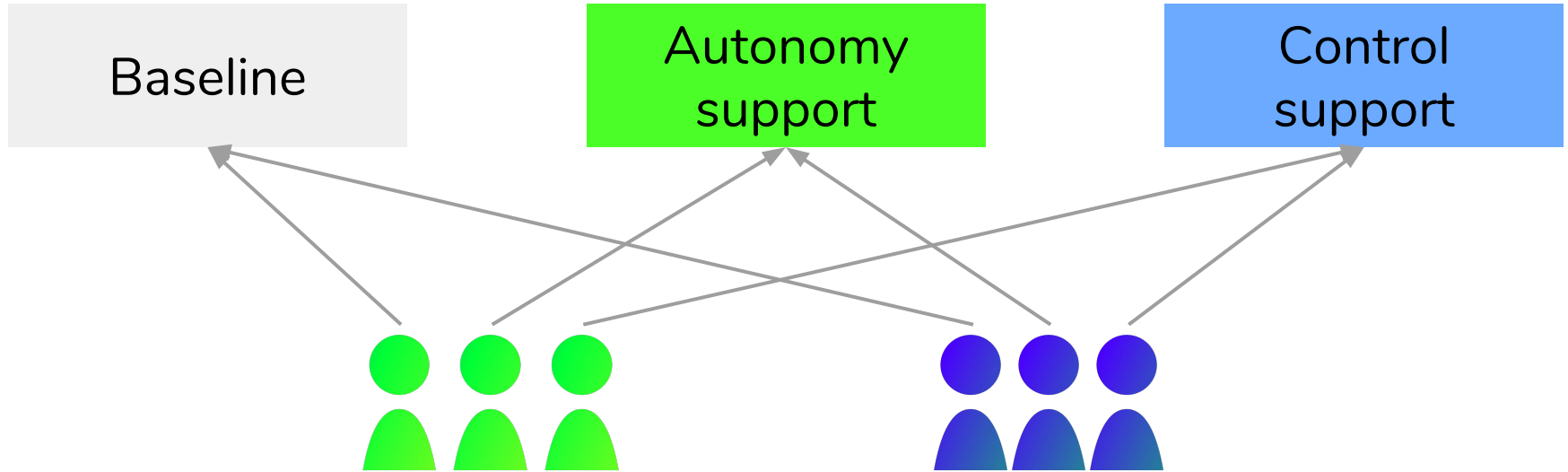
Control  
support

# Example for Different Motivation-supportive Messages

Baseline	Autonomy support	Control support
<div><div>&lt; NEW IDEA</div><p>What is your idea to make KAIST a better place? It could be about facilities, organization, social problems, ...</p><div><p>What's your idea in one sentence?</p><hr/></div><p>Describe your idea in a bit more detail</p><p>. .</p></div>	<div><div>&lt; NEW IDEA</div><p>What is your idea to make KAIST a better place? It could be about facilities, organization, social problems, ...</p><div><p><b>Let's have a real impact together!</b> Among all ideas submitted until April 12th, we will hand-pick three promising ideas, present them to the whole school, and follow up with concrete steps to support their implementation!</p></div><div><p>What's your idea in one sentence?</p><hr/></div></div>	<div><div>&lt; NEW IDEA</div><p>What is your idea to make KAIST a better place? It could be about facilities, organization, social problems, ...</p><div><p><b>Participation reward:</b> Among all contributors until April 12th, we will randomly select 10 members to win \$20.</p></div><div><p>What's your idea in one sentence?</p><hr/></div><p>Describe your idea in a bit more detail</p><p>. .</p></div>

3 different versions for “New Idea” screens.

# Treatment Conditions



## Personalization

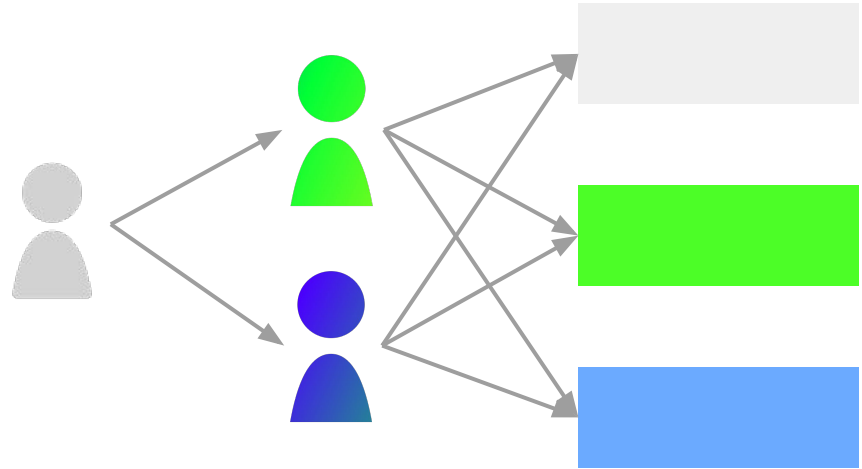
# Method

Open-call recruitment

Signup group assignment

Engagement measures

Post-survey



# Results

Users

120

Ideas

72

Comments

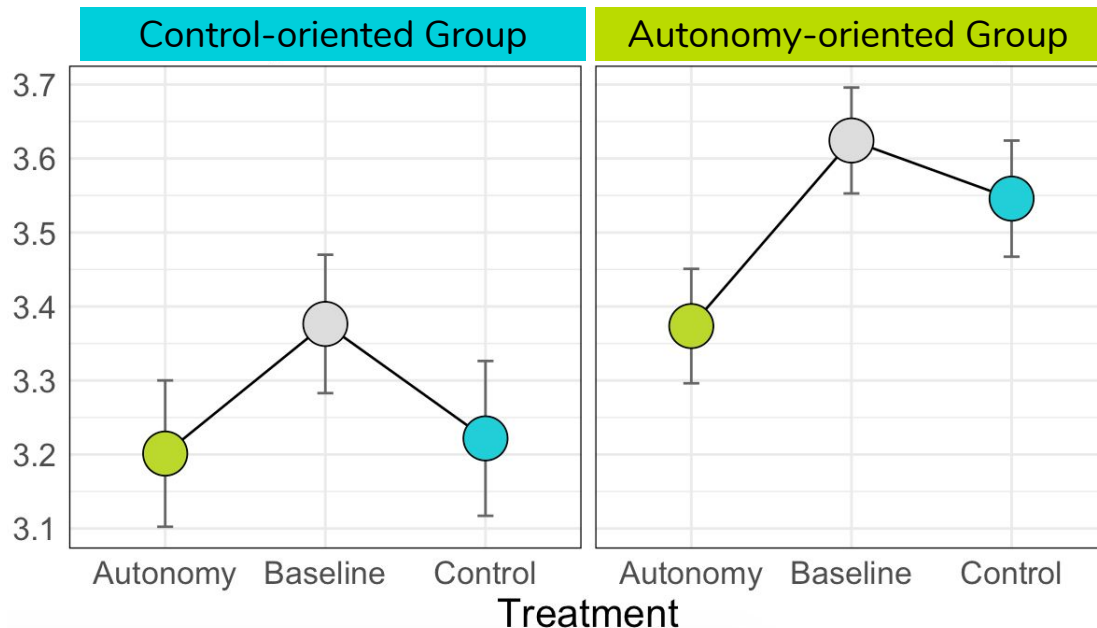
62

Likes

357

# No correlation between Treatment and Signup Group

Interaction count per user (N=114)



Least-squares means, GLM for Poisson distributed count data.

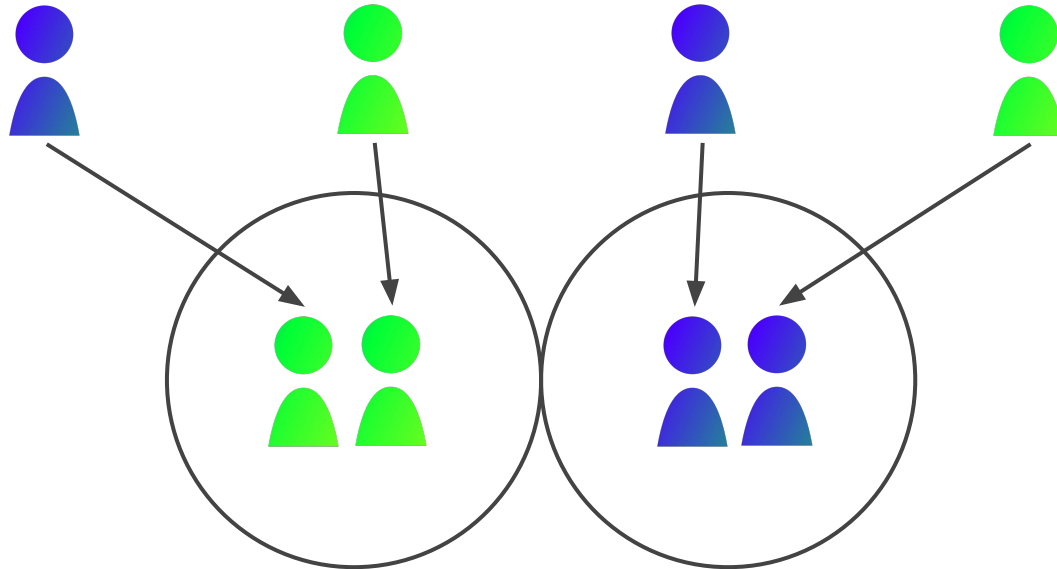


# Observations on Personalization

Using a limited number of questions to classify turned out to be inaccurate.

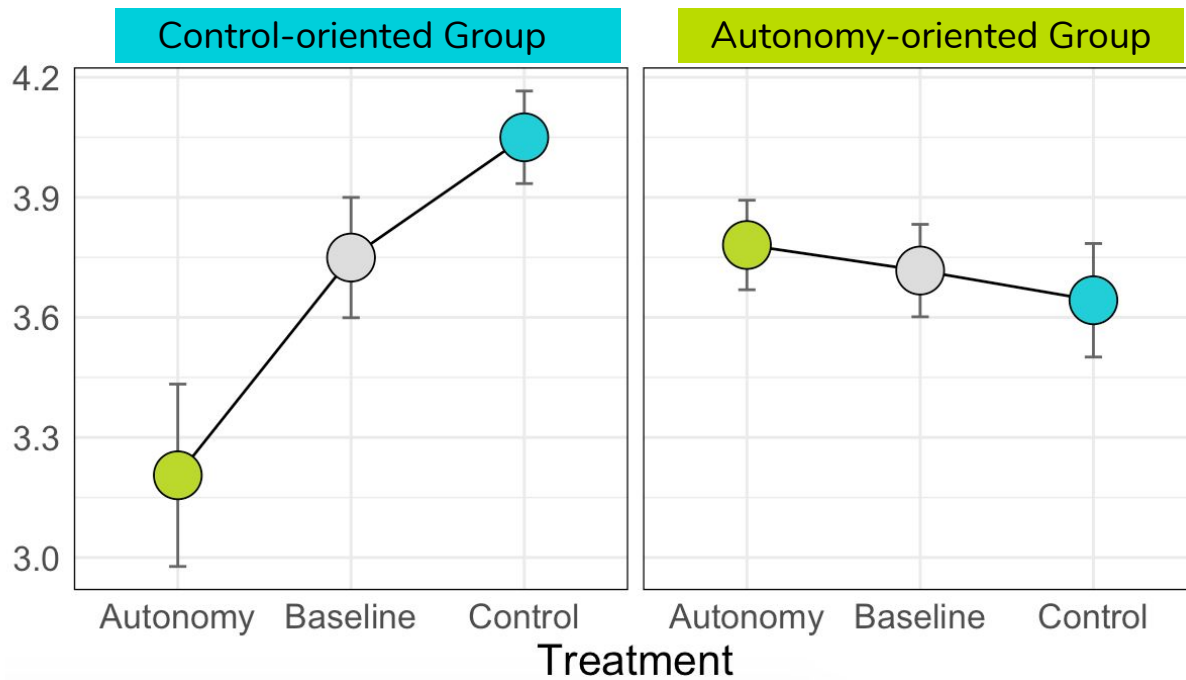
# Post-hoc classification

→ Re-classify users based on post-survey full questionnaires (kmeans clustering).



# Correlation between Treatment and Post-hoc Group

Interaction count per user (N=30)

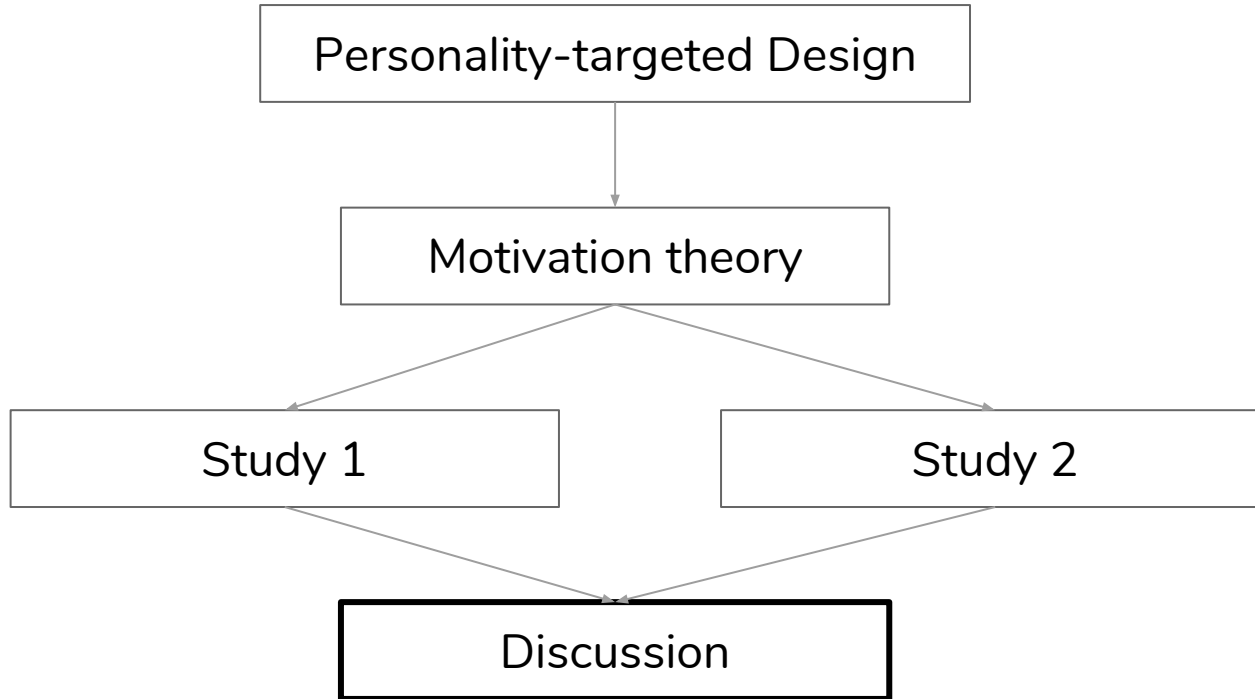


ANOVA for number of interactions  $p < 0.01$  for treatment, group, and interaction;  
Pair comparisons, Tukey method: left-hand side all  $p < 0.01$ , right-hand side n.s.

# Study 2 Limitations

Small N for post-survey

Homogenous population (mostly Korean students)



# Benefits and Challenges of Theory-based Design

SDT has proven to be a useful perspective for designing applications dealing with voluntary participation.

Translating theory to design is not an exact process.

# Possibility of Personalization

Results show personalization is possible,  
but need to improve automatic classification.

Trade-offs:

- explicit and implicit data elicitation

- potential adverse effects

- personalization and customization

# Challenges of Field Study about Motivation

Advertising study without influencing motivation

How to track diversified (offline) recruitment?



Let's move away from “one size fits all”  
by designing with diverse populations’  
motivations in mind.

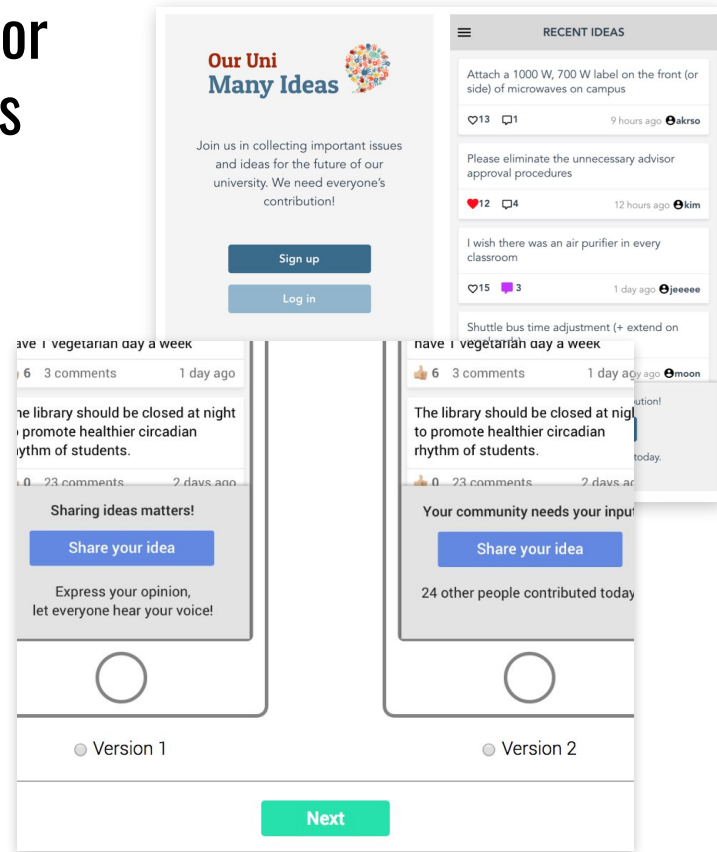
# Personalized Motivation-supportive Messages for Increasing Participation in Crowd-civic Systems

1. Survey: motivation orientation differences can explain individual preferences for different motivation-supportive designs.
2. Field study: some tangible effects on actual participation but surfaced tradeoffs.
3. Combination of studies can give a more complete picture.

Open-source app and survey code:  
<http://github.com/graup/manyideas>

Paul Grau

paul@graycoding.com  
Twitter: @graycoding



# References for slides

[Aitamurto 2016] Tanja Aitamurto and H       Landemore. Crowdsourced deliberation: The case of the law on offroad traffic in Finland. *Policy & Internet*, 8(2):174–196, 2016.

[Aitamurto 2017] Tanja Aitamurto and Jorge Saldivar. Motivating participation in crowdsourced policymaking: The interplay of epistemic and interactive aspects. *CSCW ’17*. ACM, 2017.

[Deci 1985] Edward L Deci and Richard M Ryan. The general causality orientations scale: Self-determination in personality. *Journal of research in personality*, 19(2):109–134, 1985.

[Grano 2008] Caterina Grano, Fabio Lucidi, Arnaldo Zelli, and Cristiano Violani. Motives and determinants of volunteering in older adults: An integrated model. *The International Journal of Aging and Human Development*, 67(4):305–326, 2008.

[Hsieh 2016] Gary Hsieh and Rafa   Kocielnik. You get who you pay for: The impact of incentives on participation bias. *CSCW ’16*. ACM, 2016.

[McInnis 2017] Brian McInnis, Alissa Centivany, Juho Kim, Marta Pob    , Karen Levy, and Gilly Leshed. Crowdsourcing law and policy: A design-thinking approach to crowd-civic systems. *CSCW ’17*. ACM, 2017.

[Ryan 2000] Richard M Ryan and Edward L Deci. Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary educational psychology*, 25(1):54–67, 2000.

[Zinnbauer 2015] Dieter Zinnbauer. Crowdsourced corruption reporting: What petri ed forests, street music, bath towels, and the taxman can tell us about the prospects for its future. *Policy & Internet*, 7(1):1–24, 2015.

# Appendix

# Qualitative feedback is aligned with expectation

## Controlled Orientation

Become a Contributor of the Month!

Share your idea

\$20 gift cards for Top 5 contributors.  
Announcement on official website.

**Preferred by 62%**

A gift card is **a great incentive** for someone to participate.

The **chance of winning** makes me more compelled to participate and try harder.

## Autonomous Orientation

Make our community a better place!

Share your idea

24 other people contributed today.  
Your ideas matter.

**14%**

It looks more **friendly**.

**Making things better** for everyone sounds like the best plan overall.

## Impersonal Orientation

Change may be beyond our control...

Share your idea

but there's a chance someone  
sees your idea and considers it.

**3%**

It doesn't try to make me feel **guilty** for not sharing an idea.

It's **honest**.

## Baseline

What's on your mind?

Share your idea

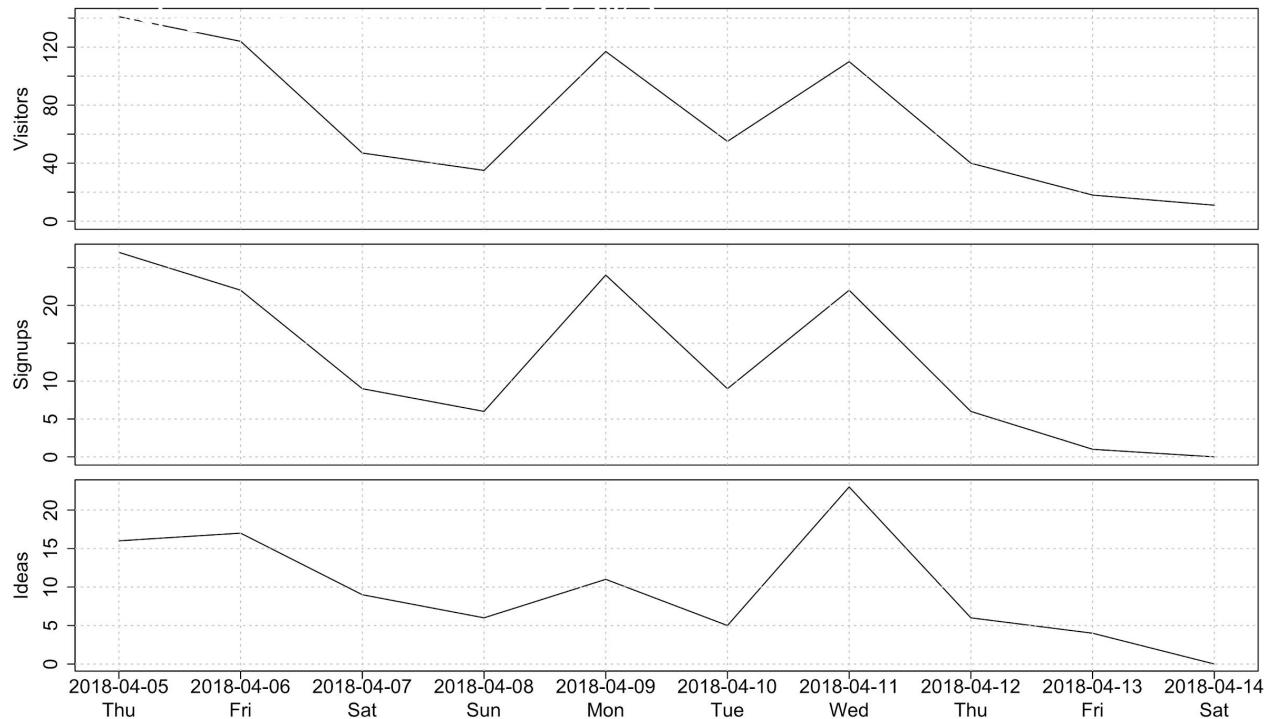
**7%**

It's very **simple** and it **doesn't insult** the user by talking down to them.

Having motivational quotes makes the entire program seem less **serious**.

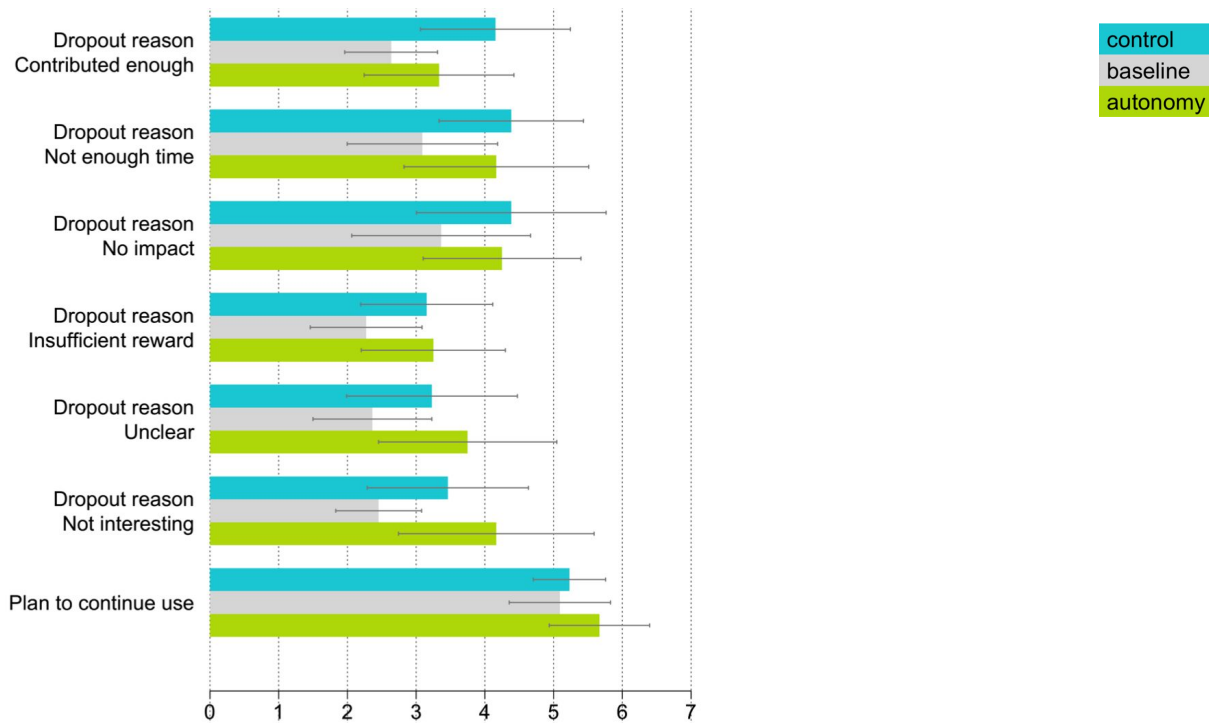
# Overall participation

8 days, 120 users, 72 ideas, 62 comments, 357 likes



# Detrimental Effects of Controlled Regulation

Post-survey data suggests additional effects.



# 카이스트 학식 메뉴 이것이 최선?

어떻게 해결하죠?

manyideas.org



위 URL을 방문하여  
여러분의 좋은 아이디어를 공유해주세요.

4월 12일까지 참여하고  
다양한 선물을 받아보세요!

카이스트 전산학부 KIXLAB에서 진행하는  
"Participation for Social Good"에 관한 연구 프로젝트입니다.

문의: grong@kaist.ac.kr



자리도 너도  
보이지 않는다  
#교분사석화

어떻게 해결하죠?

manyideas.org



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교양  
4개 신청  
0개 당첨 실화?

어떻게 해결하죠?

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한국 최고 공대  
인터넷 속도는...  
(ノT▽T)ノ

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